For official use only
CGWB/SR/AR/2015-16/56

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 DUBBAK MANDAL, MEDAK DISTRICT, TELANGANA STATE

SOUTHERN REGION
HYDERABAD
AUGUST 2016

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

CONTENTS

AT A GLANCE

Name of the Mandal	Dubbaka
District	Medak
State	Telangana
Total Area(sq. km)	252.52
Area suitable for Artificial Recharge (sq.km.)	222.52
Latitude and Longitude	18.090700 to 18.243870 & 78.558440 to 78.760
Average Annual Rainfall (mm)	860
Geology	BGC
Average Depth To Water Level (Decadal) (Pre Monsoon)	26.50
Average Depth To Water Level (Decadal) (Post Monsoon)	22.80
Ground Water Resources (2011)	
Annual Replenishable Ground Water Resources (MCM/yr)	42.78
Net Annual Ground Water Availability(MCM)/yr	38.5
Net Annual Ground Water Draft(MCM)/yr	62.36
Projected Demand for Domestic and Industrial Use(MCM)/yr	0.51
Stage of Ground Water Development (%)	162
Surface runoff available (MCM)/yr	22.16
Total Storage Created in the Mandal by Various Agencies (MCM)/yr	1.36
Artificial Recharge/Conservation Measures	
Recharge Structures Proposed (No.s)	Check Dams-13 Farm ponds-640, Recharge Shafts-43
Improving Water use Efficiency	Micro Irrigation System -3200 ha
Tentative Total Cost in Lakhs (Rs.)	2299.185 Lakhs
Expected Recharge/Savings (MCM)/yr	10.429

1. INTRODUCTION

Dubbaka Mandal is one of the over-exploited mandals in Medak district, Telangana State, which is economically backward and chronically drought affected. The mandal has 25 inhabited villages and one un inhabited village with 32 gram Panchayats.

2. LOCATION

The mandal lies between north latitudes 18.090700 to 18.243870 and between east longitudes 78.558440 to 78.760470. The mandal occupies the northern part of the Medak district and is bounded on the north by Karimnagar district, on the east by Siddipet mandal, on the south by Niruddimandal and west by Ramayampet mandal. (Fig.1) The geographical area of the mandal is 252.52 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 860 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 252.52 sq.km, the area covered by forest is 12.54 sq.km and the net area sown is 114.57 sq.km. Barren and uncultivable land is 21.09 sq.km. The land for non agricultural use accounts for 12.10 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 upto 30 m bgl depth, which are mostly dry now. Ground water occurrs in the fractured granites upto 200 m bgl. However, the potential fractures are encountered between 50-100 m bgl. The cumulative yield varies from 2-5lps.

7. GROUND WATER LEVEL SCENARIO

The depth to water level during pre and post-monsoon varies from 5 to 10 m bgl. The average depth to water level (decadal) during pre and post monsoon is 26.5 and 22.8 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 Dubbak Mandal, Medak District is given in Table-1.

Table-1: Ground water resources of Dubbaka Mandal, Medak District.

Annual Replenishable Ground water resources (MCM)	42.78
Net Annual Ground Water Availability(MCM)/yr	38.5
Net Annual Ground Water Draft(MCM)/yr	62.36
Projected Demand for Domestic and Industrial use up to 2025. (MCM)	0.51
Stage of Ground water development (%).	162
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 upto30m. 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

Dubbaka Mandal falls under high stage of ground water development i.e., 162 % 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)	252.52
Hilly Area (Sq.kms)	30
Area suitable for Artificial Recharge (sq.km.)	222.52
Runoff Yield in MCM/yr	22.16
Existing No. of Check Dams	147
Storage created MCM/yr	1.04
Existing No. of Percolation Tanks	45
Storage created MCM/yr	0.32
Total Existing Storage Created	1.36

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 run off available in the mandal has been assessed as 20.82 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) Check dams and Percolation Tanks

The area is covered by seasonal nalas – drains, which carry discharge during monsoon period along with silt load and debauched into the water bodies within a short duration. It is proposed to identify such nalas for construction of check dams/Percolation tank with recharge shafts, so as to harness ground water and to increase soil moisture content.

- The site selected for check dam/Percolation Tank should have sufficient thickness of permeable soils or weathered material to facilitate recharge of stored water within a short span of time. The water stored in these structures is mostly confined to the stream course and height is normally less than 2m.

- These are designed based on stream width and excess water is allowed to flow over the crest wall. In order to avoid scouring from excess runoff water cushions are provided on the downstream side. To harness maximum runoff in the stream, a series of such check dams can be constructed to have recharge on a regional scale.

- Considering the annual monsoon rainfall of 860 mm, sufficient rain water can be harnessed. This will improve ground water regime as well as delaying the instant flow into the main river.

- The flow in these seasonal rivers can be sustained up to about 2 to 3 months after monsoon.

- Recharge trenches can also be constructed along upstream side of the check dam/Percolation Tank in the impoundment area for enhancing the ground water recharge rate.

A total of 13 Check dams have been proposed.

B) Recharge Shafts:

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 35 and 8 recharge shafts of 165 mm dia with 30 m depth in the existing check dams and percolation tanks respectively.

.**C) Farm Ponds:**

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 640 farm ponds in 32 villages of the Mandal @ 20 farm ponds in each village.

D) 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 3200 ha @ 100 ha per village**.**

13. TENTATIVE COST ESTIMATES (DUBBAK 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)	13	0.364	5	65	0.273
2	Recharge shaft in Check dam (50% of the existing Check dams)	35	0.385	0.5	17.5	0.385
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)	8	0.088	1	8	0.088
5	Proposed Farm Pond (6 filling) 5*5*1.5 dimension @ 20 farm ponds per each village	640	0.09216	0.25	160	0.082944
6	Proposed Sprinkler/drip/HDPE pipes for 100 ha in each village	3200		0.6	1920	9.6
7	Proposed Piezometers up to 50 mbgl @ one PZ per Village	32	0	0.6	19.2	0
8 (i)	Total (No. of AR Structures)	728	0.93		269.7	0.829
8 (ii)	Total (ha)	3200			1920	9.6
	Total (8(i) + 8 (ii))				**2189.7**	**10.429**
9	Impact Assessment & O & M -5 % of Total cost of the Scheme				**109.485**	
	Grand Total				**2299.185**	

*(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							
	1st	2nd	3rd	4th	5th	6th	7th	8th
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 10.429 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 162% to 127% (35%)
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
DUBBAK MANDAL, MEDAK DISTRICT, TELANGANA

Sno	Village Name	Longitude	Latitude	Name_ARS
1	Chittapur	78.6205	18.1213	BW Recharge
2	Chittapur	78.6205	18.1213	BW Recharge
3	Chittapur	78.6363	18.1421	BW Recharge
4	Chittapur	78.6210	18.1423	BW Recharge
5	Chittapur	78.6278	18.1246	BW Recharge
6	Chittapur	78.6134	18.1325	BW Recharge
7	Habshipur	78.6833	18.1249	BW Recharge
8	Habshipur	78.6750	18.1608	BW Recharge
9	Habshipur	78.6637	18.1634	BW Recharge
10	Habshipur	78.6926	18.1748	BW Recharge
11	Habshipur	78.6503	18.1335	BW Recharge
12	Habshipur	78.6869	18.1223	BW Recharge
13	Habshipur	78.7000	18.1366	BW Recharge
14	Habshipur	78.6886	18.1167	BW Recharge
15	Habshipur	78.6683	18.1348	BW Recharge
16	Habshipur	78.6589	18.1246	BW Recharge
17	Habshipur	78.6602	18.1354	BW Recharge
18	Habshipur	78.6798	18.1248	BW Recharge
19	Habshipur	78.6511	18.1284	BW Recharge
20	Habshipur	78.6167	18.1244	BW Recharge
21	Habshipur	78.6698	18.1251	BW Recharge
22	Habshipur	78.6616	18.1613	BW Recharge
23	Habshipur	78.6751	18.1588	BW Recharge
24	Habshipur	78.6920	18.1258	BW Recharge
25	Habshipur	78.6602	18.1354	BW Recharge
26	Habshipur	78.6341	18.1447	BW Recharge
27	Habshipur	78.6611	18.1252	BW Recharge
28	Habshipur	78.6637	18.1614	BW Recharge
29	Habshipur	78.6623	18.1262	BW Recharge
30	Habshipur	78.8222	18.1581	BW Recharge
31	Habshipur	78.7692	18.1565	BW Recharge
32	Habshipur	78.6192	18.1417	BW Recharge
33	Habshipur	78.6853	18.1640	BW Recharge
34	Habshipur	78.7115	18.1584	BW Recharge
35	Habshipur	78.6529	18.1528	BW Recharge
36	Habshipur	78.6918	18.1803	BW Recharge
37	Habshipur	78.6922	18.1528	BW Recharge
38	Habshipur	78.6895	18.1181	BW Recharge
39	Habshipur	78.6699	18.1347	BW Recharge
40	Chervapur	78.1531	18.1387	BW Recharge
41	Chervapur	78.1637	18.1491	BW Recharge

42	Chervapur	78.1629	18.1486	BW Recharge
43	Chervapur	78.1579	18.1427	BW Recharge
44	Chervapur	78.1578	18.1398	BW Recharge
45	Chervapur	78.1557	18.1362	BW Recharge
46	Chervapur	78.1634	18.1498	BW Recharge
47	Chervapur	78.1662	18.1526	BW Recharge
48	Chervapur	78.1627	18.1499	BW Recharge
49	Chervapur	78.1663	18.1518	BW Recharge
50	Chervapur	78.1564	18.1414	BW Recharge
51	Chervapur	78.1555	18.1390	BW Recharge
52	Chervapur	78.1564	18.1423	BW Recharge
53	Chervapur	78.1569	18.0229	BW Recharge
54	Chervapur	78.1542	18.1384	BW Recharge
55	Chervapur	78.1575	18.0273	BW Recharge
56	Chervapur	78.1579	18.1433	BW Recharge
57	Chervapur	78.1683	18.1554	BW Recharge
58	Chervapur	78.1713	18.1579	BW Recharge
59	Chervapur	78.7125	18.2541	BW Recharge
60	Chervapur	78.1594	18.1451	BW Recharge
61	Chervapur	78.9556	18.1393	BW Recharge
62	Chittapur	78.6175	18.1228	Check Dam
63	Chittapur	78.6106	18.1384	Check Dam
64	Chittapur	78.6184	18.1393	Check Dam
65	Dharmajipet	78.6528	18.1427	Check Dam
66	Enagurthy	78.5965	18.1481	Check Dam
67	Enagurthy	78.6024	18.1415	Check Dam
68	Habshipur	78.6795	18.1284	Check Dam
69	Chowdarpally	78.6263	18.1630	Check Dam
70	Chittapur	78.6242	18.1324	Farm Pond
71	Chittapur	78.6338	18.1315	Farm Pond
72	Chittapur	78.6178	18.1221	Farm Pond
73	Chittapur	78.6172	18.1225	Farm Pond
74	Chittapur	78.6175	18.1228	Farm Pond
75	Chittapur	78.6223	18.1233	Farm Pond
76	Chittapur	78.6286	18.1282	Farm Pond
77	Chittapur	78.6233	18.1249	Farm Pond
78	Chittapur	78.6159	18.1317	Farm Pond
79	Chittapur	78.6281	18.1248	Farm Pond
80	Chittapur	78.6147	18.1296	Farm Pond
81	Chittapur	78.6192	18.1280	Farm Pond
82	Chittapur	78.6233	18.1249	Farm Pond
83	Chittapur	78.6131	18.1290	Farm Pond
84	Dharmajipet	78.6320	18.1713	Farm Pond
85	Dharmajipet	78.6205	18.1691	Farm Pond
86	Dharmajipet	78.5906	18.1573	Farm Pond

87	Dharmajipet	78.6325	18.1468	Farm Pond
88	Enagurthy	78.6117	18.1549	Farm Pond
89	Enagurthy	78.6019	18.1682	Farm Pond
90	Enagurthy	78.6063	18.1445	Farm Pond
91	Enagurthy	78.6051	18.0223	Farm Pond
92	Enagurthy	78.6100	18.1499	Farm Pond
93	Enagurthy	78.6155	18.1620	Farm Pond
94	Enagurthy	78.5932	18.1606	Farm Pond
95	Enagurthy	78.6017	18.1586	Farm Pond
96	Enagurthy	78.6117	18.1549	Farm Pond
97	Enagurthy	78.6100	18.1499	Farm Pond
98	Enagurthy	78.6098	18.1548	Farm Pond
99	Enagurthy	78.6097	18.1515	Farm Pond
100	Enagurthy	78.6106	18.1564	Farm Pond
101	Enagurthy	78.6061	18.1539	Farm Pond
102	Enagurthy	78.6069	18.1471	Farm Pond
103	Enagurthy	78.6146	18.1622	Farm Pond
104	Enagurthy	78.6111	18.1638	Farm Pond
105	Enagurthy	78.6108	18.1645	Farm Pond
106	Enagurthy	78.6062	18.1688	Farm Pond
107	Enagurthy	78.6151	18.1639	Farm Pond
108	Enagurthy	78.6139	18.1656	Farm Pond
109	Enagurthy	78.6150	18.1649	Farm Pond
110	Enagurthy	78.6150	18.1649	Farm Pond
111	Enagurthy	78.5999	18.1633	Farm Pond
112	Enagurthy	78.6006	18.1623	Farm Pond
113	Enagurthy	78.6111	18.1633	Farm Pond
114	Enagurthy	78.6137	18.1653	Farm Pond
115	Enagurthy	78.6160	18.1619	Farm Pond
116	Enagurthy	78.6068	18.1667	Farm Pond
117	Habshipur	78.6698	18.1349	Farm Pond
118	Habshipur	78.6503	18.1335	Farm Pond
119	Habshipur	78.6503	18.1335	Farm Pond
120	Habshipur	78.6699	18.1348	Farm Pond
121	Habshipur	78.6539	18.1534	Farm Pond
122	Habshipur	78.6195	18.1306	Farm Pond
123	Habshipur	78.6850	18.1535	Farm Pond
124	Habshipur	78.8569	18.1709	Farm Pond
125	Peddagundavelly	78.7040	18.1456	Farm Pond
126	Peddagundavelly	78.7387	18.1453	Farm Pond
127	Peddagundavelly	78.7221	18.1448	Farm Pond
128	Chowdarpally	78.6224	18.1503	Farm Pond
129	Chowdarpally	78.6198	18.1584	Farm Pond
130	Chittapur	78.6183	18.1234	Farm Pond
131	Chittapur	78.6208	18.1263	Farm Pond

132	Peddagundavelly	78.7024	18.1405	Farm Pond
133	Dubbaka	78.6676	18.1956	PTS/MPTS
134	Dubbaka	78.6703	18.1958	PTS/MPTS
135	Dubbaka	78.6589	18.1996	PTS/MPTS
136	Dubbaka	78.6614	18.2028	PTS/MPTS
137	Dubbaka	78.6699	18.1974	PTS/MPTS
138	Peddagundavelly	78.7219	18.1451	PTS/MPTS
139	Peddagundavelly	78.6891	18.1456	PTS/MPTS
140	Peddagundavelly	78.7113	18.1611	PTS/MPTS
141	Habshipur	78.8143	18.1617	PTS/MPTS
142	Peddagundavelly	78.7207	18.1293	PTS/MPTS
143	Peddagundavelly	78.7058	18.1462	PTS/MPTS
144	Peddagundavelly	78.7253	18.1306	PTS/MPTS
145	Peddagundavelly	78.7239	18.1283	PTS/MPTS
146	Peddagundavelly	78.7139	18.1502	PTS/MPTS
147	Peddagundavelly	78.7183	18.1334	PTS/MPTS

PROPOSED ARTIFICIAL RECHARGE STRUCTURES
DUBBAK MANDAL, MEDAK DISTRICT, TELANGANA.

S.No.	VNAME	Longitude	Latitude	Type of Structure
1	GAMBHEERPUR	78.5911	18.2387	Checkdam
2	AKARAM	78.5824	18.2252	Checkdam
3	AREPALLE	78.6420	18.2479	Checkdam
4	AREPALLE	78.6538	18.2367	Checkdam
5	AREPALLE	78.6440	18.2413	Checkdam
6	CHEEKODE	78.6648	18.2257	Checkdam
7	DUBBAK	78.6745	18.2283	Checkdam
8	RAJAKKAPET	78.6889	18.2267	Checkdam
9	RAJAKKAPET	78.7008	18.2208	Checkdam
10	RAJAKKAPET	78.7048	18.2186	Checkdam
11	RAJAKKAPET	78.7119	18.2254	Checkdam
12	DUBBAK	78.6809	18.1940	Checkdam
13	DUMPALPALLE	78.7077	18.1836	Checkdam

Fig.1

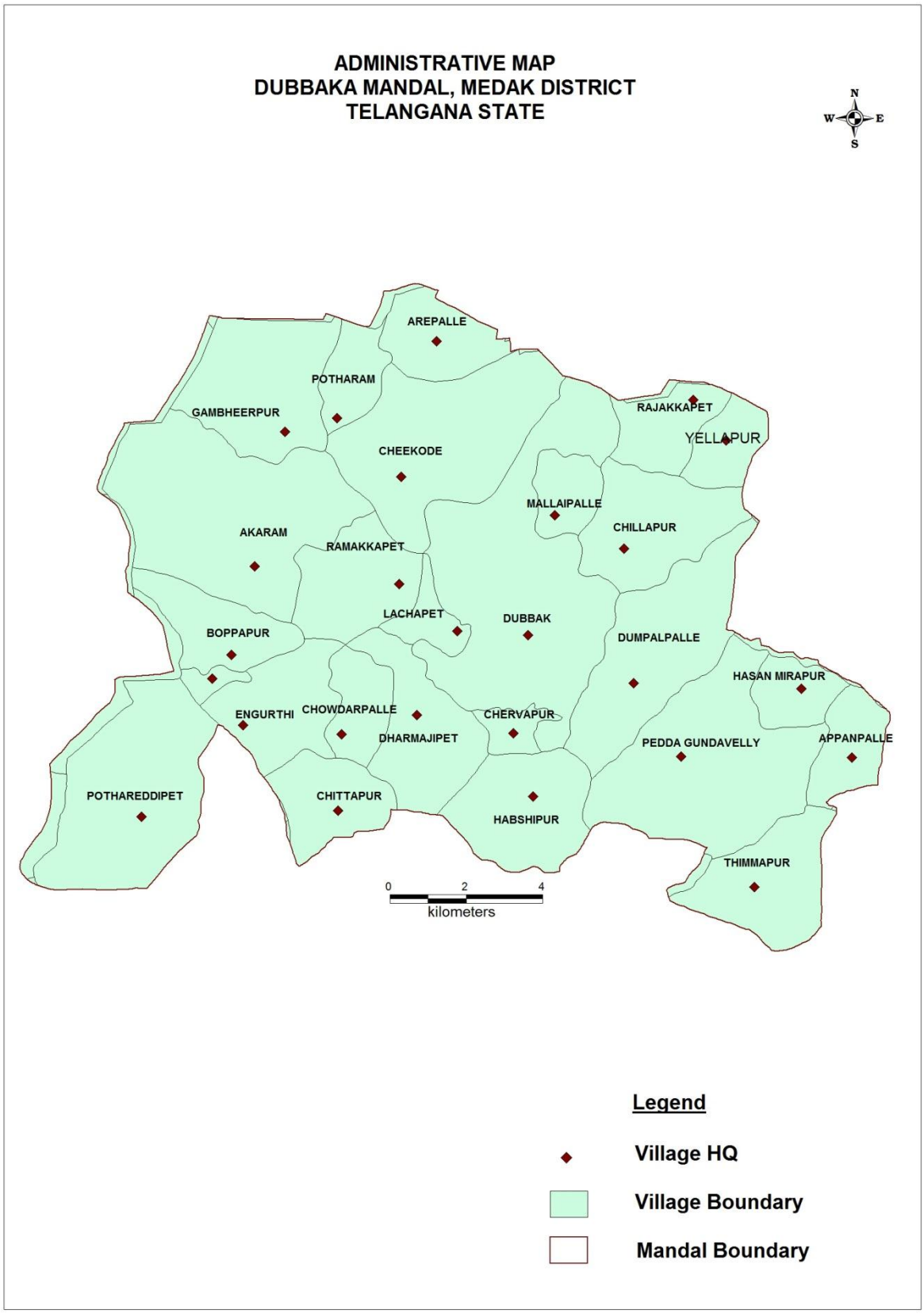

ADMINISTRATIVE MAP
DUBBAKA MANDAL, MEDAK DISTRICT
TELANGANA STATE
N
W
E
S
AREPALLE
POTHARAM
GAMBHEERPUR
CHEEKODE
RAJAKKAPET
YELLAPUR
MALLAIPALLE
CHILLAPUR
AKARAM
RAMAKKAPET
LACHAPET
DUBBAK
BOPPAPUR
DUMPALPALLE
HASAN MIRAPUR
ENGURTHI
CHOWDARPALLE
CHERVAPUR
DHARMAJIPET
PEDDA GUNDAVELLY
APPANPALLE
POTHAREDDIPET
CHITTAPUR
HABSHIPUR
THIMMAPUR
0
2
4
kilometers
Legend
Village HQ
Village Boundary
Mandal Boundary

Fig.2

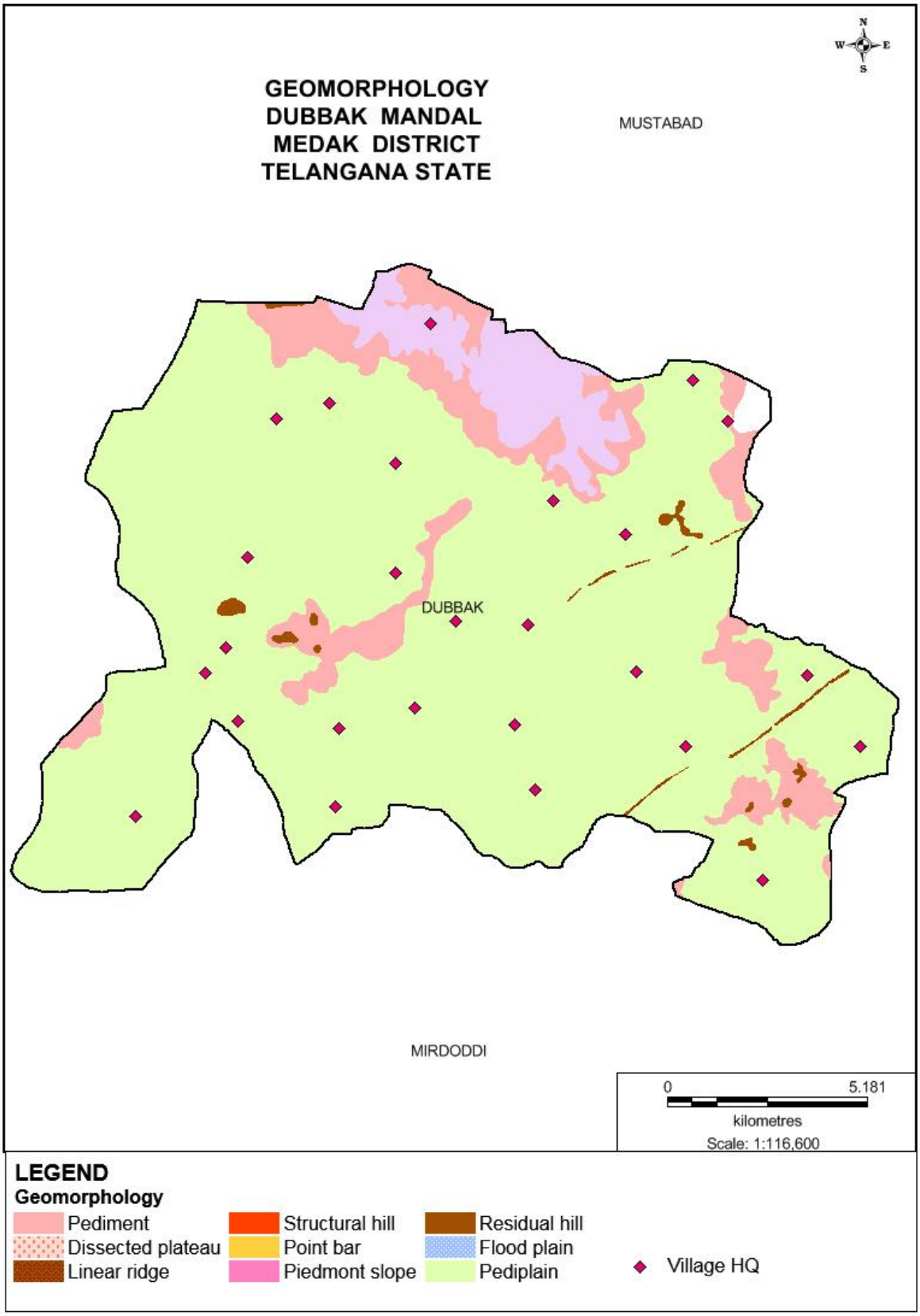

GEOMORPHOLOGY
DUBBAK MANDAL
MEDAK DISTRICT
TELANGANA STATE
MUSTABAD
DUBBAK
MIRDODDI
N
W
E
S
0
5.181
kilometres
Scale: 1:116,600
LEGEND
Geomorphology
Pediment
Dissected plateau
Linear ridge
Structural hill
Point bar
Piedmont slope
Residual hill
Flood plain
Pediplain
Village HQ

Fig.3

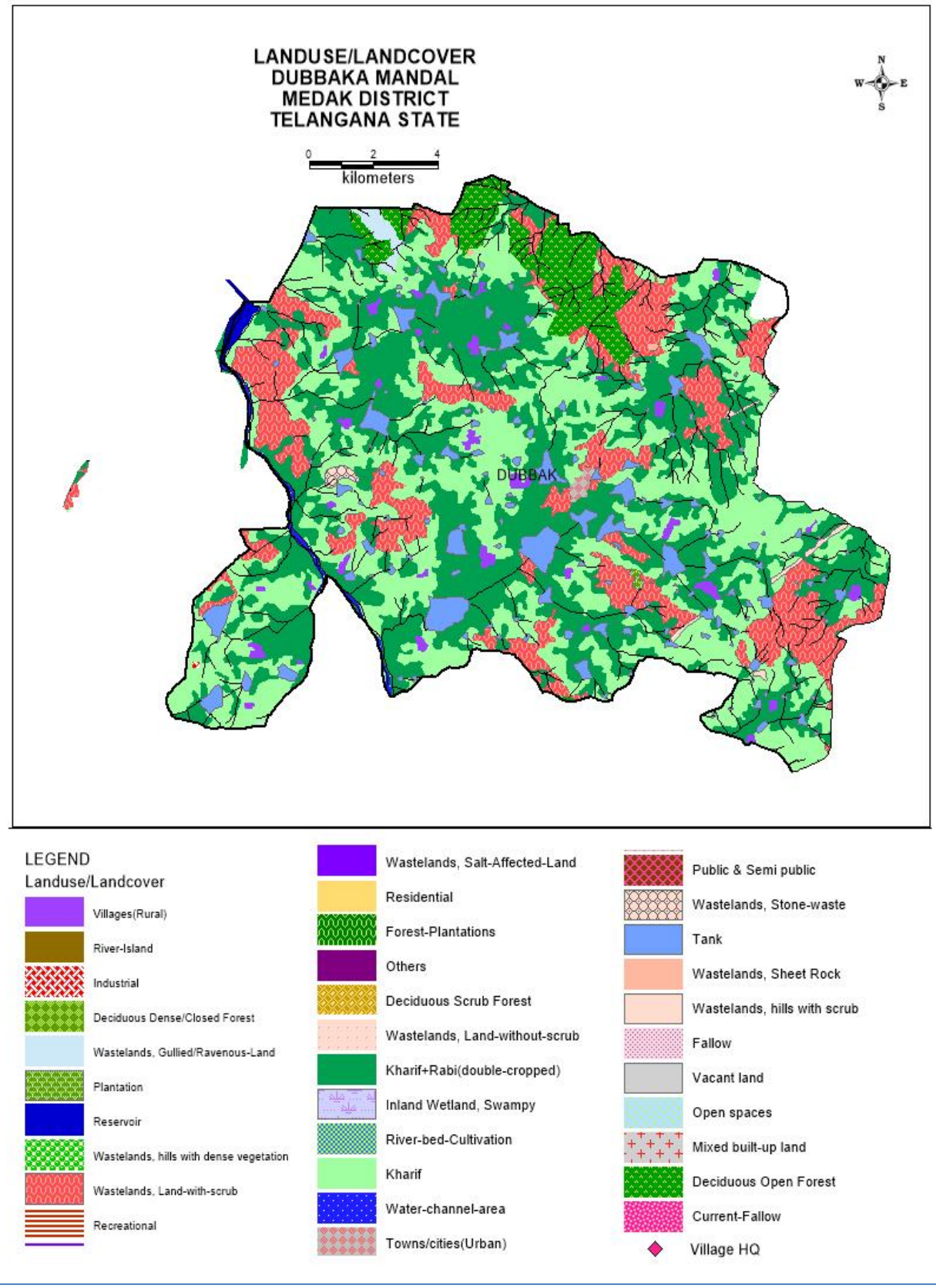

LANDUSE/LANDCOVER
DUBBAKA MANDAL
MEDAK DISTRICT
TELANGANA STATE
N
W
E
S
0
2
4
kilometers
DUBBAK
LEGEND
Landuse/Landcover
Villages(Rural)
River-Island
Industrial
Deciduous Dense/Closed Forest
Wastelands, Gullied/Ravenous-Land
Plantation
Reservoir
Wastelands, hills with dense vegetation
Wastelands, Land-with-scrub
Recreational
Wastelands, Salt-Affected-Land
Residential
Forest-Plantations
Others
Deciduous Scrub Forest
Wastelands, Land-without-scrub
Kharif+Rabi(double-cropped)
Inland Wetland, Swampy
River-bed-Cultivation
Kharif
Water-channel-area
Towns/cities(Urban)
Public & Semi public
Wastelands, Stone-waste
Tank
Wastelands, Sheet Rock
Wastelands, hills with scrub
Fallow
Vacant land
Open spaces
Mixed built-up land
Deciduous Open Forest
Current-Fallow
Village HQ

Fig.4

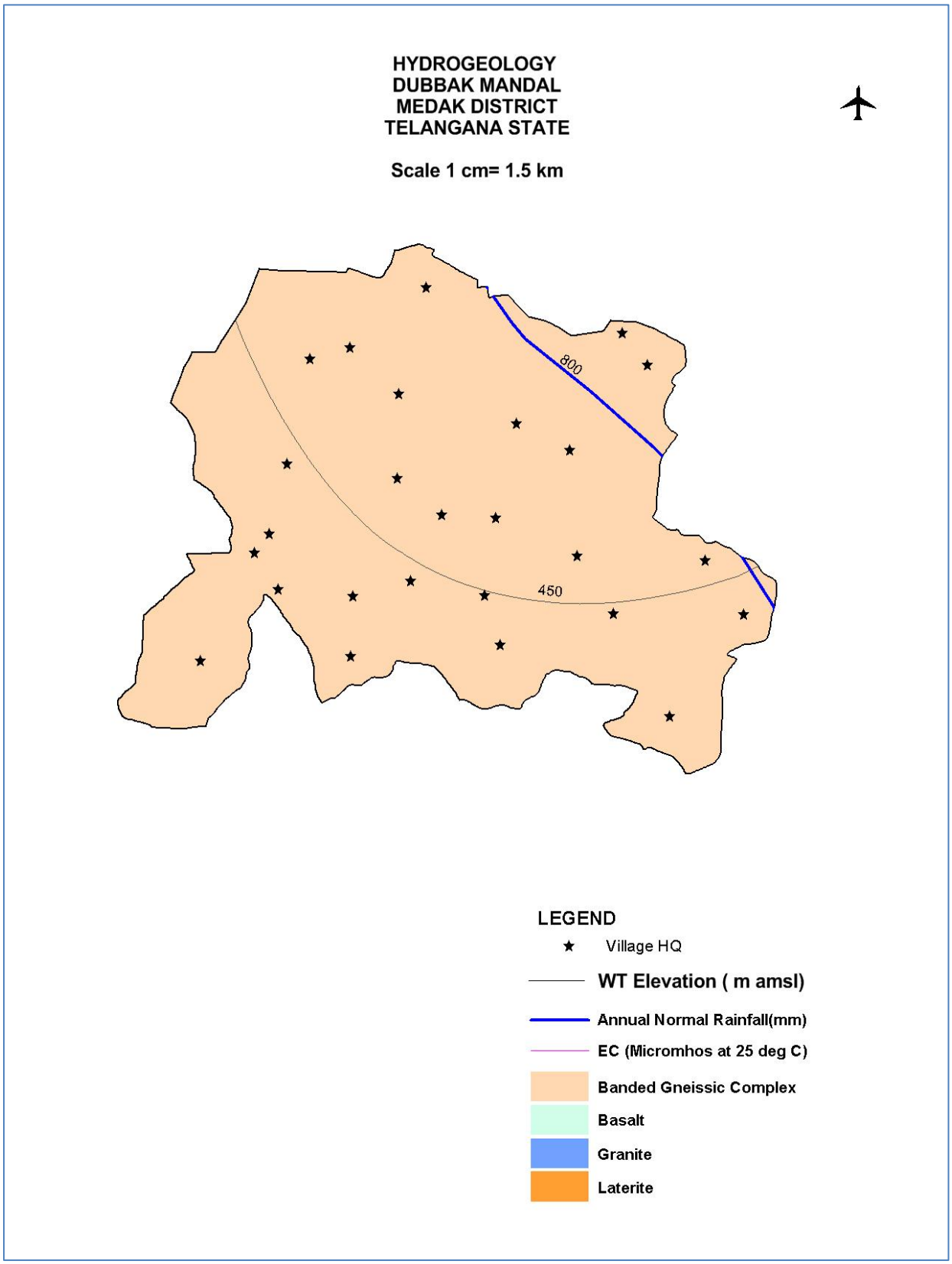

HYDROGEOLOGY
DUBBAK MANDAL
MEDAK DISTRICT
TELANGANA STATE
Scale 1 cm= 1.5 km
800
450
LEGEND
Village HQ
WT Elevation (m amsl)
Annual Normal Rainfall(mm)
EC (Micromhos at 25 deg C)
Banded Gneissic Complex
Basalt
Granite
Laterite

Fig.5

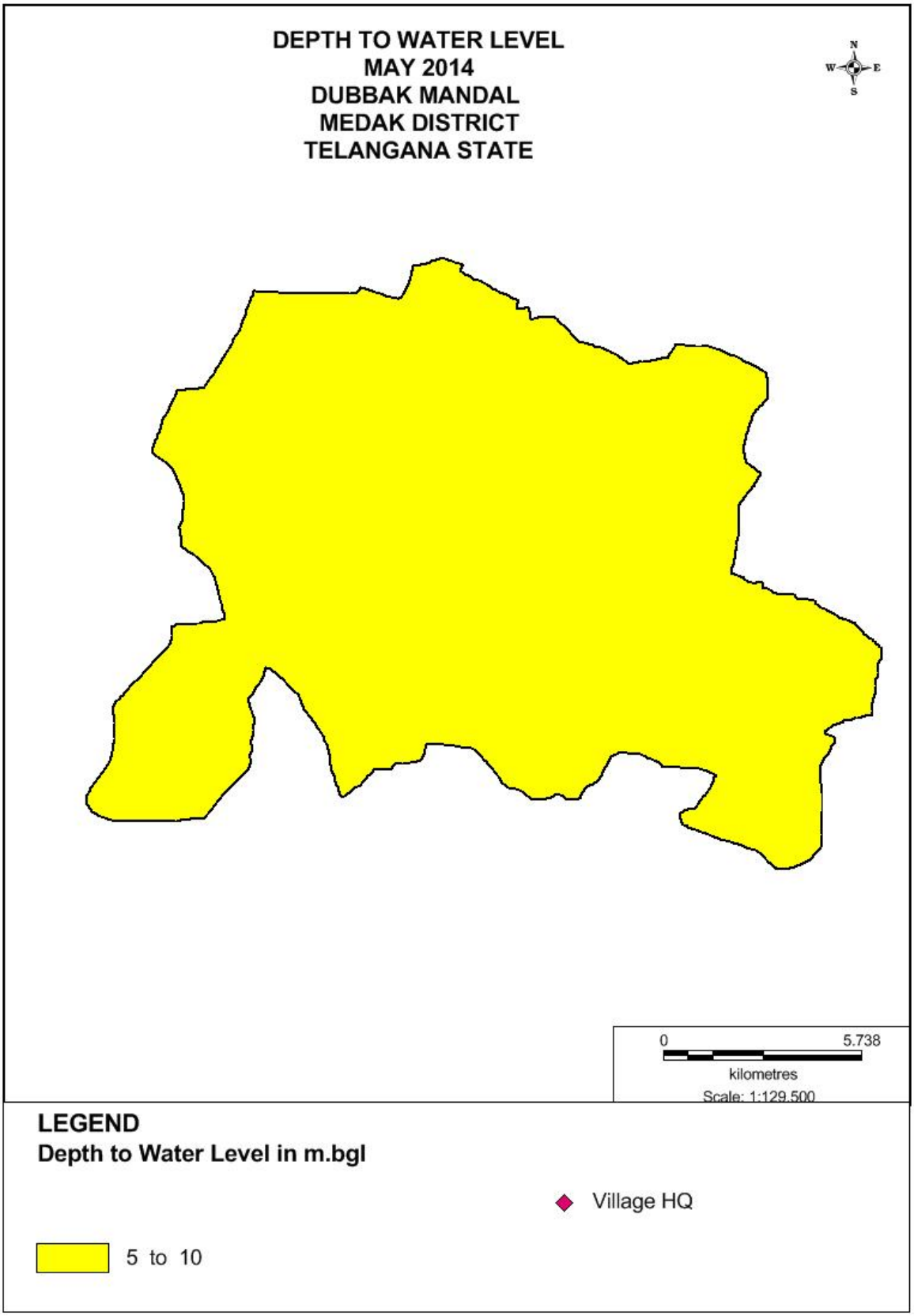

DEPTH TO WATER LEVEL
MAY 2014
DUBBAK MANDAL
MEDAK DISTRICT
TELANGANA STATE
N
W
E
S
0
5.738
kilometres
Scale: 1:129,500
LEGEND
Depth to Water Level in m.bgl
Village HQ
5 to 10

Fig.6

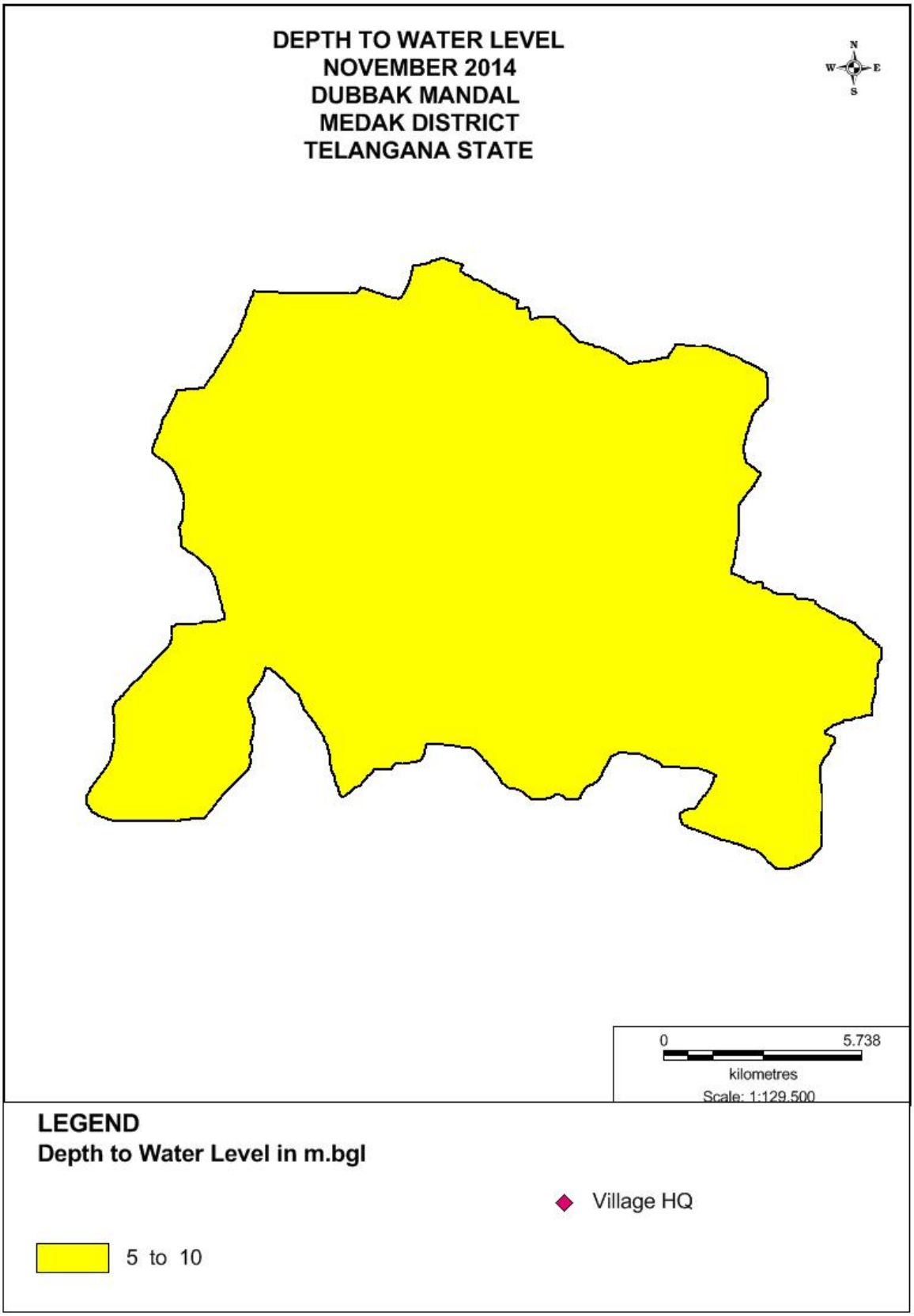
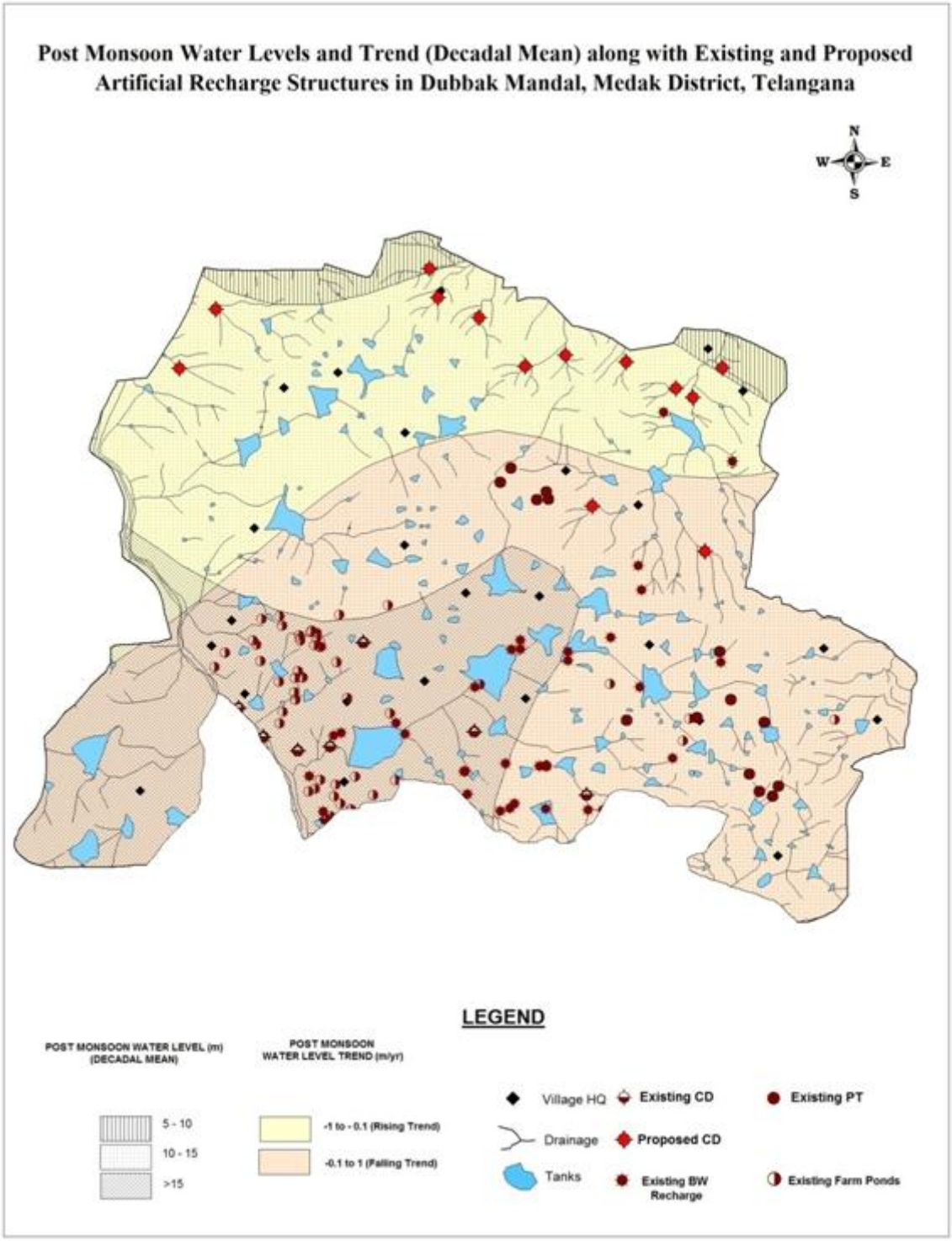

DEPTH TO WATER LEVEL
NOVEMBER 2014
DUBBAK MANDAL
MEDAK DISTRICT
TELANGANA STATE
N
W
E
S
0
5.738
kilometres
Scale: 1:129,500
LEGEND
Depth to Water Level in m.bgl
Village HQ
5 to 10

Fig.7


Post Monsoon Water Levels and Trend (Decadal Mean) along with Existing and Proposed Artificial Recharge Structures in Dubbak Mandal, Medak District, Telangana
N
W
E
S
LEGEND
POST MONSOON WATER LEVEL (m) (DECADAL MEAN)
5 - 10
10 - 15
>15
POST MONSOON WATER LEVEL TREND (m/yr)
-1 to - 0.1 (Rising Trend)
-0.1 to 1 (Falling Trend)
Village HQ
Drainage
Tanks
Existing CD
Proposed CD
Existing BW Recharge
Existing PT
Existing Farm Ponds