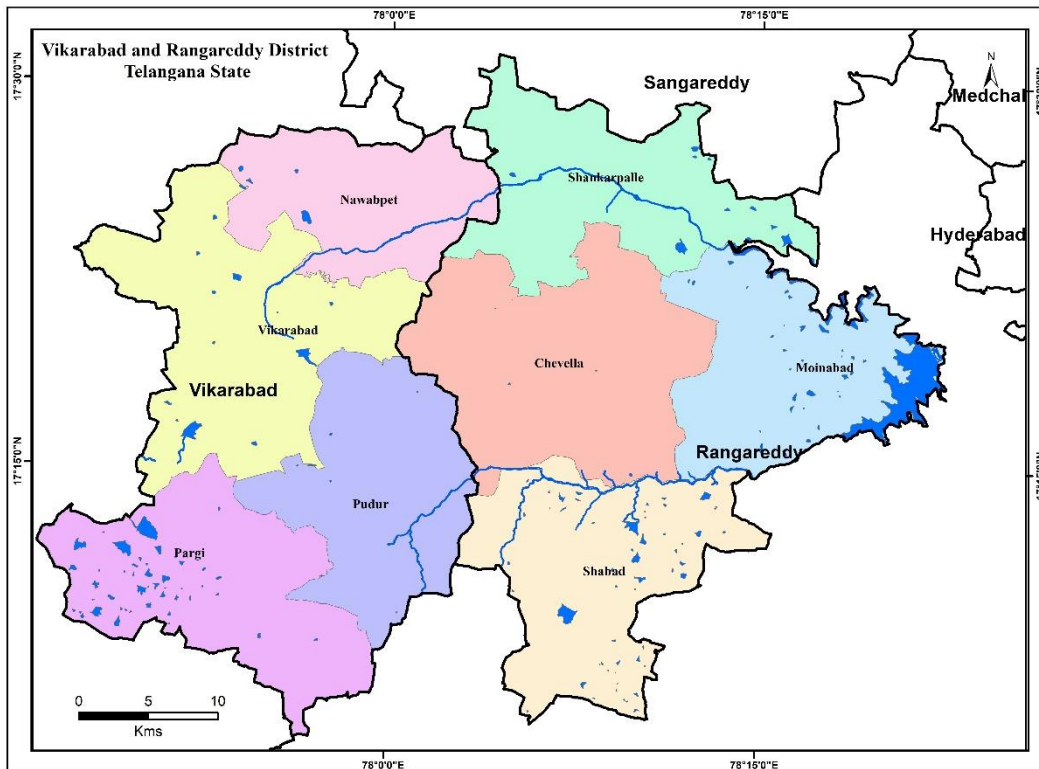




GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES
RIVER DEVELOPMENT & GANGA REJUVENATION
CENTRAL GROUND WATER BOARD

Inception Report on

**Detailed Study for protection of recharge areas in parts of
Rangareddy and Vikarabad Districts of Telangana State
Telangana under NAQUIM 2.0**



CGWB, SR, HYDERABAD

(AAP 2023-24)

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Of Rangareddy and Vikarabad Districts of Telangana State
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1.0 Introduction

The National Aquifer Mapping and Management programme (NAQUIM) was launched by CGWB with the objectives of delineating aquifers, characterizing aquifers and preparing aquifer management plans. National level mapping of Aquifers on 1:50,000 scale was considered sufficient for planning requirements up to block level. The important uses of Aquifer mapping at 1:50,000 scale include identification of suitable areas for ground water based supply to large urban agglomerations, determine sustainability of groundwater development, identification of aquifers capable of providing water supply during protracted drought periods, prioritization of aquifers for managed aquifer recharge, identification of aquifers and determination of their suitability for various purposes in regions where new urban centres or industrial hubs are likely to come up in future, planning of integrated ground water recharge schemes, issuing advisories to the state agencies on repercussions of continued development of groundwater in select areas, recommendations to state agencies in respect of areas that have prospects for ground water development etc. The findings of NAQUIM studies are being utilized by many agencies, especially the State government agencies involved in ground water management and water supply, but large scale implementation of its recommendations at ground level by the user agencies has been lacking. Keeping the above limitations in mind and considering the future requirements, NAQUIM 2.0 is now taken up.

The objectives of NAQUIM 2.0 studies are:

- i) providing information in higher granularity with a focus on increasing density of dynamic data like ground water level, ground water quality etc.
- ii) providing issue based scientific inputs for ground water management upto Panchayat level,
- iii) providing printed maps to the users
- iv) putting in place a strategy to ensure implementation of the recommended strategies.
- v) Involving state agencies in the studies for a sense of ownership.

This inception report is in accordance with the requirement of the NAQUIM 2.0 programme. It provides an overview of the studies to be taken-up and contains a description of the generation of a preliminary knowledge base, the detail work plan, methodologies, deliverables, list of activities, targets and deadlines and an estimate of the time allocation for involved personal in the study.

2.0 About Study Area:

In the commencement year (2023-2024) of NAQUIM 2.0 four blocks of Rangareddy district namely Chevella, Moinabad, Shankarpalle, Shabad and four blocks of Vikarabad District namely Nawabpet, Pudur, Pargi, Vikarabad have been taken for the study, to confront the challenges arise during NAQUIM 1.0. The total geographical area of study area is 1797 sq.km. The latitudinal extension of the study area is from 17°04'29"N to 17°31'8"N. The longitudinal extension of the study area is 77°47'8.80 E to 78°22'17 E. The study area is

falling under the toposheets No. 56 G/15, 56 G/16, 56 K/2, 56 K/3, 56 K/4, 56 K/7 and 56 K/8. The study area has a tropical climate with normal annual rainfall of 892 mm. Elevation varies from 100m to 550m (above MSL). Geomorphologically most of the study area is falling under Dissected plateaus, Pediment and Pediplain. Major channelfill deposits can be traced along the Musi River in Nawabpet, Shankarpalle, Pudur, Shabad and Moinabad blocks. The Study area is underlain by various geological formations from oldest Archaean granites and gneisses, Proterozoic Bhima series and the younger Deccan traps formations.

Table 1: Summary of Administrative Divisions of Study area

District	Name of Mandal	Area (sq.km)
Rangareddy	Chevella	277
Rangareddy	Moinabad	210
Rangareddy	Shabad	232
Rangareddy	Shankarpalle	211
Vikarabad	Nawabpet	159
Vikarabad	Pargi	227
Vikarabad	Pudur	207
Vikarabad	Vikarabad	275
	Total	1797

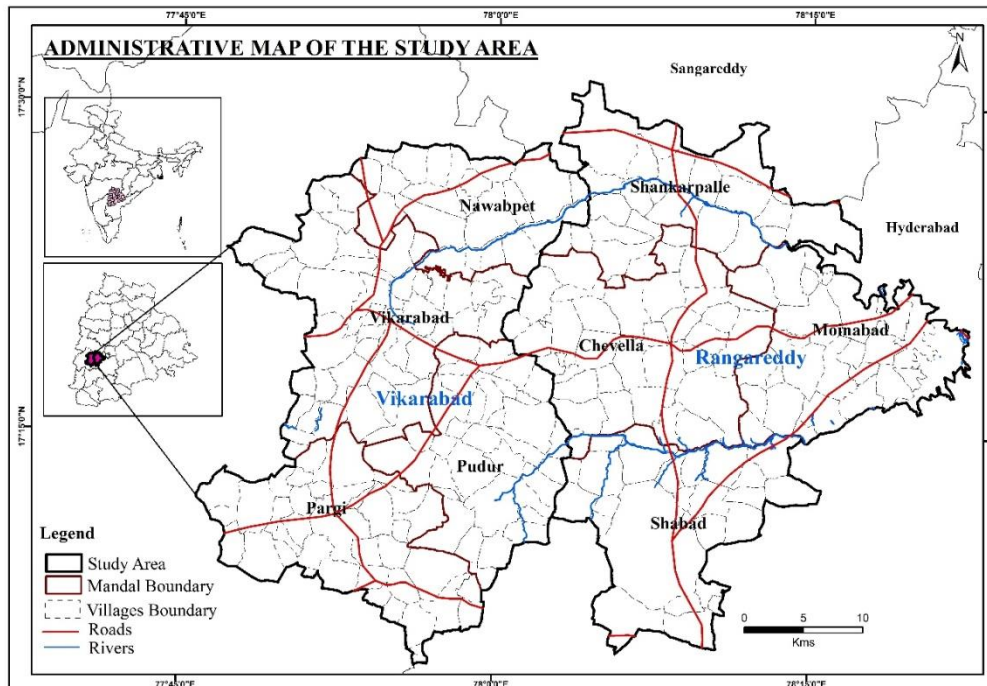


Fig:

Fig1:Location Map Study area

3.0 Priority types

NAQUIM 2.0 is designed to provide detailed information to support groundwater management decisions at ground level. Since the issues are different in different areas, the studies under NAQUIM 2.0 are proposed as issue specific and will be undertaken in prioritized focus areas. Broadly 11 Priority areas are identified based on ground water related issues and the present study deals with Other study area “Protection of Recharge areas of Musi River” category. The area is given by state government.

The detailed study is planned to cover following deliverable:

1. Aquifer Dispositions in the area
2. Aquifer-wise Ground water levels
3. Identification and protection of Recharge Areas
4. Estimation/Refinement of parameters used for resource assessment
5. Assessment of ground water resources
6. Ground Water Quality Management Interventions including demarcation of safer aquifers
7. Artificial Recharge Plan include number, pinpointed sites, cost, quantum of water harvested
8. Identification of potential aquifers for drinking water supply
9. A plan for drinking water source sustainability
10. Plan for Conjunctive use of surface water and ground water.
11. Other measures –Demand side interventions like crop diversification, micro irrigation etc

4.0 Previous Studies:

- Reappraisal Hydrogeological surveys in western parts of Rangareddy District Andhr Pradesh (January 1999) by A. Balachandran, Scientist-C, CGWB, SR, Hyderabad.
- Hydrogeological Frame work and Development prospect of Ranga Reddy district Andhra Pradesh (June 1999) by Shri G M Reddy Scientist D, CGWB SR, Hyderabad.
- Ground water Management studies in western part of Ranagereddy district A.P (2003-04) by M.V Gopal, Scientist-B, CGWB, SR, Hyderabad.
- Ground Water Information, Rangareddy district A.P (2007) by KDwaraknath, Scientist-B, CGWB, SR, Hyderabad.
- Ground Water Brochure, Ranga Reddy district A.P.(2013) by T. BharathBhushan, Scientist-B, SR, Hyderabad.
- Aquifer system of Andhra Pradesh (2013) by Dr. P N Rao, Scientist-D, CGWB, Southern Region Hyderabad.
- Aquifer Mapping and Management of Groundwater Resources in Rangareddy District, Telangana State(2022) by Smt. Caroline Louis, Scientist-B, SR, Hyderabad.
- Aquifer Mapping and Management of Groundwater Resources in Vikarabad District, Telangana State(2022) by Dr.Sudheer Kumar , Scientist-D, SR, Hyderabad.

Previous studies in study area revealed that the area has a history of water scarcity and prone to drought. Ground water in this area mainly restricted within weathered and fractured

granites, gneisses and basalts. In Basaltic terrain, vesicular basalt is the main aquifer. Broadly the aquifers classified in to two groups, namely aquifer-1, depth ranges from 0-30mbgl and aquifer-II varies from 30-200mbgl. As per NHS monitoring, the depth to water level ranges from 8-12mbgl and 2-5mbgl during pre and post monsoon respectively.

Table 2: General Aquifer Disposition & Parameter of the study area

Formation	Aquifer Depth ranges (mbgl)	Occurrence of fractures (mbgl)	Yield ranges (lps)	Sustainability
Weathered Zone	0-30	--		Potable
Vesicular Basalt/ Fractured granitic complex, Laterite	30-200	30-45, 70-100, 120-130 & 160-180	0.07-3.3	Potable
				Quality Issue (Fluoride)

Table 3: Observation details for some vital parameters.

Sl No	Parameter	Range Observed	No of Samples above Permissible limit	Highest Concentration/Value Recorded at		
				Village	Mandal	District
1	EC μ S/cm	170-2230	--	Vattiminapally	Nawabpet	Vikarabad
2	TDS mg/L	97-1310	Nil	Vattiminapally	Nawabpet	Vikarabad
3	Fluoride mg/L	01.1-1.53	01	Rapole	Pargi	Vikarabad
4	Nitrate mg/L	1.44-130.8	14	Chevella-PZ	Chevella	Ranga Reddy
5	Uranium μ g/L	0.1-62.4	1	SultanpoorThanda	Pargi	Vikarabad

Major issue in study area:

- Peri-urban areas shows shrinkage of surface water bodies and feeder channels
- Deeper water levels noticed in western part particularly in Deccan basalts
- Anthropogenic pollution mainly in peri-urban areas
- Geogenic contamination Granitic area
- Groundwater scarcity for drinking water
- Poor maintenance of existing recharge structure

5.0 Objective of the Study:

- Providing information in higher granularity with a focus on increasing density of dynamic data like ground water level and ground water quality for each aquifer.
- Improving the data base of aquifers upto 200m in 1: 10,000 scale.
- Water budgeting along with source sustainability measures specifically for each village.
- Improvising issue based scientific inputs for ground water management up to village level.
- Providing printed maps to the users
- Putting in place a strategy to ensure implementation of the recommended strategies. Involving state agencies in the studies for a sense of ownership.
- Site –specific Aquifer Management Interventions and scope for Managed Aquifer Recharge
- Cost – benefit ratio to be included based on existing standard norms of respective states.
- Protection of Ground water recharge areas from contamination.
- Identify potential aquifers for drinking water supply and sites for new sources.
- Potential sites for irrigation bore wells.
- Develop Groundwater participatory approach at grass root level for effective and sustainable groundwater management
- Providing financial security to the farming community by making them self-reliant in water sector.

6.0 Existing Data and Data gap Analysis

Data Availability of GW Level& Quality: Currently CGWB has established 31 numbers of monitoring and sampling stations in the study area. As the NAQUIM 2.0 will be carried out at a scale of 1:10,000, the study needs higher data density related to ground water level and quality with good spatial and depth wise distribution.

In order to establish new monitoring and sampling key-wells, a grid of 1.7'× 1.7'(3.14 Km× 3.14Km=9.87 Sq.km) for the study area has suggested. At least 3 samples for village or 1 for every grid whichever is higher,depth to water level and ground water samples will be collected from the key-wells.

Table 4: Details of exiting monitoring wells and proposed key well

S. No	District Name	Mandal Name	Area (Sq.km)	No of Village	Monitoring of CGWB SGWD	Proposed for No of Key wells & water Quality
1	Rangareddy	Chevella	276.59	36	7	64
2	Rangareddy	Moinabad	210.05	27	5	49
3	Rangareddy	Shabad	232.08	25	7	46
4	Rangareddy	Shankarpalle	211.13	25	6	45
5	Vikarabad	Nawabpet	158.86	22	3	39
6	Vikarabad	Pargi	226.84	37	8	63
7	Vikarabad	Pudur	206.65	34	10	56
8	Vikarabad	Vikarabad	275.10	38	6	68
		Total	1797.35	244	52	430

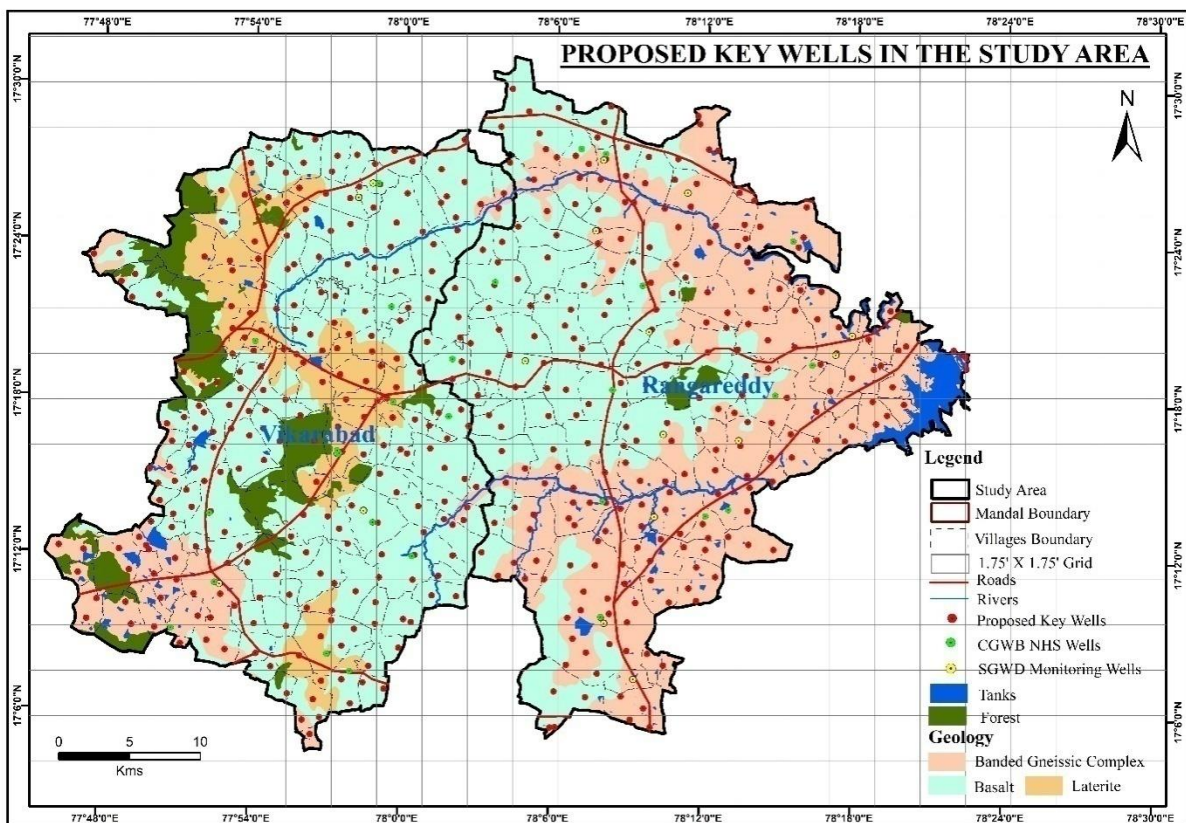


Fig2: Proposed Key wells for water level monitoring and Quality .

Data Availability of Exploration: The available CGWB in-house Exploration data in different blocks along with the toposheet No.s within the study area have been compiled and tabulated. The data insufficiency within the study area is thereby identified and given for recommendations for grid of 5' × 5' (9.25Km × 9.25Km=85.56 Sq.Km).

Table 5 : Details of existing Exploratory wells and Proposed exploratory wells

S.No	District Name	Mandal Name	Area(Sq.km)	Existing Exploratory Wells	Proposed Exploratory Wells
1	Rangareddy	Chevella	276.59	2	1
2	Rangareddy	Moinabad	210.05	1	2
3	Rangareddy	Shabad	232.08	2	2
4	Rangareddy	Shankarpalle	211.13	1	3
5	Vikarabad	Nawabpet	158.86	1	1
6	Vikarabad	Pargi	226.84	5	0
7	Vikarabad	Pudur	206.65	3	1
8	Vikarabad	Vikarabad	275.10	1	2
		Total	1797.35	16	12

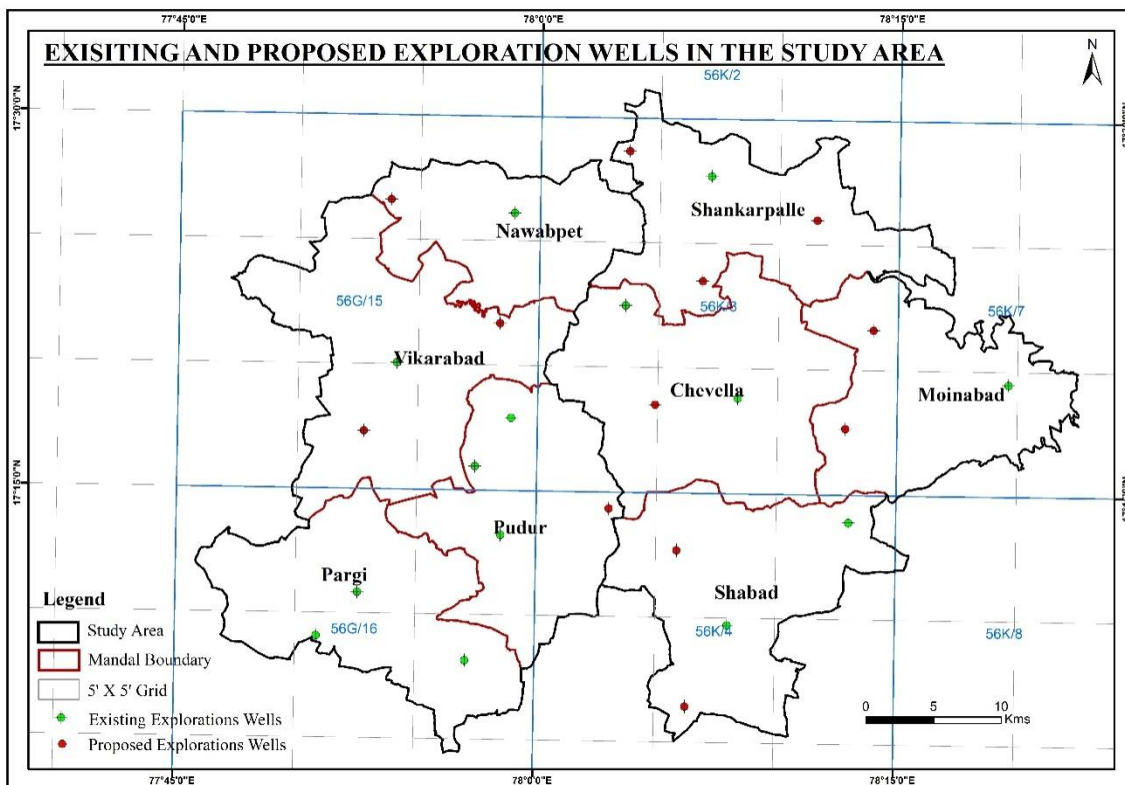


Fig3: Existing and proposed EW in the study area.

Data Availability of VES/TEM: The available CGWB in-house VES/TEM data in different blocks within the study area have been compiled. The data insufficiency within the study area is thereby identified and given for recommendations for grid of 2.75'×2.75' (5.0Km ×5.0Km=25Sq.Km).

Table 6 : Details of existing VES/TEM and Proposed VES/TEM

S.No	District Name	Mandal Name	Area(Sq.km)	Existing VES/TEM	Proposed VES/TEM
1	Rangareddy	Chevella	276.59	9	9
2	Rangareddy	Moinabad	210.05	9	7
3	Rangareddy	Shabad	232.08	5	12
4	Rangareddy	Shankarpalle	211.13	11	5
5	Vikarabad	Nawabpet	158.86	7	7
6	Vikarabad	Pargi	226.84	6	10
7	Vikarabad	Pudur	206.65	9	10
8	Vikarabad	Vikarabad	275.10	21	7
		Total	1797.35	77	67

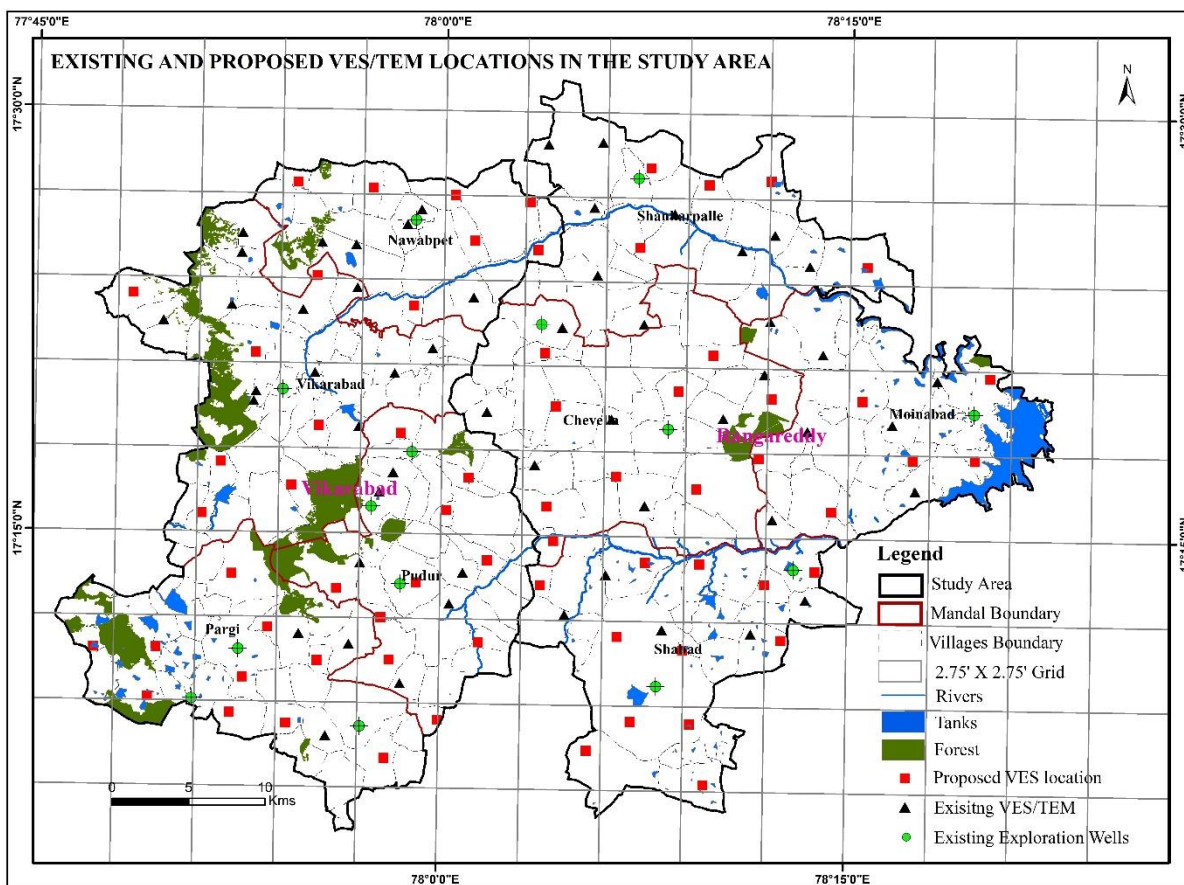


Fig4: Existing and proposed VES/TEM in the study area.

Soil Infiltration/ pumping test:

As per the existing database, no infiltration test has been carried out. Thus in the study 10 soil infiltration test are proposed.

7.0 Month-wise activity plan

Period	Assignments to be carried out
4th week of April	<ul style="list-style-type: none">• Base map Preparation• Preparation of the Inception Report
4 th week of April to 3 rd week of May	<ul style="list-style-type: none">• Field Data Collection (Pre-Monsoon)• Sample Surveys and User Feedback
June to October	<ul style="list-style-type: none">• Data Analysis and Interpretation• Workshops and mid-term review by NLEC
October to December	<ul style="list-style-type: none">• Field Data Collection (Post Monsoon)• Sample Surveys and User Feedback
December to January	<ul style="list-style-type: none">• Data Analysis and Draft Report Preparation• Other ongoing field activities
January to February	<ul style="list-style-type: none">• Field truthing of Management plan & RWH & AR Plan• Final Stage field visit for various field data collection & generation based on the requirement (data gap filling) as observed during draft report preparation
February to March	<ul style="list-style-type: none">• Modification of draft report with additional information collected by the above mentioned field checks• Scrutiny and Finalisation of the Report
March	<ul style="list-style-type: none">• Sharing of the reports with CHQ, SGWCC and DM/DC

8.0 : Composition of the team.

Composition of the Team:		
1	Team Leader	Sh.T.Madhav, Scientist-C
2	Hydrogeologist-1	Sh. M.S.Goutam, Scientist-B
3	Hydrogeologist-2	Sh. S.K Sahoo, Assistant Hydrogeologist Sh.KolliRambabu,Assistant Hydrogeologist
4	Geophysicist	Sh.T.Venkatgiri, Scientist-B
5	Chemist	Sh. S.K Ratha, Scientist-B
6	Expert (Engineer)	

9.0 Team-member-wise responsibilities

Role	Responsibilities
Team Lead	<ul style="list-style-type: none"> - 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.
Expert (Hydrogeology)-1	<ul style="list-style-type: none"> - 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
Expert (Hydrogeology)-2	<ul style="list-style-type: none"> - 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
Expert (Geophysics)	<ul style="list-style-type: none"> - Field Geophysical Surveys - Interpretation of field data - Entering data in database (WIMS) - Integration with existing geophysical and lithology data - Preparation of inferred lithologs

	<ul style="list-style-type: none"> - 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
Expert (Hydro chemistry)	<ul style="list-style-type: none"> - 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

