



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
AMADUGURU MANDAL, ANANTAPUR DISTRICT,
ANDHRA PRADESH

SOUTHERN REGION
HYDERABAD
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PLAN ON
ARTIFICIAL RECHARGE TO GROUNDWATER AND
WATER CONSERVATION IN
AMADUGURU MANDAL, ANANTAPUR DISTRICT,
ANDHRA PRADESH

CONTENTS

S.NO	TOPIC
1	INTRODUCTION
2	LOCATION
3	PHYSIOGRAPHY AND DRAINAGE
4	RAINFALL
5	LAND USE PATTERN
6	HYDROGEOLOGY
7	GROUND WATER LEVEL SCENARIO
8	DYNAMIC GROUND WATER RESOURCES
9	NEED FOR ARTIFICIAL RECHARGE AND CONSERVATION METHODS
10	JUSTIFICATION OF THE ARTIFICIAL RECHARGE PROJECT
11	AVAILABILITY OF SURPLUS, SURFACE WATER FOR ARTIFICIAL RECAHRGE OR CONSERVATION
12	FEASIBLE ARTIFICIAL RECHARGE STRUCTURES
13	TENTATIVE COST ESTIMATES
14	TIME SCHEDULE

AT A GLANCE

Name of the Mandal	AMADAGURU
District	ANANTAPUR
State	ANDHRA PRADESH
Total Area (Sq.kms)	225
Area suitable for Artificial Recharge (Sq.kms)	186
Latitude and Longitude	13.828300 to 14.094110 and 77.950330 to 78.137520
Average Annual Rainfall (mm)	621
Geology	Granites, Gneisses
Average Depth To Water Level (Decadal) (Pre Monsoon)	17.2
Average Depth To Water Level (Decadal) (Post Monsoon)	8.2
Ground Water Resources (2011)	
Annual Replenishable Ground Water Resources (MCM/yr)	16.26
Net Annual Ground Water Availability (MCM)/yr	14.63
Net Annual Ground Water Draft(MCM)/yr	15.07
Projected Demand for Domestic and Industrial Use(MCM)/yr	1.71
Stage of Ground Water Development (%)	103
Surface runoff available (MCM)/yr	16.38
Total Storage Created in the Mandal by Various Agencies (MCM)/yr	1.18
Artificial Recharge/Water Conservation Measures	
Recharge Structures Proposed (No.s)	Percolation Tanks-7, Check Dams-16 <i>Farm ponds-300, Recharge Shafts-83</i>
Improving Water use Efficiency	<i>Micro Irrigation System -1500 ha</i>
Tentative Total Cost in Lakhs (Rs.)	1279.95 Lakhs
Expected Recharge/Savings (MCM)/yr	6.312

1. INTRODUCTION

Amaduguru Mandal is one of the over-exploited mandals in Anantapur district, Andhra Pradesh State, which is economically backward and chronically drought affected. The mandal has 13 inhabited villages and 2 un-inhabited villages with 15 gram panchayats.

2. LOCATION

The mandal lies between north latitudes 13.828300 to 14.094110 and between east longitudes 77.950330 to 78.137520. The mandal occupies the South east part of the Anantapur district and is bounded on the north by Obuladevara Cheruvu, on the east by Tanakal mandal, on the south by Karnataka State and west by Obuladevara Cheruvu mandal. (Fig.1) The geographical area of the mandal is 225 sq.km.

3. PHYSIOGRAPHY AND DRAINAGE

The area is drained by streams and tributaries of Thungabhadra 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 621 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 225 sq.km, the area covered by forest is 69.42 sq.km and the net area sown is 106.72 sq.km. Barren and uncultivable land is 18.34 sq.km. The land for non-agricultural use accounts for 11.96 sq.km.(Fig.3)

6. HYDROGEOLOGY

The Mandal is underlain by granitic gneisses of Archaean age. The ground water in these formations occurs in the weathered and fractured zones under the water table and Semi-Confined conditions. The weathered zone thickness as per the GEC report is 11m. 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 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 2-18 lps.

7. GROUND WATER LEVEL SCENARIO

The average depth to water level (decadal) during pre and post monsoon is 17.2 and 8.2 m bgl respectively. The depth to water level maps for pre and post monsoon period (2014) is 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 Amaduguru Mandal, Anantapur District is given in Table-1.

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

Annual Replenishable Ground water resources (MCM)	16.26
Net Annual Ground water Availability. (MCM)	14.63
Net Annual Ground water draft. (MCM)	15.07
Projected Demand for Domestic and Industrial use up to 2025. (MCM)	1.71
Stage of Ground water development (%).	103
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 17.2 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

Amaduguru Mandal falls under high stage of ground water development i.e., 103 % and with sufficient amount of uncommitted surface runoff. The area is completely dependent on ground water for domestic industrial and irrigation purposes. During the monsoon 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)	225
Hilly Area (Sq.kms)	39
Area suitable for Artificial Recharge (sq.km.)	186
Surface runoff available (MCM)/yr	16.38
Existing No. of Check Dams	132
Storage created MCM/yr	0.94
Existing No. of Percolation Tanks	34
Storage created MCM/yr	0.24
Total Existing Storage Created	1.18

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 15.2 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 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 621 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 rates.

Thus, **a total of 16 Check dams and 7 Percolation tanks** 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 66 and 17 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 rainwater 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 300 farm ponds in 15 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 even up to 50%. The conveyance losses (mainly seepage & evaporation) can be saved up to 25 to 40% through utilization of HDPE pipes. It is proposed to take up micro irrigation system in 1500 ha @ 100 ha per village.

13. TENTATIVE COST ESTIMATES (AMADUGURU 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)	16	0.448	5	80	0.336
2	Recharge shaft in Check dam (50% of the Existing Check dams)	66	0.726	0.5	33	0.726
3	Proposed Percolation Tanks (100*100*2.5 m)* 4 fillings)	7	0.7	15	105	0.525
4	Renovation Desilting, Repairs and installation of recharge Shafts in existing PTS (50% of the Existing PTS)	17	0.187	1	17	0.187
5	Proposed Farm Pond (6 filling) 5*5*1.5 m dimension @ 20 farm ponds per each village	300	0.0432	0.25	75	0.038
6	Proposed Sprinkler/drip/HDPE pipes for 100 ha in each village	1500		0.6	900	4.5
7	Proposed Piezometers up to 50 m bgl @ one PZ per Village	15	0	0.6	9	0
8 (i)	Total (No. of AR Structures)	421	2.10		319	1.812
8 (ii)	Total (ha)	1500			900	4.5
	Total (8 (i) + 8 (ii))				1219	6.312
9	Impact Assessment & O & M 5 % of total cost of the Scheme	-	-	-	60.95	-
	Grand Total	--	-	-	1279.95	-

*(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 6.32 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 103% to 72% (31%)
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 has been taken from the EMUSTER, Department of Rural Development, Government of Andhra Pradesh.

EXISTING ARTIFICIAL RECHARGE STRUCTURES AMADUGURU MANDAL
ANANTAPUR DISTRICT, AP.

S.no	Gram Panchayat	Habitation	Structure Type	Longitude	Latitude	Scheme
1	Cheekirevulapalle	Cheekirevulapalle	Check Dam	78.0368	13.8694	NREGS
2	Cheekirevulapalle	Cheekirevulapalle	Check Dam	78.0428	13.8690	NREGS
3	Gundubaripalli	Gundubaripalli	Check Dam	78.0248	13.9093	NREGS
4	Gundubaripalli	Gundubaripalli	Check Dam	78.0299	13.8983	NREGS
5	Gundubaripalli	Gundubaripalli	Check Dam	78.0312	13.9083	NREGS
6	Gundubaripalli	Gundubaripalli	Check Dam	78.0446	13.8927	NREGS
7	Kassamudram	Cherlopalli	Check Dam	78.0019	13.9304	NREGS
8	Kassamudram	Cherlopalli	Check Dam	78.0046	13.9323	NREGS
9	Kassamudram	Cherlopalli	Check Dam	77.9995	13.9282	NREGS
10	Kassamudram	Cherlopalli	Check Dam	77.9981	13.9270	NREGS
11	Kassamudram	Cherlopalli	Check Dam	78.0115	13.9327	NREGS
12	Kassamudram	Kanchanagiripalli	Check Dam	78.0154	13.9294	NREGS
13	Kassamudram	Kanchanagiripalli	Check Dam	78.0188	13.9228	NREGS
14	Kassamudram	Kanchanagiripalli	Check Dam	78.0211	13.9252	NREGS
15	Kassamudram	Kanchanagiripalli	Check Dam	78.0329	13.9269	NREGS
16	Kassamudram	Kanchanagiripalli	Check Dam	78.0315	13.9261	NREGS
17	Kassamudram	Kanchanagiripalli	Check Dam	78.0314	13.9304	NREGS
18	Kassamudram	Kanchanagiripalli	Check Dam	78.0304	13.9298	NREGS
19	Kassamudram	Kanchanagiripalli	Check Dam	78.0289	13.9305	NREGS
20	Kassamudram	Kassamudram	Check Dam	78.0085	13.9478	NREGS
21	Kassamudram	Thollapalli	Check Dam	78.0131	13.9239	NREGS
22	Kassamudram	Thollapalli	Check Dam	78.0004	13.9243	NREGS
23	Jowkulakothapalli	Iddevandlapalli	Check Dam	78.0352	13.9861	NREGS
24	Jowkulakothapalli	Iddevandlapalli	Check Dam	78.0423	13.9873	NREGS
25	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0261	13.9760	NREGS
26	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0288	13.9811	NREGS
27	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0319	13.9791	NREGS
28	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0373	13.9782	NREGS
29	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0419	13.9776	NREGS
30	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0453	13.9755	NREGS
31	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0468	13.9731	NREGS
32	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0480	13.9691	NREGS
33	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0479	13.9653	NREGS
34	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0434	13.9706	NREGS
35	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0403	13.9739	NREGS
36	Jowkulakothapalli	Jowkulakothapalle	Check Dam	78.0449	13.9646	NREGS
37	Jowkulakothapalli	Kandukurvandlapalli	Check Dam	78.0057	13.9865	NREGS
38	Mohammadabad	Bavicheruvupalli	Check Dam	78.0246	13.9435	NREGS
39	Mohammadabad	Gollapalli	Check Dam	77.9983	13.9668	NREGS
40	Mohammadabad	Gollapalli	Check Dam	78.0007	13.9736	NREGS

41	Mohammadabad	Kokkantivaripalli	Check Dam	78.0077	13.9776	NREGS
42	Mohammadabad	Kokkantivaripalli	Check Dam	78.0089	13.9749	NREGS
43	Mohammadabad	Niluvurathipalli	Check Dam	78.0216	13.9487	NREGS
44	Mohammadabad	Niluvurathipalli	Check Dam	78.0298	13.9539	NREGS
45	Mohammadabad	Niluvurathipalli	Check Dam	78.0317	13.9556	NREGS
46	Mohammadabad	Patravandlapalli	Check Dam	78.0021	13.9565	NREGS
47	Mohammadabad	Patravandlapalli	Check Dam	77.9987	13.9583	NREGS
48	Mohammadabad	Thimirikuntapalli	Check Dam	77.9905	13.9419	NREGS
49	Mohammadabad	Thimirikuntapalli	Check Dam	77.9925	13.9336	NREGS
50	Mohammadabad	Thimirikuntapalli	Check Dam	77.9928	13.9454	NREGS
51	Mohammadabad	Thimirikuntapalli	Check Dam	77.9914	13.9439	NREGS
52	Pulikuntapalli	Bachalavandlapalli	Check Dam	78.1021	13.8882	NREGS
53	Pulikuntapalli	Bodigundlavaripalli	Check Dam	78.1045	13.8640	NREGS
54	Pulikuntapalli	Dudaragutta	Check Dam	78.0801	13.8872	NREGS
55	Pulikuntapalli	Gopalnaikthanda	Check Dam	78.0993	13.8831	NREGS
56	Pulikuntapalli	Gopalnaikthanda	Check Dam	78.1005	13.8766	NREGS
57	Pulikuntapalli	Lokojipalle	Check Dam	78.0894	13.8666	NREGS
58	Pulikuntapalli	Lokojipalle	Check Dam	78.0898	13.8724	NREGS
59	Pulikuntapalli	Lokojipalle	Check Dam	78.0878	13.8746	NREGS
60	Pulikuntapalli	Lokojipalle	Check Dam	78.0848	13.8761	NREGS
61	Pulikuntapalli	Lokojipalle	Check Dam	78.0838	13.8769	NREGS
62	Pulikuntapalli	Maddammagudipalli	Check Dam	78.0824	13.8826	NREGS
63	Pulikuntapalli	Maddammagudipalli	Check Dam	78.0814	13.8846	NREGS
64	Pulikuntapalli	Pulakuntlapalle	Check Dam	78.1025	13.8968	NREGS
65	Pulikuntapalli	Pulakuntlapalle	Check Dam	78.1007	13.8982	NREGS
66	Pulikuntapalli	Pulakuntlapalle	Check Dam	78.1030	13.9093	NREGS
67	Pulikuntapalli	Pulakuntlapalle	Check Dam	78.1034	13.8951	NREGS
68	Pulikuntapalli	Pulakuntlapalle	Check Dam	78.1051	13.8893	NREGS
69	Pulikuntapalli	Pulakuntlapalle	Check Dam	78.0945	13.8906	NREGS
70	Chinaganipalli	Akulavaripalli	Check Dam	77.9680	13.8533	NREGS
71	Chinaganipalli	Bavajivaripalli	Check Dam	77.9548	13.8541	NREGS
72	Chinaganipalli	Bavajivaripalli	Check Dam	77.9567	13.8493	NREGS
73	Chinaganipalli	Cheruvamudarapalli	Check Dam	77.9700	13.8797	NREGS
74	Chinaganipalli	Chinapallipalli	Check Dam	77.9776	13.8892	NREGS
75	Chinaganipalli	Chinapallipalli	Check Dam	77.9798	13.8892	NREGS
76	Chinaganipalli	Chinapallipalli	Check Dam	77.9775	13.8872	NREGS
77	Chinaganipalli	Chinapallipalli	Check Dam	77.9656	13.8793	NREGS
78	Chinaganipalli	Chinapallipalli	Check Dam	77.9660	13.8813	NREGS
79	Chinaganipalli	Chinapallipalli	Check Dam	77.9662	13.8866	NREGS
80	Chinaganipalli	Edigavaripalle	Check Dam	77.9736	13.8569	NREGS
81	Chinaganipalli	Gandlavaripalli	Check Dam	77.9672	13.8413	NREGS
82	Chinaganipalli	Gandlavaripalli	Check Dam	77.9569	13.8298	NREGS
83	Chinaganipalli	Gandlavaripalli	Check Dam	77.9592	13.8369	NREGS
84	Chinaganipalli	Kammavaripalli	Check Dam	77.9664	13.8643	NREGS
85	Chinaganipalli	Kammavaripalli	Check Dam	77.9643	13.8604	NREGS

86	Chinaganipalli	Maruthipuram	Check Dam	77.9704	13.8562	NREGS
87	Chinaganipalli	Maruthipuram	Check Dam	77.9676	13.8558	NREGS
88	Thummala	Balapagaripalli	Check Dam	78.0624	13.9026	NREGS
89	Thummala	Balapagaripalli	Check Dam	78.0635	13.8997	NREGS
90	Thummala	Eguvaguvvalapalli	Check Dam	78.0497	13.9075	NREGS
91	Thummala	Eguvaguvvalapalli	Check Dam	78.0573	13.9216	NREGS
92	Thummala	Erragundlavaripalli	Check Dam	78.0599	13.9053	NREGS
93	Thummala	Erragundlavaripalli	Check Dam	78.0563	13.9120	NREGS
94	Thummala	Erragundlavaripalli	Check Dam	78.0553	13.9077	NREGS
95	Thummala	Kanchravadlapalli	Check Dam	78.0884	13.9083	NREGS
96	Thummala	Kanchravadlapalli	Check Dam	78.0873	13.9016	NREGS
97	Thummala	Kanchravadlapalli	Check Dam	78.0852	13.9005	NREGS
98	Thummala	Kanchravadlapalli	Check Dam	78.0841	13.8996	NREGS
99	Thummala	Kanchravadlapalli	Check Dam	78.0793	13.8967	NREGS
100	Thummala	Kanchravadlapalli	Check Dam	78.0793	13.8952	NREGS
101	Thummala	Kottuvaripalli	Check Dam	78.0516	13.9247	NREGS
102	Thummala	Kottuvaripalli	Check Dam	78.0615	13.9230	NREGS
103	Thummala	M K PalliSugaliTha	Check Dam	78.0796	13.9572	NREGS
104	Thummala	M K PalliSugaliTha	Check Dam	78.0854	13.9613	NREGS
105	Thummala	Malakavaripalli	Check Dam	78.0675	13.9370	NREGS
106	Amadagur	Amadagur	Check Dam	78.0054	13.9056	NREGS
107	Amadagur	Balakavaripalli	Check Dam	78.0205	13.8982	NREGS
108	Amadagur	Kolimirallapalli	Check Dam	78.0001	13.9140	NREGS
109	Amadagur	Kolimirallapalli	Check Dam	78.0060	13.9166	NREGS
110	Amadagur	Kothapalli	Check Dam	78.0011	13.8972	NREGS
111	Amadagur	Mamidimakulapalli	Check Dam	78.0333	13.9184	NREGS
112	Amadagur	Mamidimakulapalli	Check Dam	78.0343	13.9175	NREGS
113	Amadagur	Mamidimakulapalli	Check Dam	78.0372	13.9139	NREGS
114	Amadagur	Peramoandlapalli	Check Dam	77.9911	13.8988	NREGS
115	Amadagur	Peramoandlapalli	Check Dam	77.9883	13.9082	NREGS
116	Amadagur	Putlavandlapalli	Check Dam	77.9906	13.8832	NREGS
117	Amadagur	Putlavandlapalli	Check Dam	77.9966	13.8814	NREGS
118	Amadagur	Reddivaripalli	Check Dam	78.0272	13.8745	NREGS
119	Amadagur	Reddivaripalli	Check Dam	78.0212	13.8744	NREGS
120	Amadagur	Reddivaripalli	Check Dam	78.0177	13.8743	NREGS
121	Amadagur	Reddivaripalli	Check Dam	78.0212	13.8855	NREGS
122	Amadagur	Reddivaripalli	Check Dam	78.0265	13.8646	NREGS
123	Amadagur	Reddivaripalli	Check Dam	78.0302	13.8735	NREGS
124	Amadagur	Seethireddipalli	Check Dam	78.0293	13.8825	NREGS
125	Amadagur	Seethireddipalli	Check Dam	78.0328	13.8838	NREGS
126	Amadagur	Seethireddipalli	Check Dam	78.0274	13.8807	NREGS
127	Mohammadabad	Bavicheruvupalli	Check Wall	78.0239	13.9415	NREGS
128	Pulikuntapalli	Pulakuntlapalle	Check Wall	78.1090	13.8927	NREGS
129	Pulikuntapalli	Pulakuntlapalle	Check Wall	78.1035	13.8936	NREGS
130	Thummala	Kanchravadlapalli	Check Wall	78.0820	13.8987	NREGS

131	Amadagur	Mamidimakulapalli	Check Wall	78.0387	13.9185	NREGS
132	Amadagur	Seethireddipalli	Check Wall	78.0252	13.8831	NREGS
133	Pulikuntapalli	Bachalavandlapalli	MPT	78.1031	13.8867	NREGS
134	Pulikuntapalli	Bachalavandlapalli	MPT	78.1032	13.8880	NREGS
135	Thummala	Malakavaripalli	MPT	78.0602	13.9458	NREGS
136	Amadagur	Kolimirallapalli	MPT	77.9974	13.9174	NREGS
137	Amadagur	Kolimirallapalli	MPT	77.9981	13.9167	NREGS
138	Amadagur	Kolimirallapalli	MPT	77.9943	13.9231	NREGS
139	Amadagur	Kolimirallapalli	MPT	77.9890	13.9260	NREGS
140	Kassamudram	Cherlopalli	PT	77.9945	13.9241	NREGS
141	Kassamudram	Cherlopalli	PT	78.0112	13.9291	NREGS
142	Kassamudram	Kassamudram	PT	78.0141	13.9414	NREGS
143	Kassamudram	Thollapalli	PT	78.0067	13.9211	NREGS
144	Kassamudram	Thollapalli	PT	78.0105	13.9225	NREGS
145	Kassamudram	Thollapalli	PT	78.0104	13.9264	NREGS
146	Mohammadabad	Gollapalli	PT	78.0031	13.9783	NREGS
147	Mohammadabad	Sangeethampalli	PT	77.9914	13.9510	NREGS
148	Mohammadabad	Thimirikuntapalli	PT	77.9976	13.9403	NREGS
149	Mohammadabad	Thimirikuntapalli	PT	77.9886	13.9336	NREGS
150	Mohammadabad	Thimirikuntapalli	PT	77.9915	13.9367	NREGS
151	Mohammadabad	Thimirikuntapalli	PT	77.9923	13.9390	NREGS
152	Mohammadabad	Thimirikuntapalli	PT	77.9921	13.9437	NREGS
153	Mohammadabad	Vaddipalli	PT	78.0001	13.9645	NREGS
154	Pulikuntapalli	Bodigundlavaripalli	PT	78.0978	13.8657	NREGS
155	Pulikuntapalli	Gopalnaikthanda	PT	78.0989	13.8807	NREGS
156	Pulikuntapalli	Karimireddipalle	PT	78.1126	13.8752	NREGS
157	Pulikuntapalli	Karimireddipalle	PT	78.1155	13.8713	NREGS
158	Pulikuntapalli	Karimireddipalle	PT	78.0696	13.8914	NREGS
159	Pulikuntapalli	Karimireddipalle	PT	78.0702	13.8899	NREGS
160	Pulikuntapalli	Lokojipalle	PT	78.0846	13.8655	NREGS
161	Pulikuntapalli	Pulakuntlapalle	PT	78.0994	13.9027	NREGS
162	Pulikuntapalli	Pulakuntlapalle	PT	78.1098	13.8991	NREGS
163	Chinaganipalli	Bavajivaripalli	PT	77.9549	13.8566	NREGS
164	Chinaganipalli	Bavajivaripalli	PT	77.9537	13.8418	NREGS
165	Chinaganipalli	Kammavaripalli	PT	77.9639	13.8684	NREGS
166	Chinaganipalli	Mattavaripalli	PT	77.9633	13.8396	NREGS

PROPOSED ARTIFICIAL RECHARGE STRUCTURES AMADUGURU MANDAL,
ANANTAPUR DIST, AP.

S.No.	Mandal	Lattitude	Longitude	Structure_Type
1	Amadaguru	13.96556	78.02832	CheckDam
2	Amadaguru	13.99436	78.00444	CheckDam
3	Amadaguru	14.00344	77.9996	CheckDam
4	Amadaguru	13.99749	78.03412	CheckDam
5	Amadaguru	13.94897	78.04058	CheckDam
6	Amadaguru	13.94083	78.04638	CheckDam
7	Amadaguru	13.9402	78.08478	CheckDam
8	Amadaguru	13.91954	78.07832	CheckDam
9	Amadaguru	13.96055	78.11188	CheckDam
10	Amadaguru	13.97589	78.12188	CheckDam
11	Amadaguru	13.97839	78.10155	CheckDam
12	Amadaguru	13.9449	78.11833	CheckDam
13	Amadaguru	13.92173	78.09897	CheckDam
14	Amadaguru	13.91547	78.108	CheckDam
15	Amadaguru	13.91078	78.11736	CheckDam
16	Amadaguru	13.96744	78.09445	CheckDam
17	Amadaguru	13.90388	78.07229	Percolation Tank
18	Amadaguru	13.94054	78.10776	Percolation Tank
19	Amadaguru	13.90294	78.04487	Percolation Tank
20	Amadaguru	13.88471	78.01246	Percolation Tank
21	Amadaguru	13.87763	77.98082	Percolation Tank
22	Amadaguru	13.87093	78.10412	Percolation Tank
23	Amadaguru	13.90108	78.0278	Percolation Tank

Fig.1

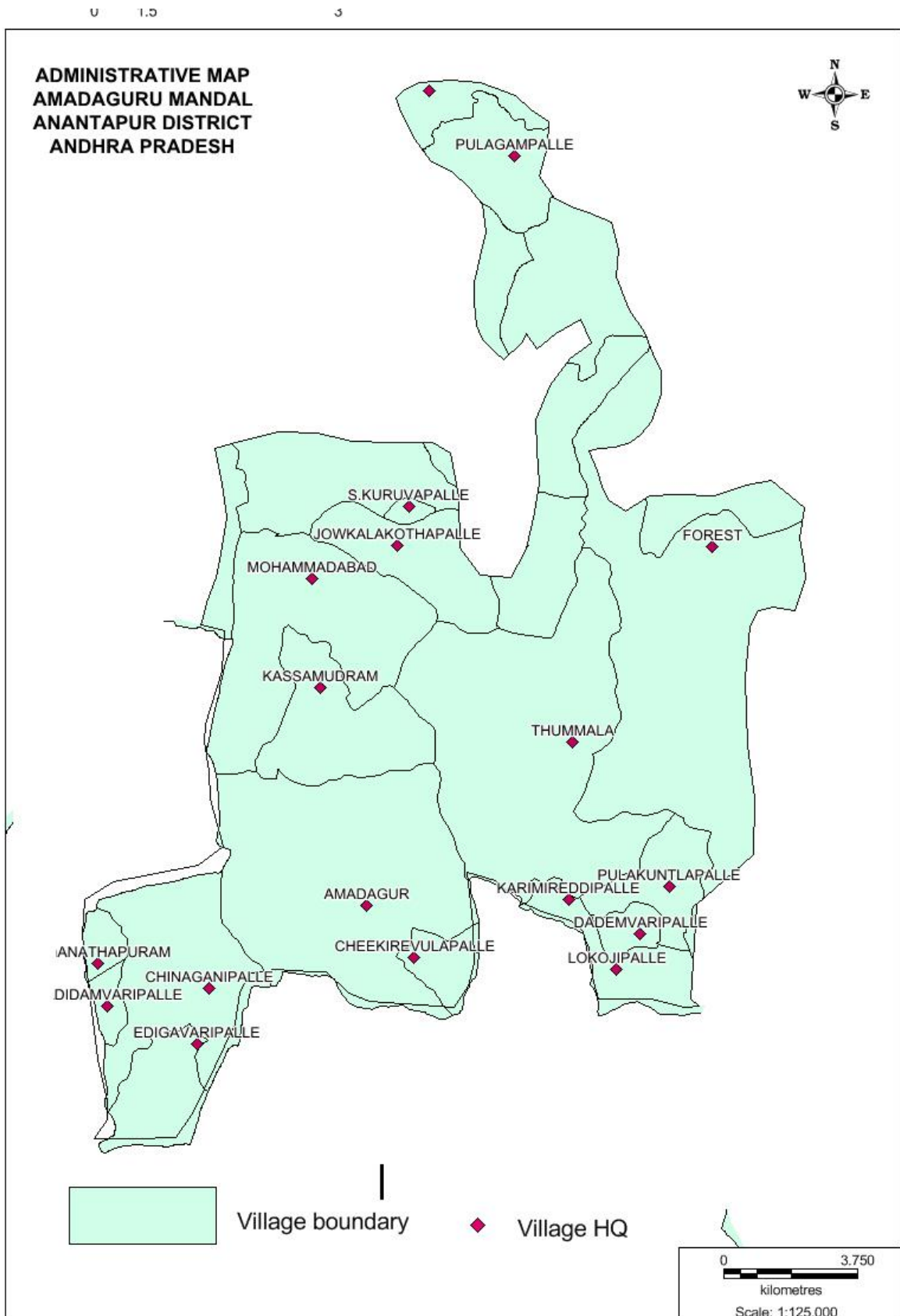


Fig.2

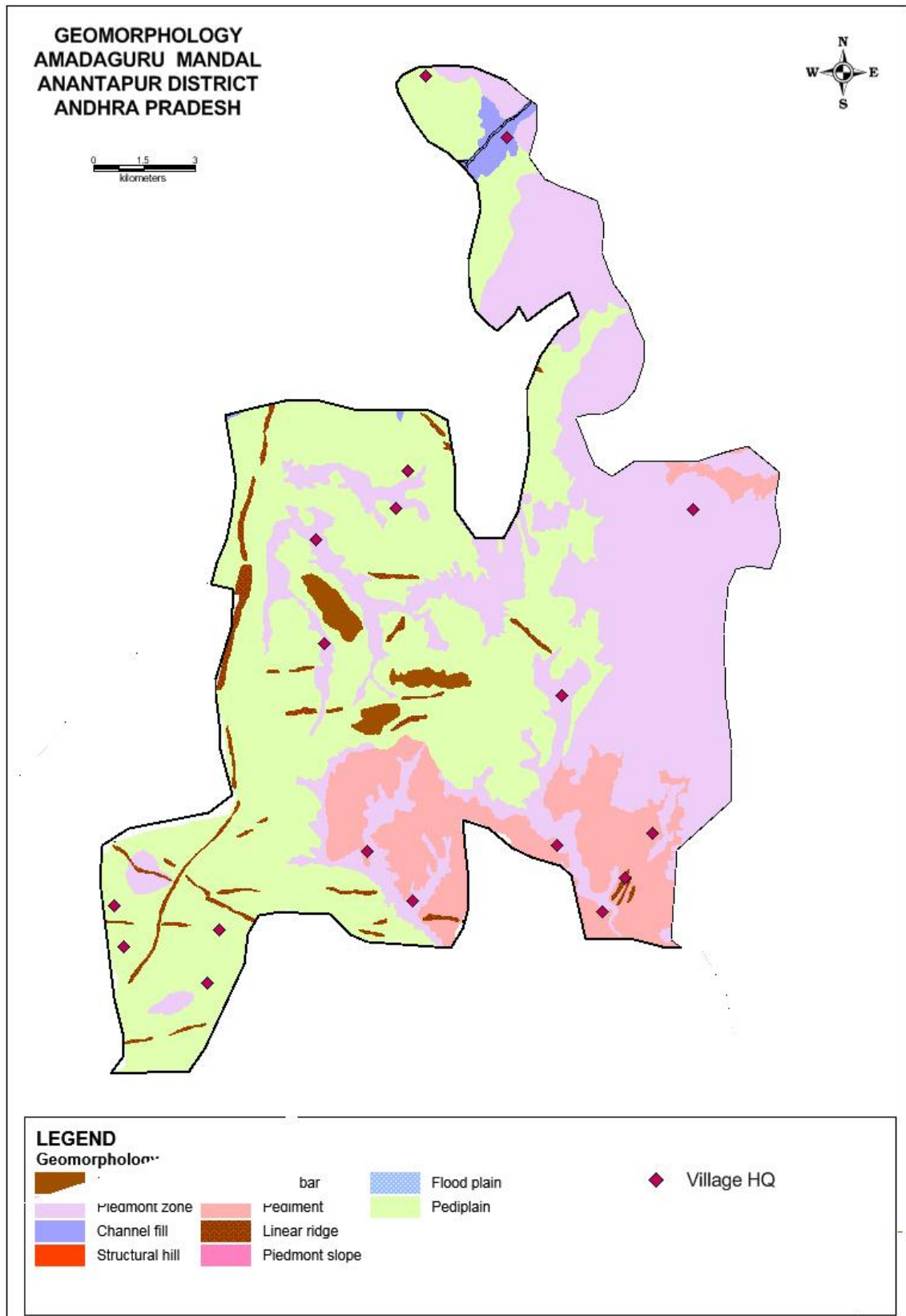


Fig.3

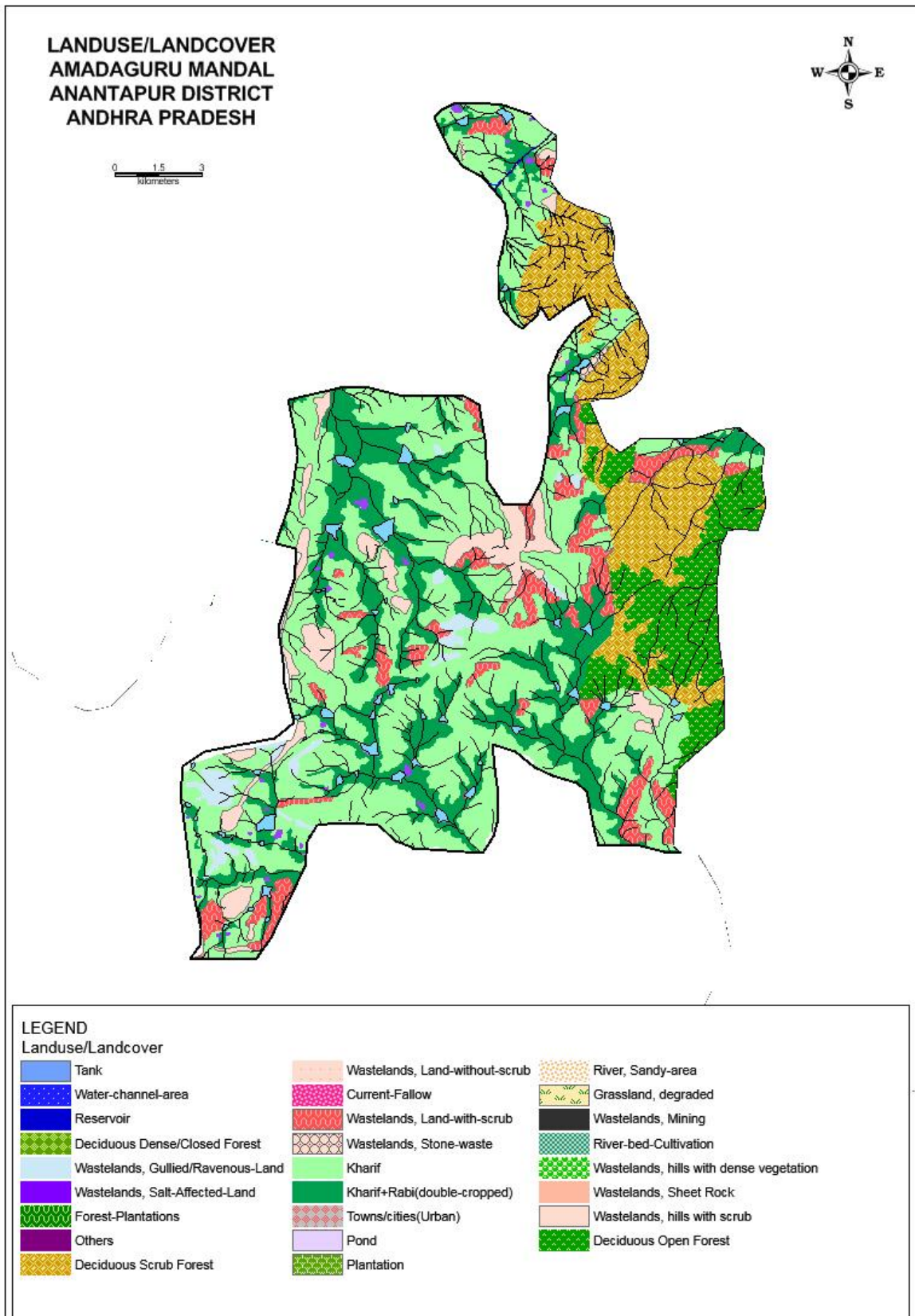


Fig.4

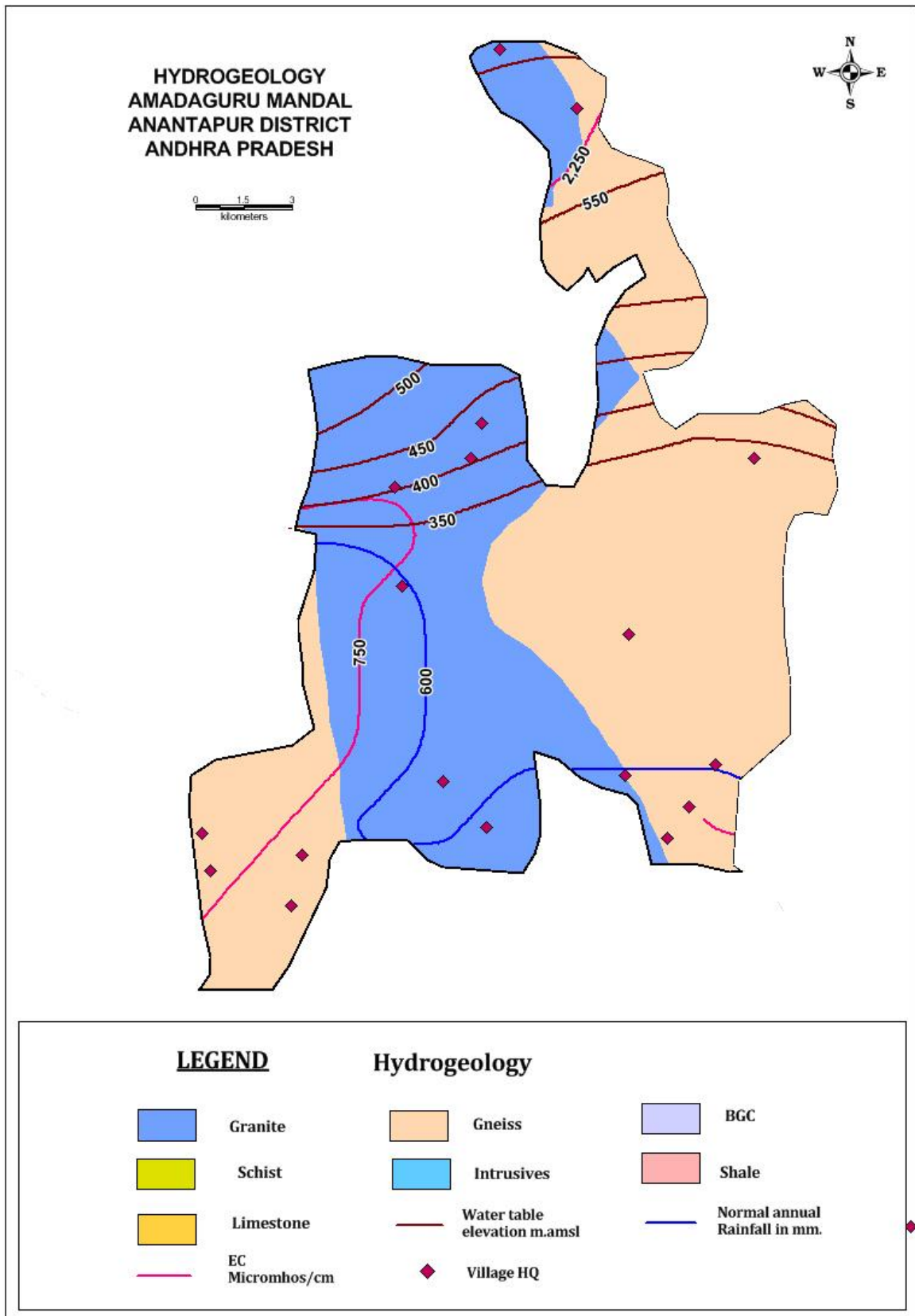


Fig.5

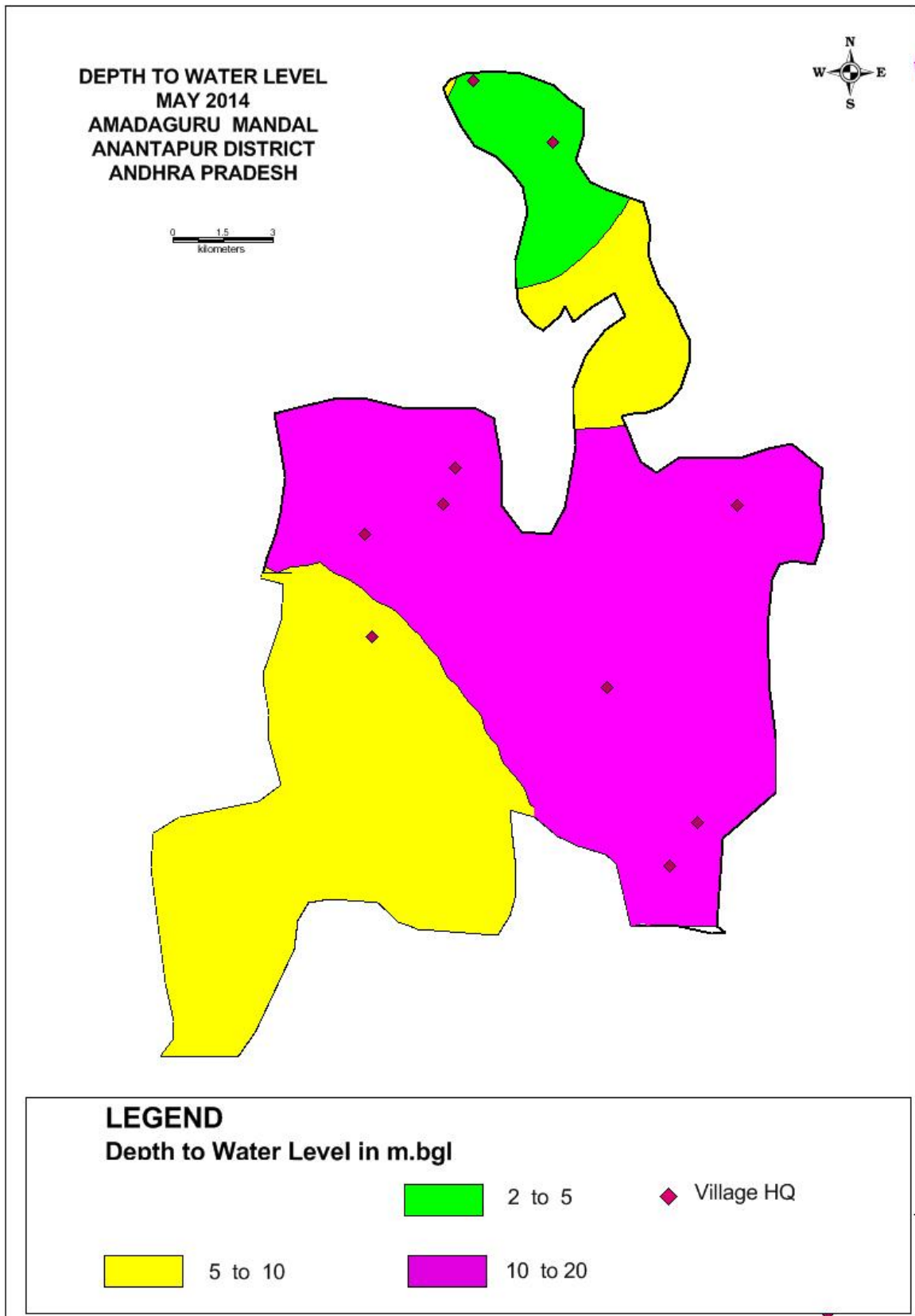


Fig.6

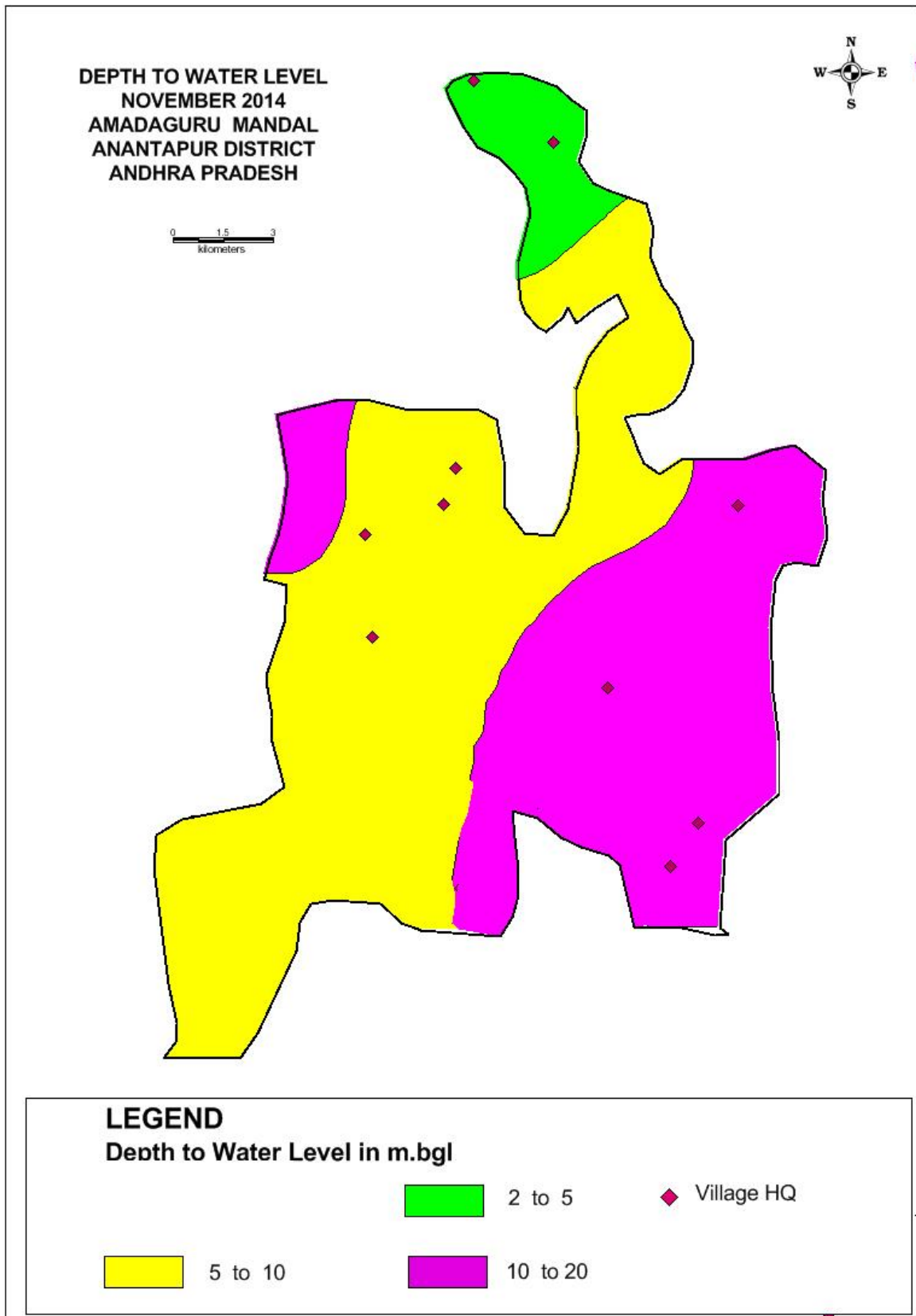


Fig.7

