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GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION
CENTRAL GROUND WATER BOARD

PLAN ON
ARTIFICIAL RECHARGE TO GROUNDWATER AND
WATER CONSERVATION IN
CHINNAKODUR MANDAL, MEDAK DISTRICT,
TELANGANA STATE

SOUTHERN REGION
HYDERABAD
AUGUST- 2016

PLAN ON
ARTIFICIAL RECHARGE TO GROUNDWATER AND
WATER CONSERVATION IN
CHINNAKODUR MANDAL, MEDAK DISTRICT,
TELANGANA STATE

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AT A GLANCE

Name of the Mandal	ChinnaKodur
District	Medak
State	Telangana
Total Area(sq. km)	266.79
Area suitable for Artificial Recharge (sq.km.)	244.79
Latitude and Longitude	18.092840 to 18.251080 & 78.790620 to 79.015970
Average Annual Rainfall (mm)	705
Geology	BGC
Average Depth To Water Level (Decadal) (Pre Monsoon)	15.40
Average Depth To Water Level (Decadal) (Post Monsoon)	10.33
Ground Water Resources (2011)	
Annual Replenishable Ground Water Resources (MCM/yr)	35.67
Net Annual Ground Water Availability(MCM)/yr	32.10
Net Annual Ground Water Draft(MCM)/yr	47.67
Projected Demand for Domestic and Industrial Use(MCM)/yr	0.42
Stage of Ground Water Development (%)	149
Surface runoff available (MCM)/yr	10.90
Total Storage Created in the Mandal by Various Agencies (MCM)/yr	2.54
Artificial Recharge/Conservation Measures	
Recharge Structures Proposed (No.s)	Farm ponds-520, Recharge Shafts-68
Improving Water use Efficiency	Micro Irrigation System -2600 ha
Tentative Total Cost in Lakhs (Rs.)	1831.305 Lakhs
Expected Recharge/Savings (MCM)/yr	8.615

1. INTRODUCTION

ChinnaKodur Mandal is one of the over-exploited Mandals in Medak district, Telangana State, which is economically backward and chronically drought affected. The Mandal has 23 inhabited villages and with 26 gram Panchayats.

2. LOCATION

The Mandal lies between north latitudes 18.092840 to 18.251080 and between east longitudes 78.790620 to 79.015970. The Mandal occupies the northeast part of the Medak district and is bounded on the north by Karimnagar district, on the east by Karimnagar district, on the south by Nanganur Mandal and west by Siddipet Mandal. (Fig.1) The geographical area of the Mandal is 266.79 sq.km.

3. PHYSIOGRAPHY AND DRAINAGE:

The area is drained by streams, falling in Manneru sub-basin of Godavari basin. The streams are mostly ephemeral in nature. The drainage pattern is dendritic, rectangular to sub rectangular due to the influence of geological structures. (Fig.2)

4. RAINFALL

The average rainfall in the Mandal is 705 mm. The rainfall during the South-west monsoon season i.e., June-September accounts for about 85% of the total rainfall.

5. LAND USE PATTERN

Out of the total geographical area of 266.79 sq.km, the area covered by forest is 8.05 sq.km and the net area sown is 130.80 sq.km. Barren and uncultivable land is 19.54 sq.km. The land for non agricultural use accounts for 11.16 sq.km. (Fig.3)

6. HYDROGEOLOGY

The area is underlain by granitic gneisses of Archaean age (Fig.4). Ground water occurs in weathered and fractured zones under water table and semi-confined conditions. The weathered zone thickness as per the GEC report is 30 m. The weathered zone has been extensively tapped by dug and dug cum bore wells up to 30 m bgl depth, which are mostly dry now. Ground water occurs in the fractured granites down to a depth of 200 m bgl. However, the potential fractures are encountered between 50-100 m bgl. The cumulative yield varies from 2-5 lps.

7. GROUND WATER LEVEL SCENARIO

The depth to water level during pre and post-monsoon varies from 5 to 20 m bgl. The average depth to water level (decadal) during pre and post monsoon is 15.4 and 10.33 m bgl respectively. The depth to water levels maps for pre and post monsoon period (2014) are shown in (Fig. 5 & 6 respectively). The decadal mean water level trend during post monsoon is depicted in the Fig-7.

8. DYNAMIC GROUND WATER RESOURCES

The Ground water availability, Utilization and stage of Development in ChinnaKodur Mandal, Medak District is given in the Table-1.

Table-1 Ground water resources of Chinna Kodur Mandal, Medak District.

Annual Replenishable Ground water resources (MCM)	35.67
Net Annual Ground Water Availability(MCM)/yr	32.10
Net Annual Ground Water Draft(MCM)/yr	47.67
Projected Demand for Domestic and Industrial use up to 2025. (MCM)	0.42
Stage of Ground water development (%).	149
Whether notified or not with year of notification.	No

9. NEED FOR ARTIFICIAL RECHARGE AND CONSERVATION METHODS

The ground water withdrawal is more than the recharge with a stage of development above hundred percent. The long term water level trend mostly shows a declining trend and the water levels are very deep ranging upto 20mbgl. The sustainability of bore wells has become questionable as many bore wells are either drying up or have recorded reduced yields. There is no surface water irrigation facility in the area. All these factors indicate that there is an urgent need for artificial recharge and water conservation in the Mandal.

10. JUSTIFICATION OF THE ARTIFICIAL RECHARGE PROJECT

Chinnakodur Mandal falls under high stage of ground water development i.e., 149 % and with sufficient amount of uncommitted surface runoff. The area is completely dependent on ground water for domestic, industrial and irrigation purposes. During the monsoons runoff quickly flows out of the area without natural recharge to ground water. It is necessary to apply artificial recharge techniques to allow more and more recharge through check dams, PTs, MPTs, farm ponds, recharge shafts to cope up with the withdrawal pattern and also to improve ground water situation through various interventions including on farm activities and micro irrigation systems (Sprinkler-Drip-HDPE).

11. AVAILABILITY OF SURPLUS, SURFACE WATER FOR ARTIFICIAL RECAHRGE OR CONSERVATION

The runoff was calculated by taking into account of normal rainfall of the mandal and corresponding runoff yield from Strangers table. The existing storage created by various artificial recharge structures constructed by the State Government, if any, was deducted for calculating the runoff yield to recommend new AR structures.

Total Geographical area (Sq.kms)	266.79
Hilly Area (Sq.kms)	22
Area suitable for Artificial Recharge (sq.km.)	244.79
Runoff Yield in MCM/yr.	10.90
Existing No. of Check Dams	212
Storage created MCM/yr.	1.5
Existing No. of Percolation Tanks	146
Storage created MCM/yr.	1.03
Total Existing Storage Created	2.54

12. FEASIBLE ARTIFICIAL RECHARGE STRUCTURES

Since the mandal is categorized as over exploited, there is an immediate need for improving ground water scenario and to ensure sustainability of ground water sources. It is also suggested to create additional storage capacity of surface water bodies which would result in supplementing irrigation thereby reducing the ground water draft. The runoff available in the mandal has been assessed as 8.36 MCM/yr, which could be considered for further planning of artificial recharge. However, the number of artificial recharge structures feasible has been recommended in areas, by considering the utilizable yield, number of existing structures, land use, drainage pattern and also where the post monsoon water levels (decadal mean) are more than 5 m bgl., and or decadal trends are either falling or showing insignificant raising trend.

A). Recharge Shaft

The existing check dams and percolation tanks lose their storage capacity as well as recharge capacity due to siltation. Hence, Recharge shafts are recommended in the existing Check dams and Percolation tanks to enhance the ground water recharge. During the heavy downpours, there will be sufficient accumulation of runoff, which can also effectively be utilized for recharge by constructing recharge shafts. Hence, it is proposed to construct 59 and 9 recharge shafts of 165 mm dia with 30 m depth in the existing check dams and percolation tanks respectively.

B). Farm Pond

A farm pond is a large dug out in the earth, usually square or rectangular in shape, which harvests rain water and stores it for future use. It has an inlet to regulate inflow and an outlet to discharge excess water. The pond is surrounded by a small bund, which prevents erosion on the banks of the pond. The size and depth depend on the amount of land available; the type of soil water from the farm pond is conveyed to the fields manually, by pumping, or by both methods.

Advantages of Farm Ponds

- They provide water to start growing crops, without waiting for rain to fall.

- They provide irrigation water during dry spells between rainfalls. This increases the yield, the number of crops in one year, and the diversity of crops that can be grown.
- Bunds can be used to raise vegetables and fruit trees, thus supplying the farm household with an additional source of income and of nutritious food.
- Farmers are able to apply adequate farm inputs and perform farming operations at the appropriate time, thus increasing their productivity and their confidence in farming.
- They check soil erosion and minimize siltation of waterways and reservoirs.
- They supplies water for domestic purposes and livestock.
- They promote fish rearing.
- They recharge the ground water.
- They improve drainage.
- The excavated earth has a very high value and can be used to enrich soil in the fields, levelling land, and constructing farm roads.

As per the Land use classification, majority of the area is covered by the agricultural field. Hence, it is proposed to construct 520 farm ponds in 26 villages of the Mandal @ 20 farm ponds in each village.

C). Micro Irrigation System (Sprinkler /drip/HDPE pipes)

Micro irrigation is defined as the frequent application of small quantities of water directly above and below the soil surface; usually as discrete drops, continuous drops or tiny streams through emitters placed along a water delivery line.

In flood/furrow irrigation method more than 50% of applied water is wasted through seepage to deeper level, localized inundation causes loss through evaporation and it leaches out the nutrients from the plant. While through drip & sprinkler irrigation wastages of irrigational water could be minimized. The studies on different crops, has revealed that irrigation water is saved drastically. The conveyance losses (mainly seepage & evaporation) can be saved up to 25 to 40% through utilization of HDPE pipes. Initially the scheme is proposed to be implemented in worst affected areas showing deepest water levels and significant declining trends. It is proposed to take up micro irrigation system in 2600 ha @ 100 ha per village.

13. TENTATIVE COST ESTIMATES (CHINNAKODUR MANDAL)

S.No.	Feasible Artificial Recharge & Water Conservation structures/	No. of Structures/ Quantity	Total Volume (MCM)	Tentative unit cost (in Rs lakh)	Total tentative cost (in Rs Lakh)	Expected Annual GW recharge/savings (MCM)
1	Proposed Masonry Check dams Crest Length -10-15 m, Height-1-2 m) (0.007 MCM*4 fillings)	0	0	5	0	0
2	Recharge shaft in Check dam (50% of the existing Check dams)	59	0.649	0.5	29.5	0.649
3	Proposed Percolation Tanks (100*100*2.5)* 4 fillings)	0	0	15	0	0
4	Renovation Desilting, Repairs and installation of Recharge Shafts in existing PTS (50% of the existing PTS)	9	0.099	1	9	0.099
5	Proposed Farm Pond (6 filling) 5*5*1.5 dimension @ 20 farm ponds per each village	520	0.07488	0.25	130	0.067392
6	Proposed Sprinkler/drip/HDPE pipes for 100 ha in each village	2600		0.6	1560	7.8
7	Proposed Piezometers up to 50 mbgl @ one PZ per Village	26	0	0.6	15.6	0
8 (i)	Total (No. of AR Structures)	614	0.82		184.1	0.815
8 (ii)	Total (ha)	2600			1560	7.8
	Total (8(i) + 8 (ii))				1744.1	8.615
9	Impact Assessment & O & M -5 % of Total cost of the Scheme				87.205	
	Grand Total				1831.305	

*(Expected annual GW Recharge/Savings MCM - CDS& PTS: 75%, Farm ponds - 90%, Sprinklers-50%, Recharge shafts in existing CDS and PTS-100%)

Note: The type, number and cost of structure may vary according to site, after the ground truth verification.

14. TIME SCHEDULE

Steps	Quarters							
	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th
Identification of line department/implementing agency and preparation of DPR								
Approval of Scheme and releases of sanction of funds								
Implementation of ARS								

Phase = one quarter or 3 months or equivalent to financial quarter

A). Operation and Maintenance

In all projects impact assessment has to be carried out to ensure that project is economically viable, socially equitable and environmentally sustainable by inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse. Accordingly it is proposed to have impact assessment as well as operation & Maintenance at the rate of 5% of the total cost of the project for 5 years from the completion of artificial recharge project.

B). Expected Benefits

The benefits of the project are:

1. The implementation of the project would result in additional recharge/Ground water savings to the tune of 8.615 MCM.
2. Ground water recharge will help in arresting the rapid decline in ground water resources and will also ensure improvement in quality of ground water by dilution.
3. Proposed structures and measures will also enhance the ground water potential and would ensure sustainability of ground water resources. It is estimated that the stage of ground water development may likely to be reduced from the present 149% to 117% (32%)
4. It will also help in controlling soil erosion.

Acknowledgements

The inputs with regard to the Utilizable Yield, existing and proposed Artificial Recharge Structures have been provided by the Director, State Ground Water Department, Government of Telangana. The same is duly acknowledged.

EXISTING ARTIFICIAL RECHARGE STRUCTURES
CHINNAKODUR MANDAL, MEDAK DISTRICT, TELANGANA

Sno	Name_Vill	Longitude	Latitude	Name_ARS
1	Chinnakodur	78.9112	18.1482	BW Recharge
2	Chinnakodur	78.8961	18.1832	BW Recharge
3	Chinnakodur	78.9267	18.1995	BW Recharge
4	Chinnakodur	78.8924	18.2096	BW Recharge
5	Chinnakodur	78.9099	18.1960	BW Recharge
6	Chinnakodur	78.9215	18.1982	BW Recharge
7	Chinnakodur	78.8957	18.1667	BW Recharge
8	Chinnakodur	78.8856	18.1777	BW Recharge
9	Chinnakodur	78.8958	18.1668	BW Recharge
10	Chinnakodur	78.9187	18.1559	BW Recharge
11	Chinnakodur	78.8731	18.2018	BW Recharge
12	Chinnakodur	78.8840	18.2032	BW Recharge
13	Chinnakodur	78.9244	18.1646	BW Recharge
14	Chinnakodur	78.8815	18.1708	BW Recharge
15	Chinnakodur	78.9146	18.1543	BW Recharge
16	Chinnakodur	78.9187	18.1482	BW Recharge
17	Chinnakodur	78.9187	18.1483	BW Recharge
18	Chinnakodur	78.9198	18.1516	BW Recharge
19	Chinnakodur	78.8947	18.1758	BW Recharge
20	Chinnakodur	78.9050	18.1528	BW Recharge
21	Chinnakodur	78.8974	18.1846	BW Recharge
22	Chinnakodur	78.8906	18.1877	BW Recharge
23	Chinnakodur	78.8963	18.1759	BW Recharge
24	Chinnakodur	78.9123	18.2067	BW Recharge
25	Chinnakodur	78.9400	18.1725	BW Recharge
26	Chinnakodur	78.9451	18.1735	BW Recharge
27	Chinnakodur	78.9043	18.1792	BW Recharge
28	Chinnakodur	78.9028	18.1611	BW Recharge
29	Chinnakodur	78.9099	18.1571	BW Recharge
30	Chinnakodur	78.9597	18.1764	BW Recharge
31	Chinnakodur	78.9556	18.1847	BW Recharge
32	Chinnakodur	78.9139	18.1764	BW Recharge
33	Chinnakodur	78.9097	18.1681	BW Recharge
34	Chinnakodur	78.9458	18.1819	BW Recharge
35	Chinnakodur	78.9444	18.1708	BW Recharge

36	Chinnakodur	78.9458	18.1556	BW Recharge
37	Chinnakodur	78.9056	18.1847	BW Recharge
38	Chinnakodur	78.9333	18.1764	BW Recharge
39	Chinnakodur	78.9208	18.1847	BW Recharge
40	Chinnakodur	78.9417	18.1792	BW Recharge
41	Chinnakodur	78.9056	18.1764	BW Recharge
42	Chinnakodur	78.9431	18.1792	BW Recharge
43	Chinnakodur	78.9139	18.1625	BW Recharge
44	Chinnakodur	78.9431	18.1556	BW Recharge
45	Chinnakodur	78.9458	18.1736	BW Recharge
46	Chinnakodur	78.9542	18.1736	BW Recharge
47	Chinnakodur	78.9097	18.1847	BW Recharge
48	Chinnakodur	78.9417	18.1778	BW Recharge
49	Chinnakodur	78.9556	18.1847	BW Recharge
50	Chinnakodur	78.9083	18.1639	BW Recharge
51	Chinnakodur	78.9028	18.1556	BW Recharge
52	Chinnakodur	78.9444	18.1639	BW Recharge
53	Chinnakodur	78.9458	18.1764	BW Recharge
54	Chinnakodur	78.9444	18.1847	BW Recharge
55	Chinnakodur	78.9446	18.1724	BW Recharge
56	Chinnakodur	78.9444	18.1847	BW Recharge
57	Chinnakodur	78.9028	18.1667	BW Recharge
58	Chinnakodur	78.9367	18.1736	BW Recharge
59	Chinnakodur	78.9403	18.1792	BW Recharge
60	Chinnakodur	78.9458	18.1819	BW Recharge
61	Chinnakodur	78.9514	18.1708	BW Recharge
62	Chinnakodur	78.9431	18.1750	BW Recharge
63	Chinnakodur	78.9514	18.1736	BW Recharge
64	Chinnakodur	78.9450	18.1737	BW Recharge
65	Chinnakodur	78.9451	18.1701	BW Recharge
66	Chinnakodur	78.9368	18.1701	BW Recharge
67	Chinnakodur	78.8064	18.1712	BW Recharge
68	Chinnakodur	78.9398	18.1701	BW Recharge
69	Chinnakodur	78.7573	18.1702	BW Recharge
70	Chinnakodur	78.9368	18.1701	BW Recharge
71	Chinnakodur	78.9368	18.1706	BW Recharge
72	Chinnakodur	78.9368	18.1711	BW Recharge
73	Chinnakodur	78.9451	18.1702	BW Recharge
74	Chinnakodur	78.9368	18.1709	BW Recharge

75	Chinnakodur	78.4237	18.1709	BW Recharge
76	Chinnakodur	78.9398	18.1702	BW Recharge
77	Chinnakodur	78.9399	18.1709	BW Recharge
78	Chinnakodur	78.7614	18.2540	BW Recharge
79	Chinnakodur	78.7545	18.2043	BW Recharge
80	Chinnakodur	78.9146	18.2479	BW Recharge
81	Chinnakodur	78.7066	18.2541	BW Recharge
82	Chinnakodur	78.6979	18.2152	BW Recharge
83	Peddakodur	78.8873	18.1588	BW Recharge
84	Peddakodur	78.8708	18.1597	BW Recharge
85	Peddakodur	78.8694	18.1542	BW Recharge
86	Peddakodur	78.8542	18.1617	BW Recharge
87	Ibrahimnagar	78.8782	18.2541	BW Recharge
88	Ibrahimnagar	78.7143	18.2377	BW Recharge
89	Ibrahimnagar	78.8618	18.2476	BW Recharge
90	Ibrahimnagar	78.8618	18.2043	BW Recharge
91	Ibrahimnagar	78.7143	18.2040	BW Recharge
92	Ibrahimnagar	78.7143	18.2040	BW Recharge
93	Ibrahimnagar	78.6979	18.2535	BW Recharge
94	Ibrahimnagar	78.7143	18.2540	BW Recharge
95	Ibrahimnagar	78.6980	18.2540	BW Recharge
96	Ibrahimnagar	78.7143	18.2541	BW Recharge
97	Ibrahimnagar	78.7670	18.2040	BW Recharge
98	Ibrahimnagar	78.7143	18.2479	BW Recharge
99	Ibrahimnagar	78.7560	18.2540	BW Recharge
100	Ibrahimnagar	78.8618	18.2043	BW Recharge
101	Chinnakodur	78.9082	18.2016	Check Dam
102	Chinnakodur	78.9234	18.1774	Check Dam
103	Chinnakodur	78.9281	18.1896	Check Dam
104	Machapur	78.8770	18.2051	Check Dam
105	Machapur	78.8891	18.2072	Check Dam
106	Machapur	78.8876	18.2115	Check Dam
107	Machapur	78.8703	18.2072	Check Dam
108	Machapur	78.8878	18.2100	Check Dam
109	Machapur	78.8970	18.2027	Check Dam
110	Peddakodur	78.8958	18.1412	Check Dam
111	Ibrahimnagar	78.9432	18.1636	Check Dam
112	Ibrahimnagar	78.9385	18.1493	Check Dam
113	Ibrahimnagar	78.9524	18.1568	Check Dam

114	Ibrahmnagar	78.9324	18.1367	Check Dam
115	Ibrahmnagar	78.9377	18.1510	Check Dam
116	Chinnakodur	78.8699	18.1482	Check Wall
117	Chinnakodur	78.8713	18.1649	Check Wall
118	Machapur	78.9008	18.2025	Check Wall
119	Chinnakodur	78.9096	18.1540	Farm Pond
120	Chinnakodur	78.9225	18.1653	Farm Pond
121	Chinnakodur	78.9134	18.1902	Farm Pond
122	Chinnakodur	78.8728	18.1689	Farm Pond
123	Chinnakodur	78.8855	18.1698	Farm Pond
124	Chinnakodur	78.8840	18.1685	Farm Pond
125	Chinnakodur	78.8967	18.1571	Farm Pond
126	Chinnakodur	78.9033	18.2037	Farm Pond
127	Chinnakodur	78.9096	18.2026	Farm Pond
128	Chinnakodur	78.9107	18.1830	Farm Pond
129	Chinnakodur	78.9102	18.1839	Farm Pond
130	Chinnakodur	78.8915	18.1646	Farm Pond
131	Chinnakodur	78.9004	18.1544	Farm Pond
132	Chinnakodur	78.9099	18.1642	Farm Pond
133	Chinnakodur	78.9133	18.1659	Farm Pond
134	Chinnakodur	78.9101	18.1672	Farm Pond
135	Chinnakodur	78.9043	18.1765	Farm Pond
136	Chinnakodur	78.9082	18.2014	Farm Pond
137	Chinnakodur	78.8951	18.1536	Farm Pond
138	Chinnakodur	78.8896	18.1755	Farm Pond
139	Chinnakodur	78.9030	18.1481	Farm Pond
140	Chinnakodur	78.9028	18.1481	Farm Pond
141	Chinnakodur	78.8956	18.1765	Farm Pond
142	Chinnakodur	78.8817	18.1672	Farm Pond
143	Chinnakodur	78.8817	18.1701	Farm Pond
144	Chinnakodur	78.9045	18.1738	Farm Pond
145	Machapur	78.9042	18.2028	Farm Pond
146	Machapur	78.8922	18.1969	Farm Pond
147	Machapur	78.8880	18.1915	Farm Pond
148	Machapur	78.8700	18.2029	Farm Pond
149	Machapur	78.8728	18.2067	Farm Pond
150	Machapur	78.8799	18.1984	Farm Pond
151	Machapur	78.8899	18.1973	Farm Pond
152	Machapur	78.8888	18.1970	Farm Pond

153	Machapur	78.8805	18.1785	Farm Pond
154	Machapur	78.8713	18.2044	Farm Pond
155	Machapur	78.8900	18.1824	Farm Pond
156	Machapur	78.8833	18.2149	Farm Pond
157	Machapur	78.8940	18.1977	Farm Pond
158	Peddakodur	78.8774	18.1594	Farm Pond
159	Peddakodur	78.8774	18.1563	Farm Pond
160	Peddakodur	78.8859	18.1424	Farm Pond
161	Peddakodur	78.8879	18.1411	Farm Pond
162	Peddakodur	78.9003	18.1431	Farm Pond
163	Peddakodur	78.8834	18.1563	Farm Pond
164	Peddakodur	78.8893	18.1435	Farm Pond
165	Peddakodur	78.8794	18.1546	Farm Pond
166	Peddakodur	78.8986	18.1428	Farm Pond
167	Peddakodur	78.8775	18.1441	Farm Pond
168	Peddakodur	78.8823	18.1592	Farm Pond
169	Ibrahimnagar	78.9329	18.1663	Farm Pond
170	Ibrahimnagar	78.9413	18.1568	Farm Pond
171	Ibrahimnagar	78.9445	18.1612	Farm Pond
172	Ibrahimnagar	78.9386	18.1683	Farm Pond
173	Chandlapur	78.8588	18.1679	Farm Pond
174	Chandlapur	78.8671	18.1697	Farm Pond
175	Chandlapur	78.8666	18.1542	Farm Pond
176	Chandlapur	78.8611	18.1559	Farm Pond
177	Chandlapur	78.8709	18.1858	Farm Pond
178	Chandlapur	78.8662	18.1829	Farm Pond
179	Chandlapur	78.8632	18.1648	Farm Pond
180	Chandlapur	78.8688	18.1741	Farm Pond
181	Chandlapur	78.8586	18.1733	Farm Pond
182	Chandlapur	78.8687	18.1534	Farm Pond
183	Chandlapur	78.8592	18.1610	Farm Pond
184	Chandlapur	78.8687	18.1551	Farm Pond
185	Chandlapur	78.8698	18.1616	Farm Pond
186	Chandlapur	78.8721	18.1569	Farm Pond
187	Chandlapur	78.8600	18.1629	Farm Pond
188	Chandlapur	78.8543	18.1748	Farm Pond
189	Chandlapur	78.8593	18.1756	Farm Pond
190	Chandlapur	78.8571	18.1769	Farm Pond
191	Chandlapur	78.8573	18.1701	Farm Pond

192	Chandlapur	78.8634	18.1701	Farm Pond
193	Chandlapur	78.8618	18.1707	Farm Pond
194	Chandlapur	78.8782	18.2540	Farm Pond
195	Chinnakodur	78.9341	18.2120	PTS/MPTS
196	Chinnakodur	78.8734	18.1959	PTS/MPTS
197	Chinnakodur	78.9229	18.1985	PTS/MPTS
198	Chinnakodur	78.9248	18.1766	PTS/MPTS
199	Machapur	78.8809	18.2025	PTS/MPTS
200	Peddakodur	78.8794	18.1570	PTS/MPTS
201	Peddakodur	78.8802	18.1424	PTS/MPTS
202	Ibrahimnagar	78.9413	18.1557	PTS/MPTS
203	Ibrahimnagar	78.9407	18.1691	PTS/MPTS
204	Ibrahimnagar	78.9554	18.1567	PTS/MPTS
205	Ibrahimnagar	78.9453	18.1555	PTS/MPTS
206	Ibrahimnagar	78.9588	18.1470	PTS/MPTS
207	Ibrahimnagar	78.9544	18.1557	PTS/MPTS
208	Chandlapur	78.8557	18.1580	PTS/MPTS
209	Chandlapur	78.8546	18.1825	PTS/MPTS
210	Chandlapur	78.8931	18.1736	PTS/MPTS
211	Chinnakodur	78.8876	18.1646	PTS/MPTS
212	Peddakodur	78.8985	18.1489	PTS/MPTS

Fig.1

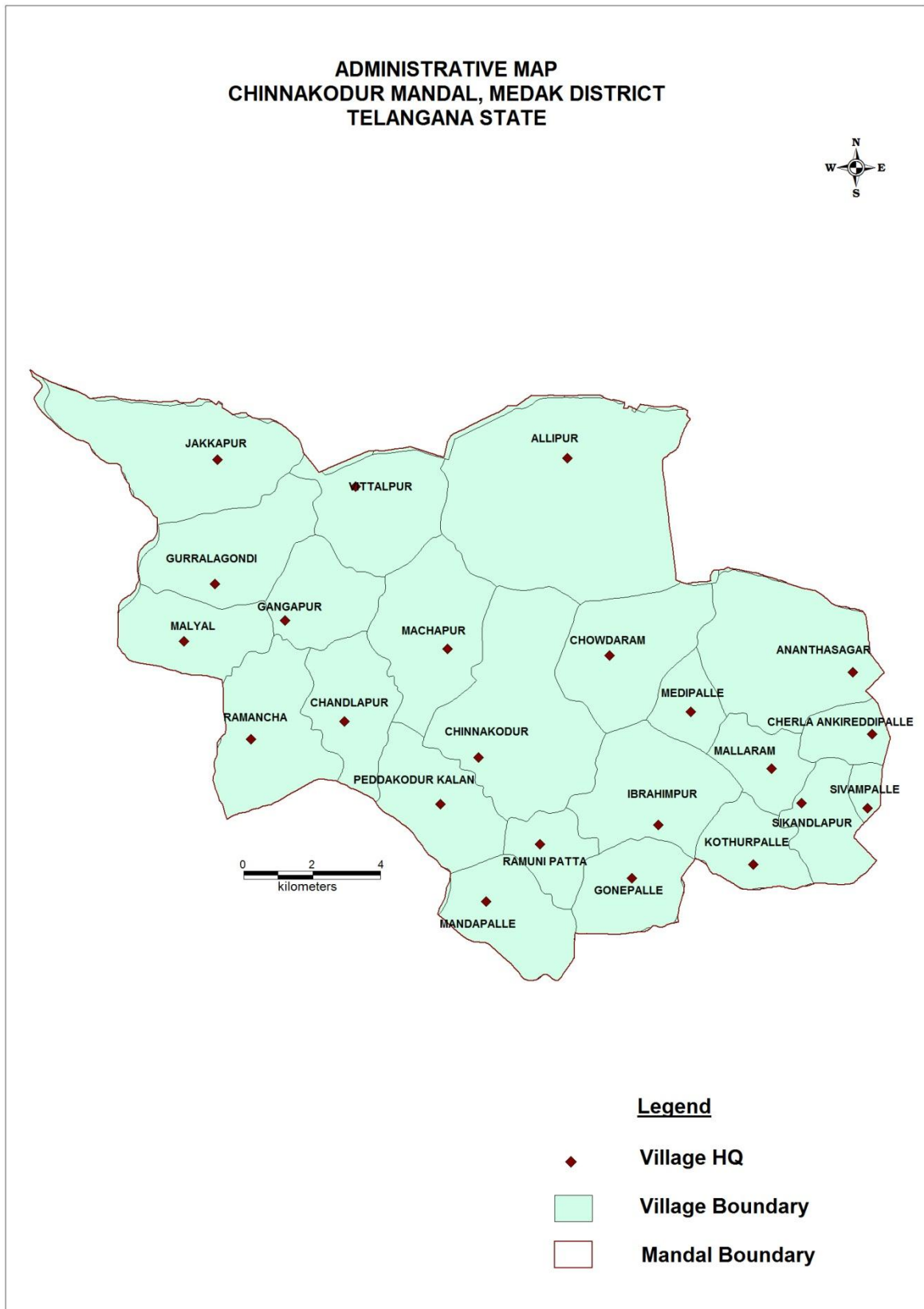


Fig.2

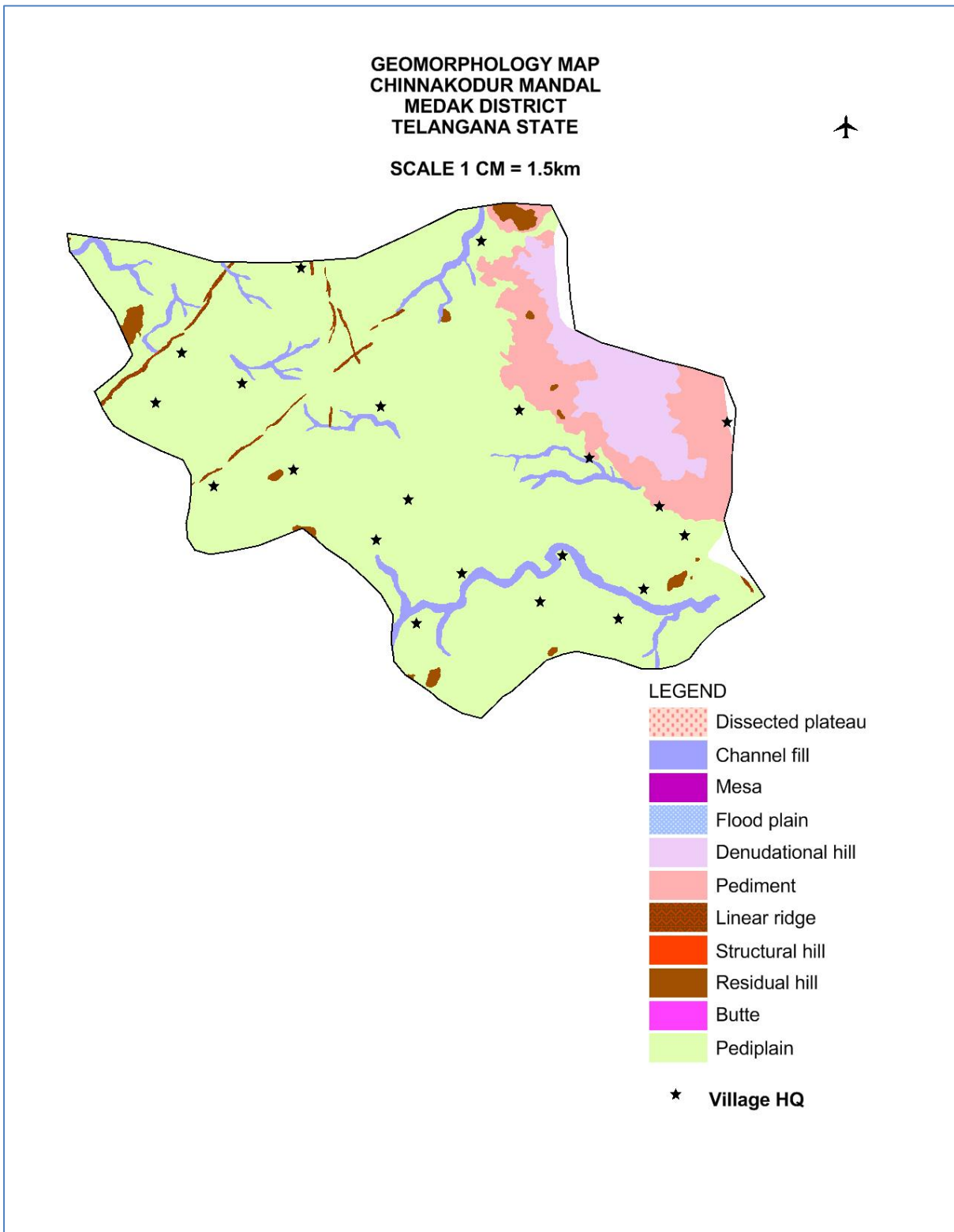


Fig.3

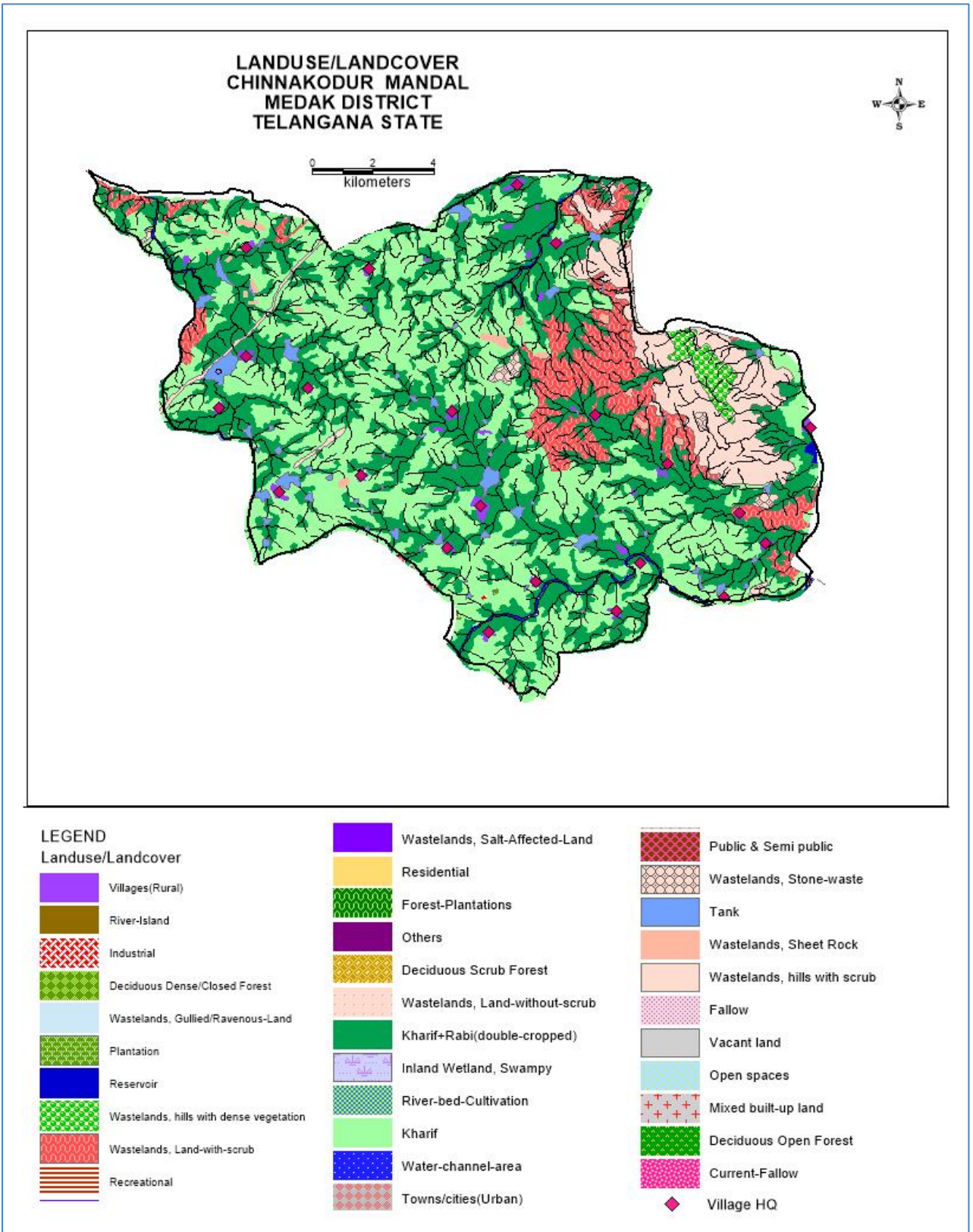


Fig.4

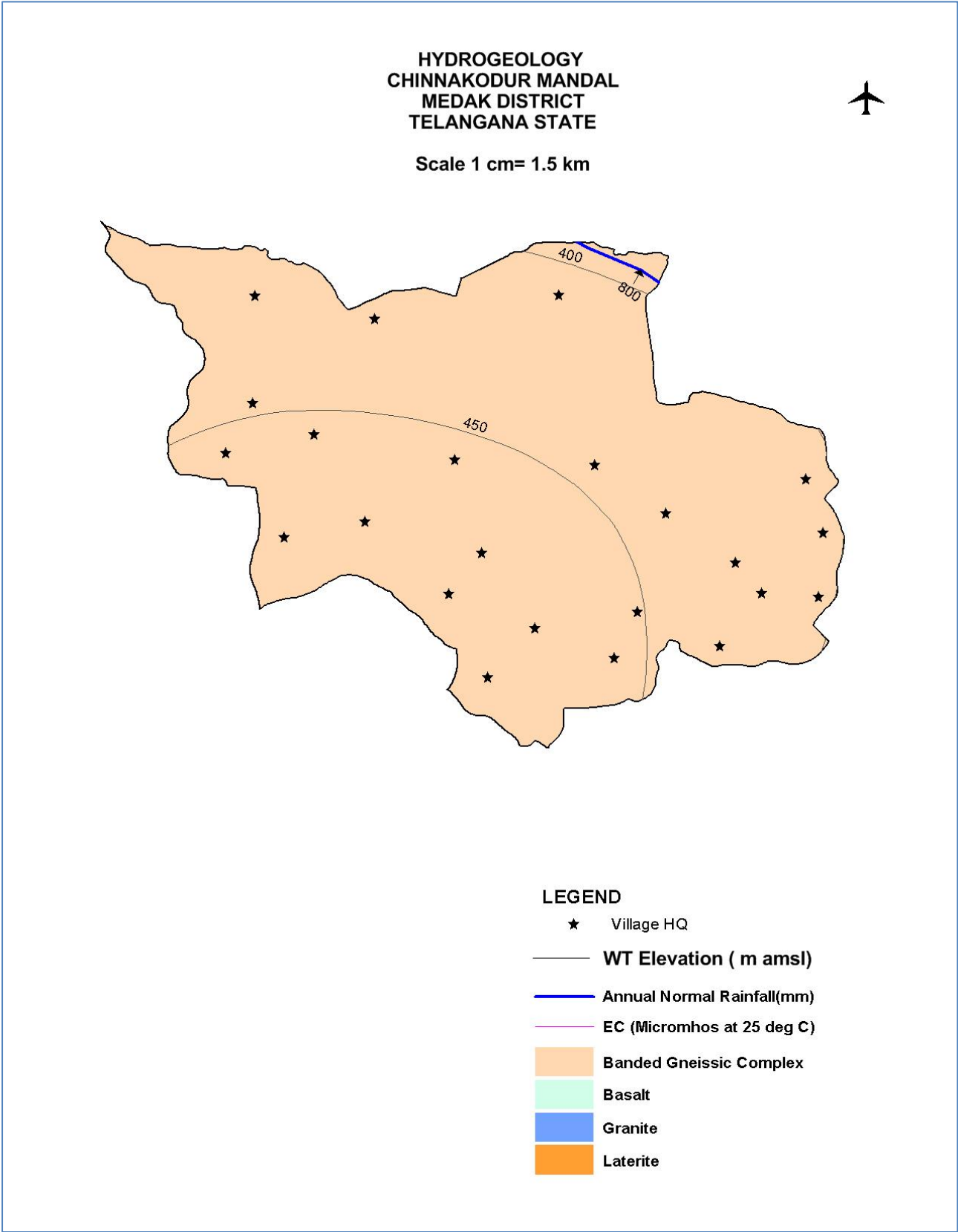


Fig.5

DEPTH TO WATER LEVEL
MAY 2014
CHINNAKOUR MANDAL
MEDAK DISTRICT
TELANGANA STATE



Scale 1 cm= 1.5 km

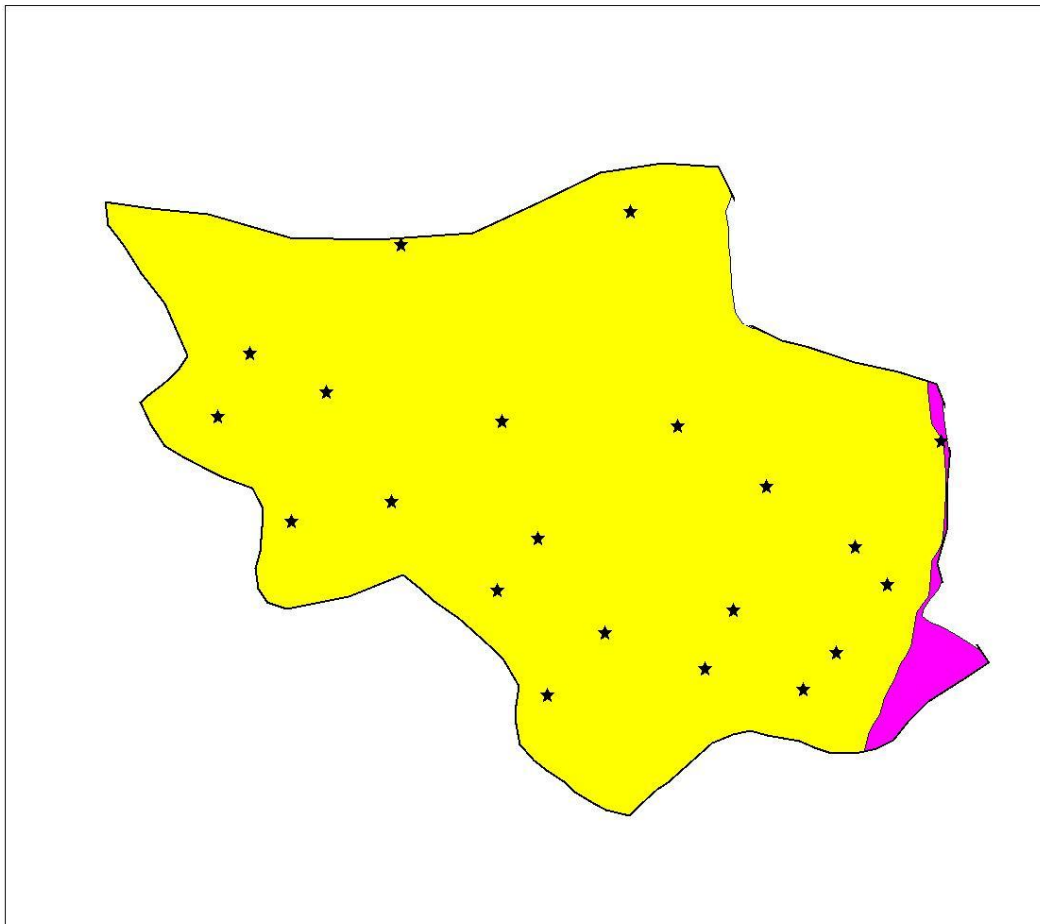


Fig.6

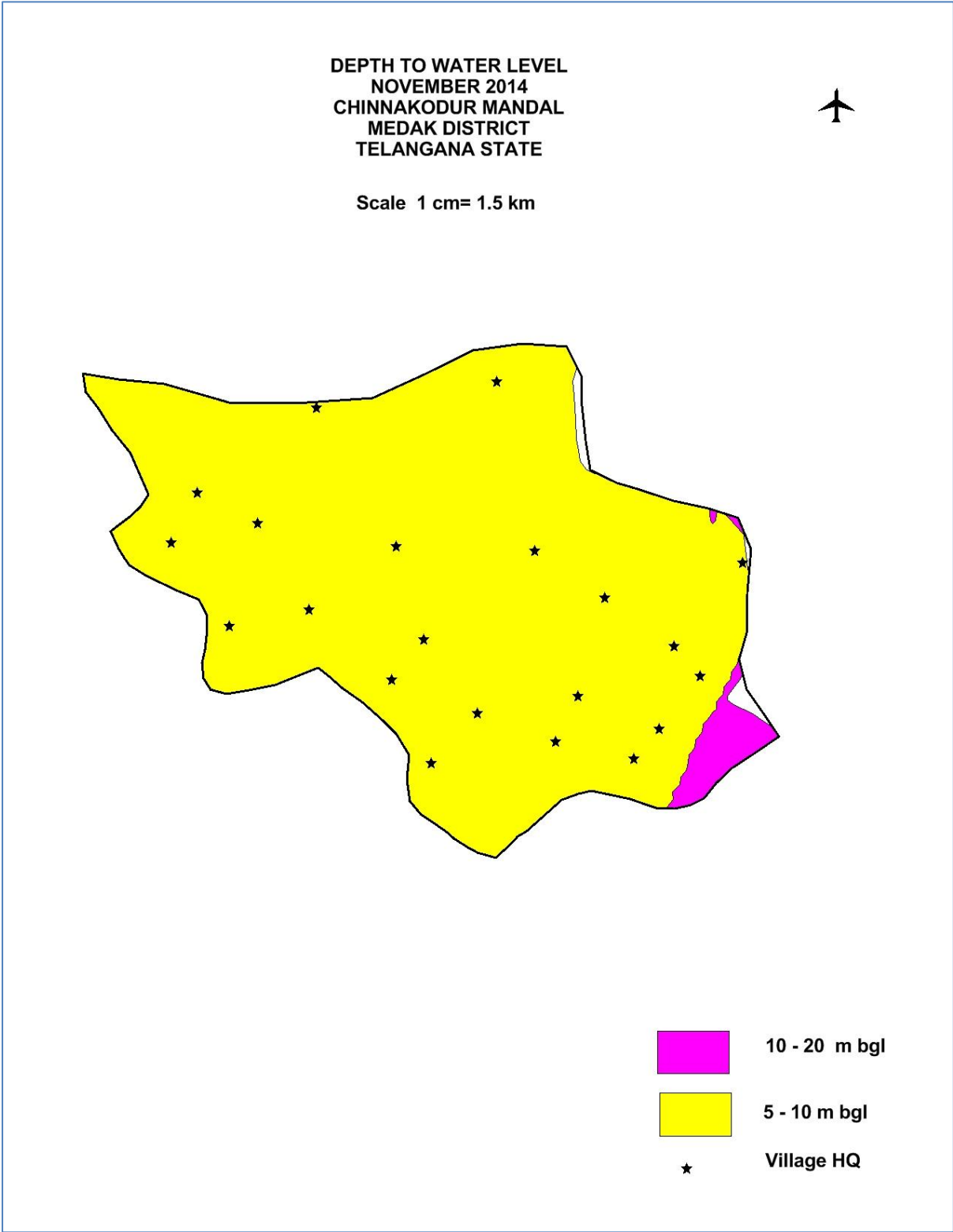


Fig.7

