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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 TADIPATRI MANDAL, ANANTAPUR DISTRICT, ANDHRA PRADESH

SOUTHERN REGION
HYDERABAD
AUGUST-2016

PLAN ON
ARTIFICIAL RECHARGE TO GROUNDWATER AND WATER CONSERVATION IN TADIPATRI MANDAL, ANANTAPUR DISTRICT, ANDHRA PRADESH

CONTENTS

AT A GLANCE

Name of the Mandal	TADIPATRI
District	ANATAPUR
State	ANDHRA PRADESH
Total Area (Sq.kms)	436
Area suitable for Artificial Recharge (Sq.kms)	433
Latitude and Longitude	14.805210 to 15.053930 and 77.905300 to 78.139030
Average Annual Rainfall (mm)	667
Geology	Shale, Limestones
Average Depth To Water Level (Decadal) (Pre Monsoon)	10.88
Average Depth To Water Level (Decadal) (Post Monsoon)	5.80
Ground Water Resources (2011)	
Annual Replenishable Ground Water Resources (MCM/yr)	23.37
Net Annual Ground Water Availability(MCM)/yr	21.03
Net Annual Ground Water Draft(MCM)/yr	29.51
Projected Demand for Domestic and Industrial Use(MCM)/yr	5.57
Stage of Ground Water Development (%)	140
Surface runoff available (MCM)/yr	47.50
Total Storage Created in the Mandal by Various Agencies (MCM)/yr	0.91
Artificial Recharge/Conservation Measures	
Recharge Structures Proposed (No.s)	Percolation Tanks: 0, Check Dams:47 Farm ponds: 540, Recharge Shafts: 65
Improving Water use Efficiency	Micro Irrigation System: 2700 ha
Tentative Total Cost in Lakhs (Rs.)	2143.785
Expected Recharge/Savings (MCM)/yr	9.87

1. INTRODUCTION

Tadipatri Mandal is one of over-exploited mandal in Anantapur district, Andhra Pradesh State, which is economically backward and chronically drought affected. The mandal has 27 inhabited villages and with 26 gram panchayats.

2. LOCATION

The mandal lies between north latitudes 14.805210 to 15.053930 and between east longitudes 77.905300 to 78.139030. The mandal occupies the northeast part of the Anantapur district and is bounded on the north by Yadiki Mandal, on the east by Kadapa district, on the south by Putlur mandal and west by Peddapappu rmandal. (Fig.1) The geographical area of the mandal is 436 sq.km.

3. PHYSIOGRAPHY AND DRAINAGE:

The area is drained by streams which are tributaries of Pennar River. 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 667 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 436 sq.km, the net area sown is 175.92 sq.km. Barren and uncultivable land is 48.7 sq.km. The land for non agricultural use accounts for 42.5 sq.km. (Fig.3)

6. HYDROGEOLOGY

The area is underlain by Shales and Lime stones (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 10 m. The weathered zone has been extensively tapped by dug and dug cum bore wells up to 20 m depth, which are mostly dry now. Ground water occurs in the fractured rocks up to 200 m bgl. The cumulative yield varies from 2-5 lps.

7. GROUND WATER LEVEL SCENARIO

The depth to water level during the pre-monsoon and post-monsoon varies from 5 to 20 m. The average depth to water level (decadal) during pre and post monsoon is 10.8 and 5.8 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 Tadipatri Mandal, Ananthapur District is given in Table-1.

Table-1: Ground water resources of Tadipatri Mandal, Anantapur District.

Annual Replenishable Ground water resources (MCM)	23.37
Net Annual Ground Water Availability(MCM)/yr	21.03
Net Annual Ground Water Draft(MCM)/yr	29.51
Projected Demand for Domestic and Industrial use up to 2025. (MCM)	5.57
Stage of Ground water development (%).	140
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 upto20 m. 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

Tadipatri Mandal falls under high stage of ground water development i.e., 140 % 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)	436
Hilly Area (Sq.kms)	2.71
Area suitable for Artificial Recharge (sq.km.)	433.29
Runoff Yield in MCM/yr	47.50
Existing No. of Check Dams	117
Storage created MCM/yr	0.83
Existing No. of Percolation Tanks	12
Storage created MCM/yr	0.08
Total Existing Storage Created	0.91

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 46.59 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 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 667 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.

Thus, a total of 47 **Check dams** are recommended.

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 59 and 6 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 540 farm ponds in 27 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 2700 ha @ 100 ha per village.

13. TENTATIVE COST ESTIMATES (TADIPATRI 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)	47	1.316	5	235	0.987
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)	6	0.066	1	6	0.066
5	Proposed Farm Pond (6 filling) 5*5*1.5 dimension @ 20 farm ponds per each village	540	0.07776	0.25	135	0.069984
6	Proposed Sprinkler/drip/HDPE pipes for 100 ha in each village	2700	16.2	0.6	1620	8.1
7	Proposed Piezometers up to 50 mbgl @ one PZ per Village	27	0	0.6	16.2	0
8 (i)	Total (No. of AR Structures)	679	2.11		421.7	1.772
8 (ii)	Total (ha)	2700			1620	8.1
	Total (8(i) + 8 (ii))				**2041.7**	**9.872**
9	Impact Assessment & O & M -5 % of Total cost of the Scheme				**102.085**	
	Grand Total				**2143.785**	

*(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 9.872 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 140% to 95% (45%)
4. It will also help in controlling soil erosion.

Acknowledgements

The data received from the Director Ground Water Department Andhra Pradesh in respect of the basic inputs is duly acknowledged. The information on existing Artificial Recharge Structures have been taken from the EMUSTER, Department of Rural Development, Government of AP.

EXISTING ARTIFICIAL RECHARGE STRUCTURES

TADIPATRI MANDAL, ANANTAPUR DISTRICT, AP

S.no	Gram Panchayat	Habitation	Structure Type	Longitude	Latitude	Scheme
1	Bodaipalle	Bodaipalle	Check Dam	78.0950	14.8902	NREGS
2	Bodaipalle	Bodaipalle	Check Dam	78.0975	14.8874	NREGS
3	Bodaipalle	Bodaipalle	Check Dam	78.0926	14.8941	NREGS
4	Bodaipalle	Bodaipalle	Check Dam	78.1033	14.9076	NREGS
5	Bodaipalle	Bodaipalle	Check Dam	78.1077	14.9197	NREGS
6	Bodaipalle	Bodaipalle	Check Dam	78.1065	14.9252	NREGS
7	Bodaipalle	Bodaipalle	Check Dam	78.1043	14.9257	NREGS
8	Kaverisamudram	Kaverisamudram	Check Dam	78.0116	14.9557	NREGS
9	Kaverisamudram	Kaverisamudram	Check Dam	78.0119	14.9564	NREGS
10	Kaverisamudram	Kaverisamudram	Check Dam	77.9935	14.9740	NREGS
11	Kaverisamudram	Kaverisamudram	Check Dam	77.9962	14.9790	NREGS
12	Kaverisamudram	Kaverisamudram	Check Dam	77.9971	14.9821	NREGS
13	Kaverisamudram	Kaverisamudram	Check Dam	78.0010	14.9864	NREGS
14	Kaverisamudram	Kaverisamudram	Check Dam	77.9983	14.9515	NREGS
15	Terannapalli	Terannapalli	Check Dam	77.9721	14.8769	NREGS
16	Terannapalli	Terannapalli	Check Dam	77.9653	14.8770	NREGS
17	Velamakur	Velamakur	Check Dam	78.0703	14.9030	NREGS
18	Velamakur	Velamakur	Check Dam	78.0802	14.9129	NREGS
19	Velamakur	Velamakur	Check Dam	78.0791	14.9176	NREGS
20	Velamakur	Velamakur	Check Dam	78.0796	14.9203	NREGS
21	Velamakur	Velamakur	Check Dam	78.0820	14.9254	NREGS
22	Velamakur	Velamakur	Check Dam	78.0781	14.9227	NREGS
23	Venkatareddypalli	Venkatareddypalli	Check Dam	78.0271	14.9698	NREGS
24	Venkatareddypalli	Venkatareddypalli	Check Dam	78.0316	14.9663	NREGS
25	Venkatareddypalli	Venkatareddypalli	Check Dam	78.0377	14.9681	NREGS
26	Venkatareddypalli	Venkatareddypalli	Check Dam	78.0417	14.9683	NREGS
27	Venkatareddypalli	Venkatareddypalli	Check Dam	78.0255	14.9643	NREGS
28	Venkatareddypalli	Venkatareddypalli	Check Dam	78.0327	14.9592	NREGS
29	Venkatareddypalli	Venkatareddypalli	Check Dam	78.0349	14.9524	NREGS
30	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9317	14.8675	NREGS
31	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9311	14.8737	NREGS
32	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9319	14.8765	NREGS
33	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9305	14.8816	NREGS
34	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9305	14.8825	NREGS
35	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9292	14.8878	NREGS
36	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9284	14.8898	NREGS
37	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9331	14.8968	NREGS
38	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9364	14.8970	NREGS
39	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9326	14.8941	NREGS

40	Yerraguntapalli	Yerraguntapalli	Check Dam	77.9281	14.8980	NREGS
41	Challavaripalle	Challavaripalle	Check Dam	78.0224	14.8811	NREGS
42	Challavaripalle	Challavaripalle	Check Dam	78.0348	14.8700	NREGS
43	Challavaripalle	Challavaripalle	Check Dam	78.0330	14.8687	NREGS
44	Challavaripalle	Challavaripalle	Check Dam	78.0310	14.8673	NREGS
45	Urichinthala	Talaricheruvu	Check Dam	78.0798	14.9492	NREGS
46	Urichinthala	Urichinthala	Check Dam	78.0886	14.9436	NREGS
47	Urichinthala	Urichinthala	Check Dam	78.0869	14.9445	NREGS
48	Peddapolamada	Peddapolamada	Check Dam	77.9584	14.9319	NREGS
49	Peddapolamada	Peddapolamada	Check Dam	77.9427	14.9192	NREGS
50	Peddapolamada	Peddapolamada	Check Dam	77.9532	14.9157	NREGS
51	Ravivenkatampalli	Ravivenkatampalli	Check Dam	77.9597	14.8969	NREGS
52	Ravivenkatampalli	Ravivenkatampalli	Check Dam	77.9470	14.8850	NREGS
53	Ravivenkatampalli	Ravivenkatampalli	Check Dam	77.9556	14.8634	NREGS
54	Komali	Komali	Check Dam	77.9317	14.9361	NREGS
55	Komali	Komali	Check Dam	77.9286	14.9342	NREGS
56	Komali	Komali	Check Dam	77.9408	14.9348	NREGS
57	Komali	Talagaripalli	Check Dam	77.9270	14.9399	NREGS
58	Chukkalur	Chukkalur	Check Dam	77.9856	14.9547	NREGS
59	Chukkalur	Varadaiahpalli	Check Dam	77.9936	14.9740	NREGS
60	Chukkalur	Varadaiahpalli	Check Dam	77.9972	14.9819	NREGS
61	Chukkalur	Varadaiahpalli	Check Dam	77.9962	14.9789	NREGS
62	Chukkalur	Varadaiahpalli	Check Dam	78.0010	14.9866	NREGS
63	Gangadevipalli	Gangadevipalle	Check Dam	77.9614	14.9731	NREGS
64	Gangadevipalli	Gangadevipalle	Check Dam	77.9646	14.9715	NREGS
65	Gangadevipalli	Gangadevipalle	Check Dam	77.9594	14.9757	NREGS
66	Gangadevipalli	Gangadevipalle	Check Dam	77.9761	14.9789	NREGS
67	Alur	Alur	Check Dam	78.0574	14.9077	NREGS
68	Alur	Alur	Check Dam	78.0575	14.9053	NREGS
69	Alur	Alur	Check Dam	78.0761	14.9406	NREGS
70	Alur	Avulathippiahpalli	Check Dam	78.0445	14.9533	NREGS
71	Gannavaripalli	Thippareddypalli	Check Dam	77.9947	14.8827	NREGS
72	Gannavaripalli	Thippareddypalli	Check Dam	78.0015	14.8827	NREGS
73	Diguvapalli	Diguvapalli	Check Dam	77.9644	14.8662	NREGS
74	Diguvapalli	Eguvapalli	Check Dam	77.9611	14.8546	NREGS
75	Diguvapalli	M.Kottalapalli	Check Dam	77.9763	14.8721	NREGS
76	Brahmanapalle	Brahmanapalle	Check Dam	77.9539	14.9966	NREGS
77	Brahmanapalle	Brahmanapalle	Check Dam	77.9525	14.9963	NREGS
78	Brahmanapalle	Brahmanapalle	Check Dam	77.9617	14.9948	NREGS
79	Brahmanapalle	Thimepalli	Check Dam	77.9694	15.0196	NREGS
80	Brahmanapalle	Thimepalli	Check Dam	77.9690	15.0142	NREGS
81	Brahmanapalle	Thimepalli	Check Dam	77.9746	15.0093	NREGS
82	Brahmanapalle	Thimepalli	Check Dam	77.9755	15.0094	NREGS
83	Brahmanapalle	Thimepalli	Check Dam	77.9674	15.0172	NREGS

84	Brahmanapalle	Thimepalli	Check Dam	77.9796	15.0267	NREGS
85	Brahmanapalle	Thimepalli	Check Dam	77.9733	15.0202	NREGS
86	Igudur	Igudur	Check Dam	77.9317	14.9653	NREGS
87	Igudur	Igudur	Check Dam	77.9317	14.9670	NREGS
88	Bhogasamudram	Ayyavaripalle	Check Dam	78.0089	15.0180	NREGS
89	Bhogasamudram	Ayyavaripalle	Check Dam	78.0010	15.0303	NREGS
90	Bhogasamudram	Bhogasamudram	Check Dam	78.0100	15.0099	NREGS
91	Bhogasamudram	Bhogasamudram	Check Dam	78.0091	15.0072	NREGS
92	Bhogasamudram	Bhogasamudram	Check Dam	78.0164	15.0082	NREGS
93	Bhogasamudram	Bhogasamudram	Check Dam	78.0096	15.0112	NREGS
94	Bhogasamudram	Bhogasamudram	Check Dam	78.0228	14.9994	NREGS
95	Bhogasamudram	Bhogasamudram	Check Dam	78.0100	15.0135	NREGS
96	Bhogasamudram	Gadaraguttapalli	Check Dam	78.0242	14.9970	NREGS
97	Bhogasamudram	Venkatampalle	Check Dam	77.9892	15.0152	NREGS
98	Bhogasamudram	Venkatampalle	Check Dam	77.9844	15.0227	NREGS
99	Bhogasamudram	Venkatampalle	Check Dam	77.9843	15.0359	NREGS
100	Bhogasamudram	Venkatampalle	Check Dam	77.9842	15.0365	NREGS
101	Bhogasamudram	Venkatampalle	Check Dam	77.9830	15.0186	NREGS
102	Bhogasamudram	Venkatampalle	Check Dam	77.9851	15.0260	NREGS
103	Bhogasamudram	Venkatampalle	Check Dam	77.9862	15.0249	NREGS
104	Bhogasamudram	Venkatampalle	Check Dam	77.9746	15.0186	NREGS
105	Bhogasamudram	Venkatampalle	Check Dam	77.9836	15.0391	NREGS
106	Bhogasamudram	Venkatampalle	Check Dam	77.9829	15.0411	NREGS
107	Bhogasamudram	Venkatampalle	Check Dam	77.9843	15.0480	NREGS
108	Bhogasamudram	Venkatampalle	Check Dam	77.9846	15.0316	NREGS
109	Bhogasamudram	Venkatampalle	Check Dam	77.9828	15.0348	NREGS
110	Sajjaladinne	Sajjaladinne	Check Wall	78.0176	14.9304	NREGS
111	Venkatareddypalli	Venkatareddypalli	Check Wall	78.0336	14.9667	NREGS
112	Challavaripalle	Challavaripalle	Check Wall	78.0374	14.8732	NREGS
113	Challavaripalle	Challavaripalle	Check Wall	78.0346	14.8709	NREGS
114	Urichinthala	Talaricheruvu	Check Wall	78.0660	14.9718	NREGS
115	Peddapolamada	Peddapolamada	Check Wall	77.9525	14.9253	NREGS
116	Brahmanapalle	DiguvaKothur	Check Wall	77.9603	15.0012	NREGS
117	Brahmanapalle	Thimepalli	Check Wall	77.9693	15.0194	NREGS
118	Bhogasamudram	Ayyavaripalle	MPT	78.0021	15.0313	NREGS
119	Bhogasamudram	Venkatampalle	MPT	77.9855	15.0298	NREGS
120	Kaverisamudram	Kaverisamudram	PT	77.9965	14.9761	NREGS
121	Yerraguntapalli	Yerraguntapalli	PT	77.9294	14.8684	NREGS
122	Urichinthala	Urichinthala	PT	78.1025	14.9404	NREGS
123	Urichinthala	Urichinthala	PT	78.0880	14.9492	NREGS
124	Gangadevipalli	Gangadevipalle	PT	77.9790	14.9834	NREGS
125	Alur	Alur	PT	78.0566	14.9334	NREGS
126	Alur	Alur	PT	78.0666	14.9275	NREGS
127	Alur	Alur	PT	78.0677	14.9249	NREGS

128	Igudur	Igudur	PT	77.9342	14.9724	NREGS
129	Bhogasamudram	Ayyavaripalle	PT	78.0024	15.0348	NREGS

PROPOSED ARTIFICIAL RECHARGE STRUCTURES
TADIPATRI MANDAL, ANANTAPUR DISTRICT, AP.

S.No.	Mandal	Lattitude	Longitude	Structure_Type
1	Tadipatri	14.9874	78.0250	CheckDam
2	Tadipatri	14.9904	77.9902	CheckDam
3	Tadipatri	14.9777	77.9875	CheckDam
4	Tadipatri	14.9691	77.9830	CheckDam
5	Tadipatri	14.9178	77.9778	CheckDam
6	Tadipatri	14.8984	77.9988	CheckDam
7	Tadipatri	14.8884	78.0285	CheckDam
8	Tadipatri	14.8758	78.0460	CheckDam
9	Tadipatri	14.8685	78.0698	CheckDam
10	Tadipatri	14.8641	78.0791	CheckDam
11	Tadipatri	14.8405	78.0760	CheckDam
12	Tadipatri	14.8531	78.0688	CheckDam
13	Tadipatri	14.8785	77.9830	CheckDam
14	Tadipatri	14.8944	77.9706	CheckDam
15	Tadipatri	14.9078	77.9551	CheckDam
16	Tadipatri	14.8994	77.9454	CheckDam
17	Tadipatri	14.9308	77.9499	CheckDam
18	Tadipatri	14.8461	78.0009	CheckDam
19	Tadipatri	14.8302	78.0805	CheckDam
20	Tadipatri	14.9264	78.1225	CheckDam
21	Tadipatri	14.8235	78.0615	CheckDam
22	Tadipatri	14.8488	78.0519	CheckDam
23	Tadipatri	14.8501	78.1008	CheckDam
24	Tadipatri	14.8608	77.9492	CheckDam
25	Tadipatri	14.8948	78.0161	CheckDam
26	Tadipatri	14.8938	77.9830	CheckDam
27	Tadipatri	14.9424	78.0102	CheckDam
28	Tadipatri	14.9238	78.0422	CheckDam
29	Tadipatri	14.9061	78.0901	CheckDam
30	Tadipatri	14.9214	78.1201	CheckDam
31	Tadipatri	15.0094	77.9902	CheckDam
32	Tadipatri	14.9997	77.9837	CheckDam
33	Tadipatri	14.9764	78.0264	CheckDam
34	Tadipatri	14.9444	78.0336	CheckDam
35	Tadipatri	14.9264	78.0540	CheckDam
36	Tadipatri	14.9321	78.0715	CheckDam

37	Tadipatri	14.9171	78.0870	CheckDam
38	Tadipatri	14.9724	77.9203	CheckDam
39	Tadipatri	14.9621	77.9454	CheckDam
40	Tadipatri	14.9218	77.9654	CheckDam
41	Tadipatri	14.9381	78.0037	CheckDam
42	Tadipatri	14.9667	78.0164	CheckDam
43	Tadipatri	14.8904	78.0557	CheckDam
44	Tadipatri	14.9634	78.0491	CheckDam
45	Tadipatri	14.9577	78.0412	CheckDam
46	Tadipatri	14.8398	77.9820	CheckDam
47	Tadipatri	14.8788	78.0157	CheckDam

Fig.1

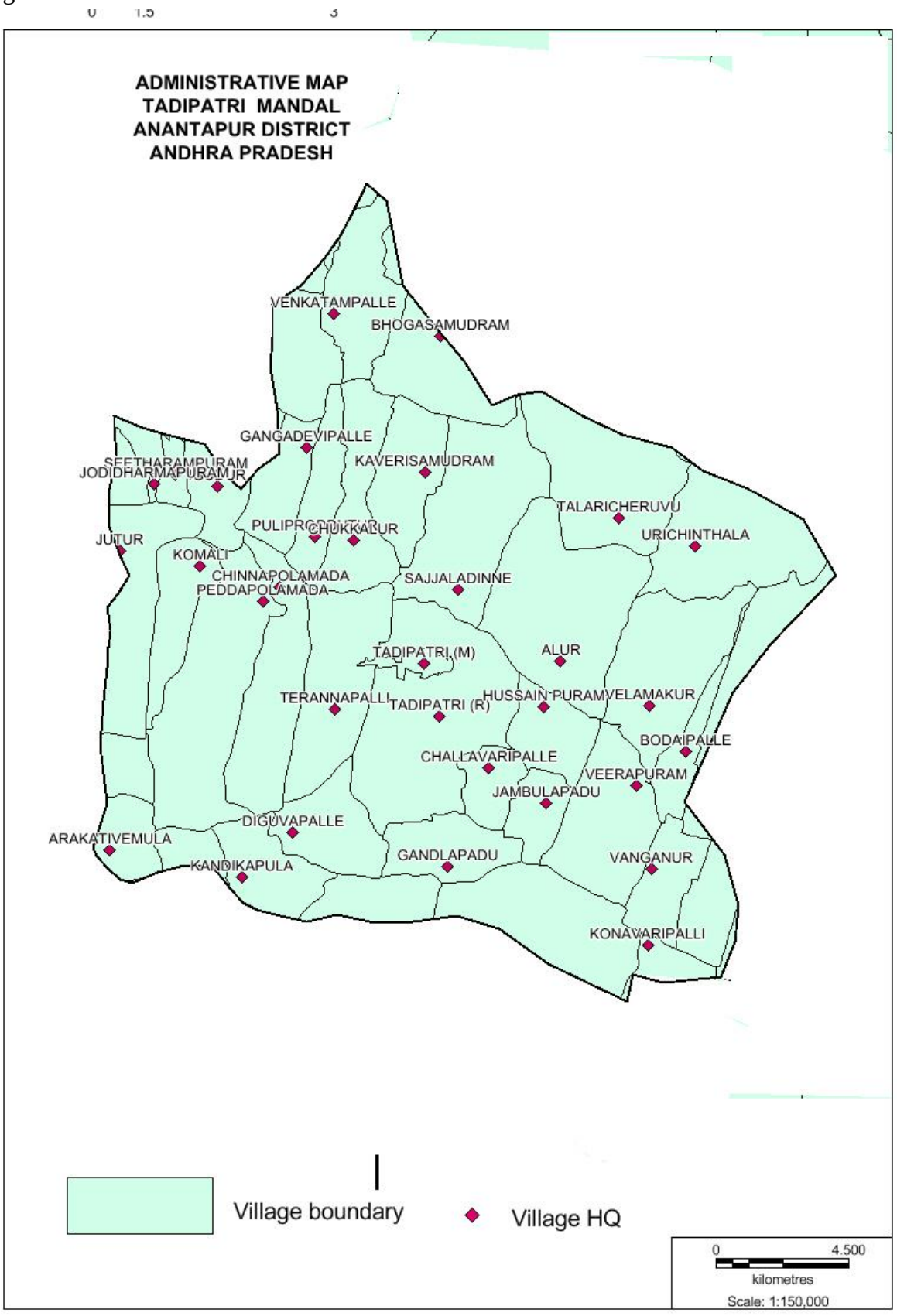

ADMINISTRATIVE MAP
TADIPATRI MANDAL
ANANTAPUR DISTRICT
ANDHRA PRADESH
VENKATAMPALLE
BHOGASAMUDRAM
GANGADEVIPALLE
KAVERISAMUDRAM
SEETHARAMPURAM
JODIDHARMAPURAMJR
TALARICHERUVU
URICHINTHALA
CHUKKALUR
JUTUR
KOMALI
CHINNAPOLAMADA
PEDDAPOLAMADA
SAJJALADINNE
TADIPATRI (M)
ALUR
TERANNAPALLI
TADIPATRI (R)
HUSSAIN PURAM
VELAMAKUR
BODAIPALLE
CHALLAVARIPALLE
VEERAPURAM
JAMBULAPADU
DIGUVAPALLE
ARAKATIVEMULA
GANDLAPADU
VANGANUR
KANDIKAPULA
KONAVARIPALLI
Village boundary
Village HQ
0
4.500
kilometres
Scale: 1:150,000

Fig.2

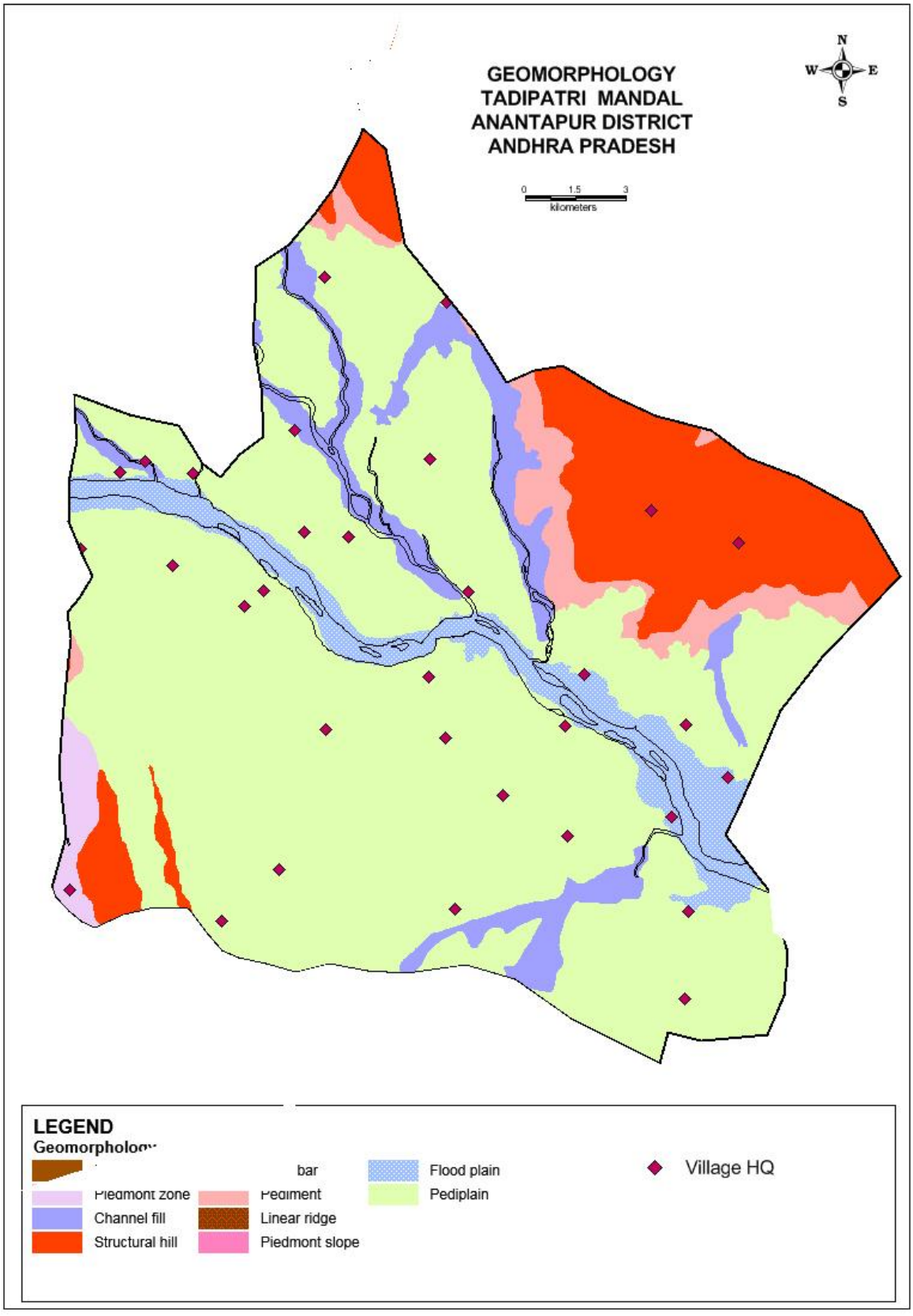

GEOMORPHOLOGY
TADIPATRI MANDAL
ANANTAPUR DISTRICT
ANDHRA PRADESH
N
W
E
S
0
1.5
3
kilometers
LEGEND
Geomorpholo
bar
Flood plain
Village HQ
Piedmont zone
Pediment
Pediplain
Channel fill
Linear ridge
Structural hill
Piedmont slope

Fig.3

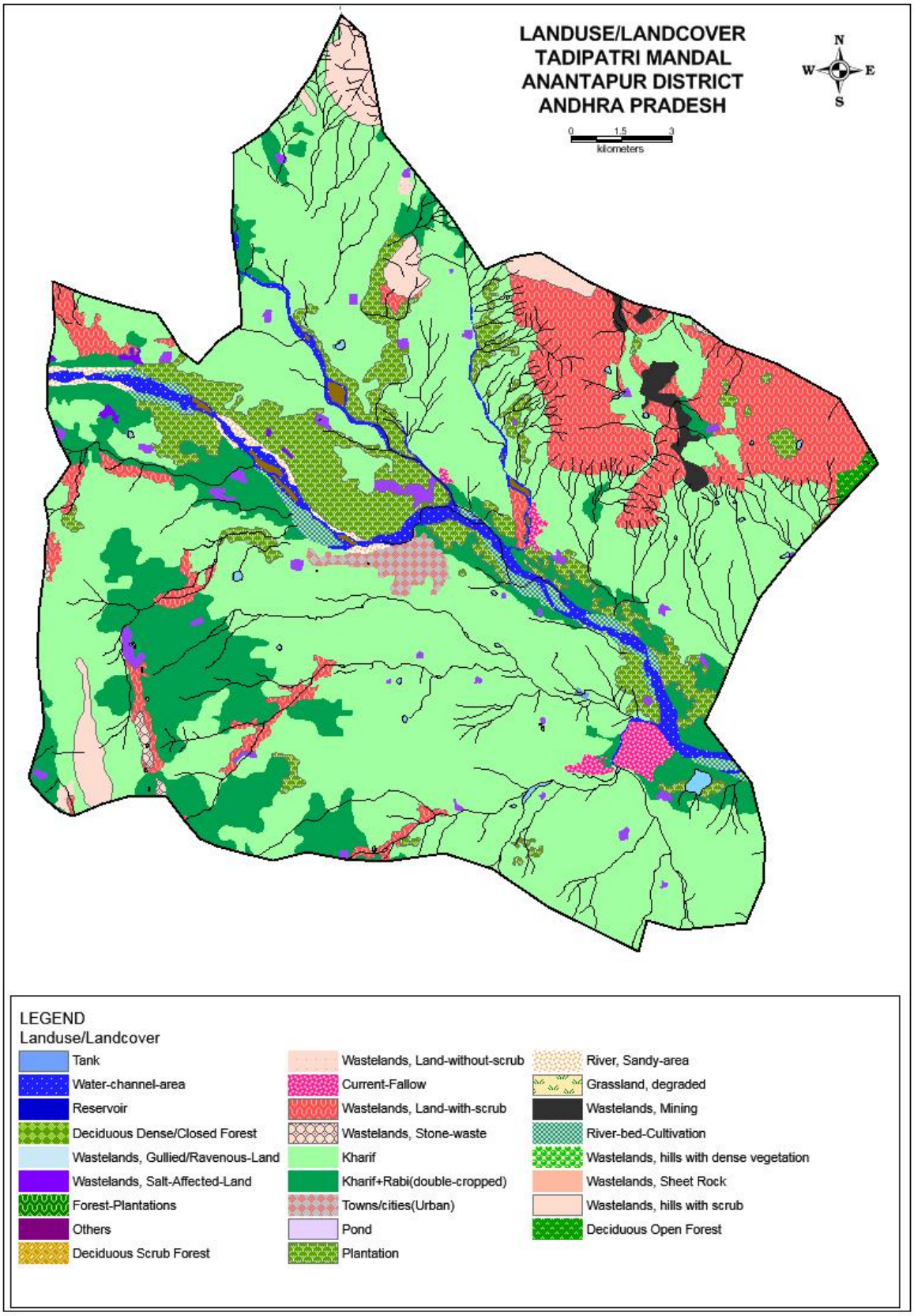

LANDUSE/LANDCOVER
TADIPATRI MANDAL
ANANTAPUR DISTRICT
ANDHRA PRADESH
N
W
E
S
0
1.5
3
kilometers
LEGEND
Landuse/Landcover
Tank
Water-channel-area
Reservoir
Deciduous Dense/Closed Forest
Wastelands, Gullied/Ravenous-Land
Wastelands, Salt-Affected-Land
Forest-Plantations
Others
Deciduous Scrub Forest
Wastelands, Land-without-scrub
Current-Fallow
Wastelands, Land-with-scrub
Wastelands, Stone-waste
Kharif
Kharif+Rabi(double-cropped)
Towns/cities(Urban)
Pond
Plantation
River, Sandy-area
Grassland, degraded
Wastelands, Mining
River-bed-Cultivation
Wastelands, hills with dense vegetation
Wastelands, Sheet Rock
Wastelands, hills with scrub
Deciduous Open Forest

Fig.4

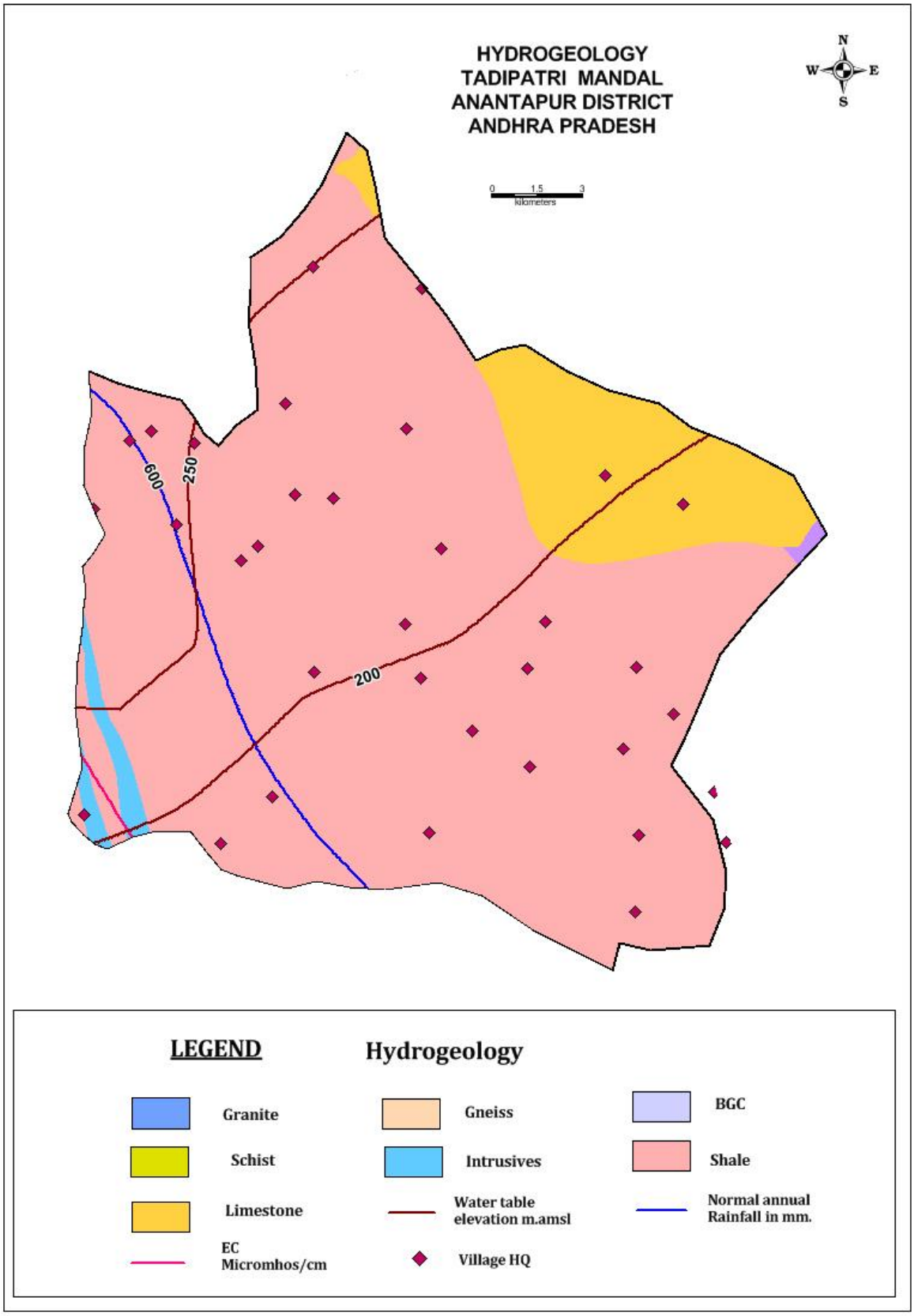

HYDROGEOLOGY
TADIPATRI MANDAL
ANANTAPUR DISTRICT
ANDHRA PRADESH
N
W
E
S
0 1.5 3
kilometers
600
250
200
LEGEND
Hydrogeology
Granite
Gneiss
BGC
Schist
Intrusives
Shale
Limestone
Water table elevation m.amsl
Normal annual Rainfall in mm.
EC Micromhos/cm
Village HQ

Fig.5

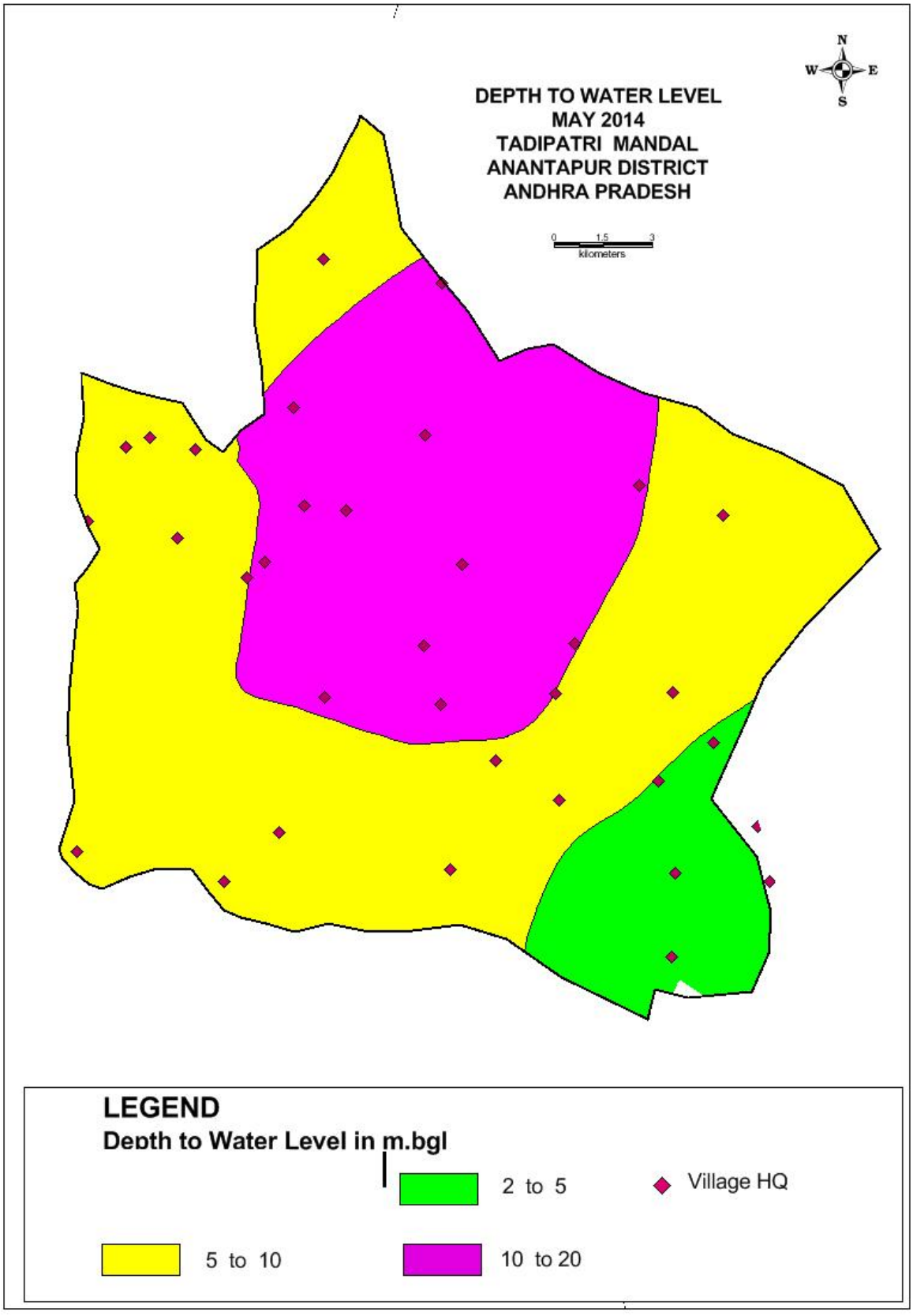

N
W
E
S
DEPTH TO WATER LEVEL
MAY 2014
TADIPATRI MANDAL
ANANTAPUR DISTRICT
ANDHRA PRADESH
0 1.5 3
kilometers
LEGEND
Depth to Water Level in m.bgl
2 to 5
Village HQ
5 to 10
10 to 20

Fig.6

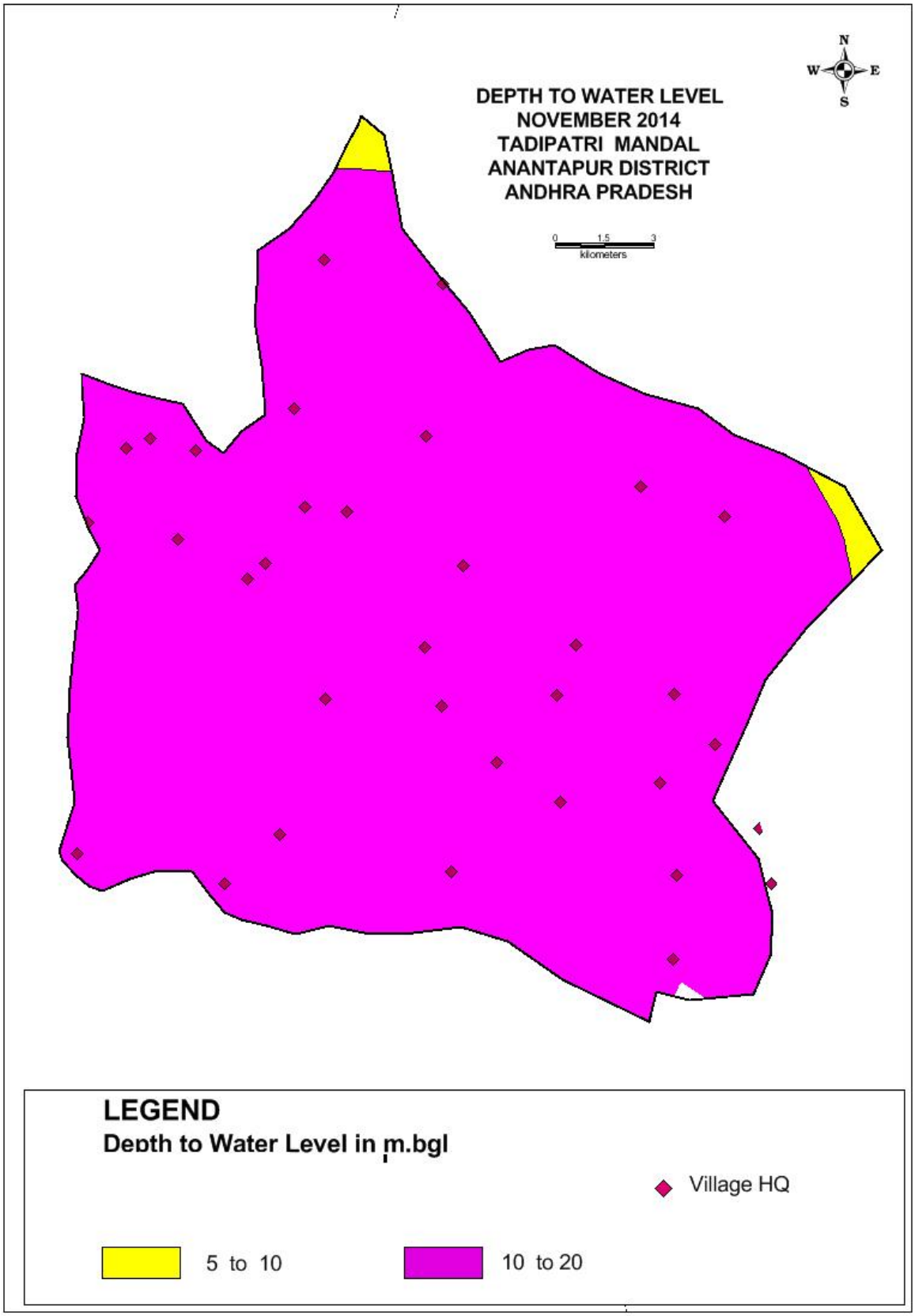
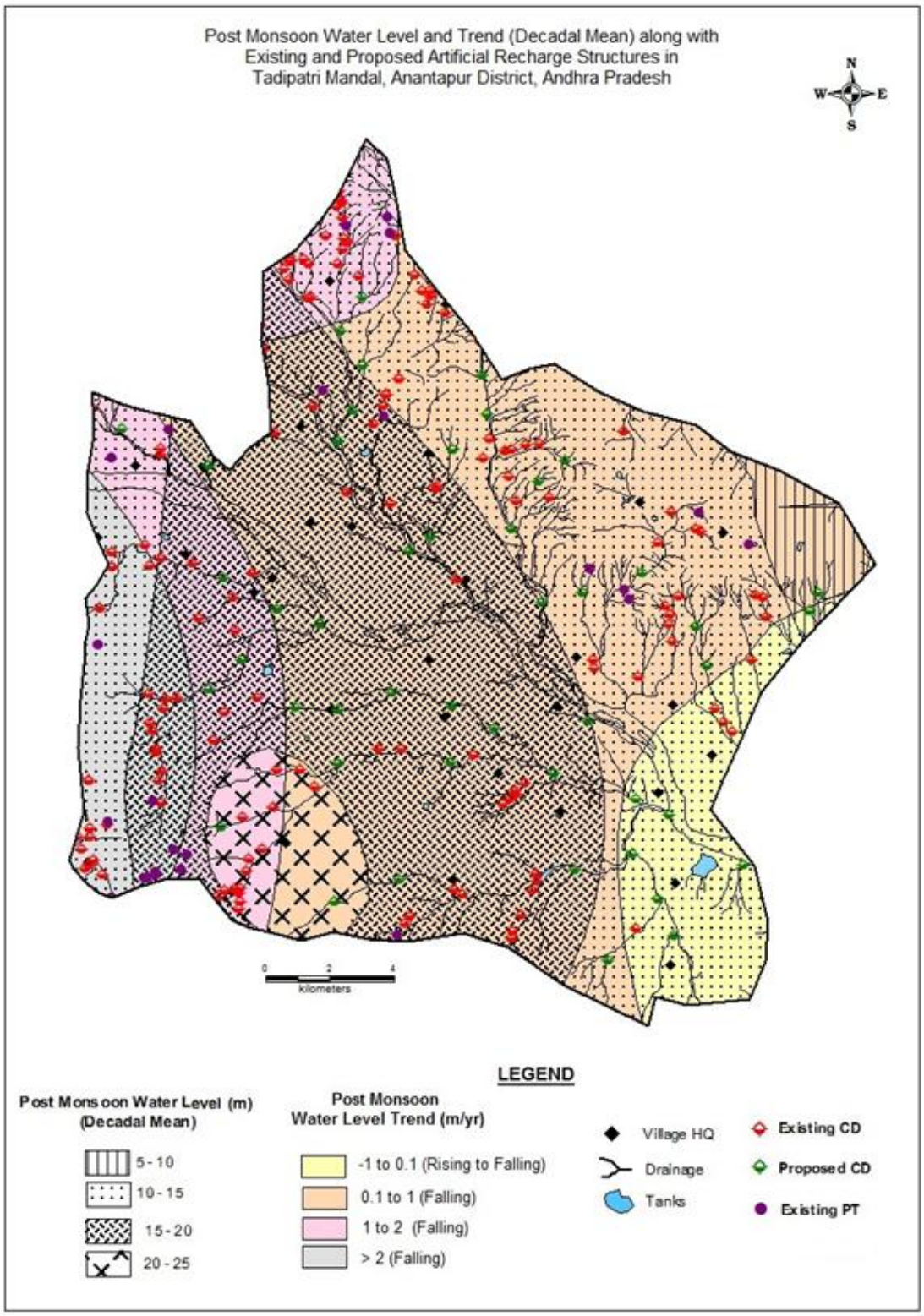

N
W
E
S
DEPTH TO WATER LEVEL
NOVEMBER 2014
TADIPATRI MANDAL
ANANTAPUR DISTRICT
ANDHRA PRADESH
0 1.5 3
kilometers
LEGEND
Depth to Water Level in m.bgl
Village HQ
5 to 10
10 to 20

Fig.7


Post Monsoon Water Level and Trend (Decadal Mean) along with
Existing and Proposed Artificial Recharge Structures in
Tadipatri Mandal, Anantapur District, Andhra Pradesh
N
W
E
S
0
2
4
kilometers
LEGEND
Post Monsoon Water Level (m) (Decadal Mean)
5 - 10
10 - 15
15 - 20
20 - 25
Post Monsoon Water Level Trend (m/yr)
-1 to 0.1 (Rising to Falling)
0.1 to 1 (Falling)
1 to 2 (Falling)
> 2 (Falling)
Village HQ
Drainage
Tanks
Existing CD
Proposed CD
Existing PT