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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  
BATHALAPALLI MANDAL, ANANTAPUR DISTRICT,  
ANDHRA PRADESH STATE

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

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	BATHALAPALLI
District	ANANTAPUR
State	ANDHRA PRADESH
Total Area (Sq.kms)	235
Area suitable for Artificial Recharge (Sq.kms)	231
Latitude and Longitude	14.383380 to 14.4591010 and 77.694140 to 77.909420
Average Annual Rainfall (mm)	518
Geology	Granites, Gneisses
Average Depth To Water Level (Decadal) (Pre Monsoon)	12.1
Average Depth To Water Level (Decadal) (Post Monsoon)	8.4
Ground Water Resources (2011)	
Annual Replenishable Ground Water Resources (MCM)	21.62
Net Annual Ground Water Availability (MCM)/yr	19.64
Net Annual Ground Water Draft (MCM)/yr	20.41
Projected Demand for Domestic and Industrial Use (MCM)/yr	1.36
Stage of Ground Water Development (%)	104
Surface runoff available (MCM)/yr	13.43
Total Storage Created in the Mandal by Various Agencies (MCM)/yr	1.93
Artificial Recharge/Conservation Measures	
Recharge Structures Proposed (No.s)	Percolation Tanks -7, Check Dams -14 Farm Ponds-220, Recharge Shafts-136
Improving Water use Efficiency	Micro Irrigation System -1100 ha
Tentative Total Cost in Lakhs (Rs.)	1026.27
Expected Recharge/Savings (MCM)/yr	5.64

## 1. INTRODUCTION

Bathalapalli Mandal is one of the over-exploited mandal in Anantapur district, Andhra Pradesh State, which is economically backward and chronically drought affected. The mandal has 11 inhabited villages and with 11 gram panchayats.

## 2. LOCATION

The mandal lies between north latitudes 14.383380 to 14.4591010 and between east longitudes 77.694140 to 77.909420. The mandal occupies the eastern part of the Anantapur district and is bounded on the north by Narpala Mandal, on the east by Tadimarri mandal, on the south by Mudigubba mandal and west by Dharmavaram mandal. (Fig.1). The geographical area of the mandal is 235 sq.km.

## 3. PHYSIOGRAPHY AND DRAINAGE

The area is drained by low order streams which are 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 518 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 235 sq.km, the area covered by forest is 3.6 sq.km and the net area sown is 150.46 sq.km. Barren and uncultivable land is 24.90 sq.km. The land for non agricultural use accounts for 11.42 sq.km (Fig.3)

## 6. HYDROGEOLOGY

The Mandal is underlain by granitic gneisses of Archaean age (Fig.4). 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 9 m. The weathered zone has been extensively tapped by dug and dug cum bore wells upto 20 m depth. Ground water occurs in 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 2-5lps.

## 7. GROUND WATER LEVEL SCENARIO

The depth to water level during pre and post-monsoon varies from 5 to 20 m bgl. The Decadal mean water level trend during post monsoon is depicted in the Fig-5.

## 8. DYNAMIC GROUND WATER RESOURCES

The Ground water availability, Utilization and stage of Development in Bathalapalli Mandal, Ananthapur District is given in Table-1.

Table-1: Ground water resources of Bathalapalli Mandal, Ananthapur District.

Annual Replenishable Ground water resources (MCM)	21.62
Net Annual Ground water Availability. (MCM)	19.64
Net Annual Ground water draft. (MCM)	20.41
Projected Demand for Domestic and Industrial use up to 2025. (MCM)	1.36
Stage of Ground water development (%)	104
Whether notified or not with year of notification.	No

## 9. NEED FOR ARTIFICIAL RECHARGE AND CONSERVATION

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 15mbgl. 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.

## 10. JUSTIFICATION OF THE ARTIFICIAL RECHARGE PROJECT

Bathalapalli Mandal falls under high stage of ground water development i.e., 104 % 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)	235
Hilly Area (Sq.kms)	3.6
Area suitable for Artificial Recharge (sq.km.)	231.4
Runoff Yield in MCM/yr	13.43
Existing No. of Check Dams	216
Storage created MCM/yr	1.53
Existing No. of Percolation Tanks	56
Storage created MCM/yr	0.40
Total Existing Storage Created MCM/yr	1.93

## 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 for ground water recharge purpose within the mandal has been assessed as 11.5 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 propose that such seasonal nalas will be identified and the rain water will be harnessed through 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 518 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 **14 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 108 and 28 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 220 farm ponds in 11 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 1100 ha@ 100 ha per village.



13. TENTATIVE COST ESTIMATES (BATHALAPALLI 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)	14	0.392	5	70	0.294
2	Recharge shaft in Check dam (50% of the existing Check dams)	108	1.188	0.5	54	1.188
3	Proposed Percolation Tanks (100*100*2.5)* 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)	28	0.308	1	28	0.308
5	Proposed Farm Pond (6 filling) 5*5*1.5 dimension @ 20 farm ponds per each village	220	0.03168	0.25	55	0.028512
6	Proposed Sprinkler/drip/HDPE pipes for 100 ha in each village	1100	6.6	0.6	660	3.3
7	Proposed Piezometers up to 50 mbgl @ one PZ per Village	9	0	0.6	5.4	0
8 (i)	Total (No. of AR Structures)	386	2.62		317.4	2.344
8 (ii)	Total (ha)	1100			660	3.3
	<b>Total (8(i) + 8 (ii))</b>				<b>977.4</b>	<b>5.644</b>
9	Impact Assessment & O & M -5 % of Total cost of the Scheme				<b>48.87</b>	
	<b>Grand Total</b>				<b>1026.27</b>	

\*(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	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
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 5.64 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 104% to 80% (24%)
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 AP.

EXISTING ARTIFICIAL RECHARGE STRUCTURES  
BATHALAPALLI MANDAL, ANANTAPUR DISTRICT, AP

S.no	Gram Panchayat	Habitation	Structure Type	Longitude	Latitude	Scheme
1	D.cherlopalle	D.Cherlopalle	Check Dam	77.8683	14.4112	NREGS
2	D.cherlopalle	D.Cherlopalle	Check Dam	77.8674	14.4097	NREGS
3	D.cherlopalle	D.Cherlopalle	Check Dam	77.8659	14.4189	NREGS
4	D.cherlopalle	D.Cherlopalle	Check Dam	77.8716	14.4275	NREGS
5	D.cherlopalle	D.Cherlopalle	Check Dam	77.8712	14.4334	NREGS
6	D.cherlopalle	D.Cherlopalle	Check Dam	77.8706	14.4343	NREGS
7	D.cherlopalle	D.Cherlopalle	Check Dam	77.8706	14.4363	NREGS
8	D.cherlopalle	D.Cherlopalle	Check Dam	77.8692	14.4404	NREGS
9	D.cherlopalle	D.Cherlopalle	Check Dam	77.8647	14.4415	NREGS
10	D.cherlopalle	D.Cherlopalle	Check Dam	77.8583	14.4334	NREGS
11	D.cherlopalle	D.Cherlopalle	Check Dam	77.8659	14.4127	NREGS
12	D.cherlopalle	Pathyapuram	Check Dam	77.8571	14.4190	NREGS
13	D.cherlopalle	Pathyapuram	Check Dam	77.8573	14.4204	NREGS
14	D.cherlopalle	Pathyapuram	Check Dam	77.8562	14.4256	NREGS
15	D.cherlopalle	Pathyapuram	Check Dam	77.8546	14.4246	NREGS
16	D.cherlopalle	Pathyapuram	Check Dam	77.8553	14.4282	NREGS
17	D.cherlopalle	Pathyapuram	Check Dam	77.8579	14.4316	NREGS
18	D.cherlopalle	Pathyapuram	Check Dam	77.8634	14.3989	NREGS
19	D.cherlopalle	Pathyapuram	Check Dam	77.8655	14.3978	NREGS
20	D.cherlopalle	Pathyapuram	Check Dam	77.8653	14.3995	NREGS
21	D.cherlopalle	Pathyapuram	Check Dam	77.8608	14.3957	NREGS
22	D.cherlopalle	Pathyapuram	Check Dam	77.8658	14.4041	NREGS
23	D.cherlopalle	Pathyapuram	Check Dam	77.8608	14.3957	NREGS
24	D.cherlopalle	Pathyapuram	Check Dam	77.8670	14.3928	NREGS
25	D.cherlopalle	Pathyapuram	Check Dam	77.8668	14.3925	NREGS
26	D.cherlopalle	Pathyapuram	Check Dam	77.8617	14.3936	NREGS
27	D.cherlopalle	Pathyapuram	Check Dam	77.8721	14.4007	NREGS
28	D.cherlopalle	Pathyapuram	Check Dam	77.8707	14.4027	NREGS
29	D.cherlopalle	Pathyapuram	Check Dam	77.8660	14.4062	NREGS
30	D.cherlopalle	Pathyapuram	Check Dam	77.8606	14.4089	NREGS
31	D.cherlopalle	Pathyapuram	Check Dam	77.8643	14.4122	NREGS
32	D.cherlopalle	Pathyapuram	Check Dam	77.8708	14.4231	NREGS
33	Mustur	EdulaMustur	Check Dam	77.7291	14.5355	NREGS
34	Mustur	EdulaMustur	Check Dam	77.7154	14.5381	NREGS
35	Mustur	EdulaMustur	Check Dam	77.7204	14.5359	NREGS
36	Mustur	EdulaMustur	Check Dam	77.7290	14.5251	NREGS
37	Mustur	EdulaMustur	Check Dam	77.7304	14.5242	NREGS
38	Mustur	EdulaMustur	Check Dam	77.7335	14.5221	NREGS
39	Mustur	EdulaMustur	Check Dam	77.7350	14.5207	NREGS
40	Mustur	Raghavampalle	Check Dam	77.7378	14.5191	NREGS

41	Mustur	Raghavampalle	Check Dam	77.7403	14.5203	NREGS
42	Mustur	Raghavampalle	Check Dam	77.7433	14.5276	NREGS
43	Thambapuram	Jwalapuram	Check Dam	77.8225	14.4622	NREGS
44	Thambapuram	Thambapuram	Check Dam	77.8202	14.4950	NREGS
45	Thambapuram	Thambapuram	Check Dam	77.8253	14.4997	NREGS
46	Thambapuram	Thambapuram	Check Dam	77.8240	14.4985	NREGS
47	Thambapuram	Thambapuram	Check Dam	77.8274	14.5020	NREGS
48	Thambapuram	Thambapuram	Check Dam	77.8282	14.5045	NREGS
49	Thambapuram	Thambapuram	Check Dam	77.8315	14.5088	NREGS
50	Thambapuram	Thambapuram	Check Dam	77.8259	14.5094	NREGS
51	Thambapuram	Thambapuram	Check Dam	77.8236	14.5041	NREGS
52	Sangala	Sangala	Check Dam	77.8168	14.4350	NREGS
53	Sangala	Sangala	Check Dam	77.8246	14.4471	NREGS
54	Sangala	Sangala	Check Dam	77.8148	14.4273	NREGS
55	Sangala	Sangala	Check Dam	77.8129	14.4307	NREGS
56	Sangala	Sangala	Check Dam	77.8139	14.4311	NREGS
57	Sangala	Sangala	Check Dam	77.8140	14.4329	NREGS
58	Sangala	Sangala	Check Dam	77.8158	14.4348	NREGS
59	Sangala	Vardhapuram	Check Dam	77.8329	14.4504	NREGS
60	Sangala	Vardhapuram	Check Dam	77.8339	14.4560	NREGS
61	Sanjeevapuram	Lingareddipalli	Check Dam	77.7526	14.5459	NREGS
62	Sanjeevapuram	Lingareddipalli	Check Dam	77.7521	14.5481	NREGS
63	Sanjeevapuram	Yerraihpalli	Check Dam	77.7157	14.5628	NREGS
64	Sanjeevapuram	Yerraihpalli	Check Dam	77.7162	14.5621	NREGS
65	Sanjeevapuram	Yerraihpalli	Check Dam	77.7226	14.5564	NREGS
66	Sanjeevapuram	Yerraihpalli	Check Dam	77.7208	14.5855	NREGS
67	Sanjeevapuram	Yerraihpalli	Check Dam	77.7027	14.5764	NREGS
68	Sanjeevapuram	Yerraihpalli	Check Dam	77.7201	14.5550	NREGS
69	Nallaboyanapalli	Katamkunta	Check Dam	77.8968	14.4034	NREGS
70	Nallaboyanapalli	Katamkunta	Check Dam	77.8993	14.4153	NREGS
71	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8839	14.4021	NREGS
72	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8840	14.4006	NREGS
73	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8840	14.3995	NREGS
74	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8852	14.3975	NREGS
75	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8746	14.4063	NREGS
76	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8869	14.4175	NREGS
77	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8912	14.4151	NREGS
78	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8940	14.4161	NREGS
79	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8761	14.4077	NREGS
80	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8793	14.4159	NREGS
81	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8800	14.4115	NREGS
82	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8815	14.4099	NREGS
83	Nallaboyanapalli	Nallaboyanapalli	Check Dam	77.8947	14.4176	NREGS

84	Garisalapalli	Jalalapuram	Check Dam	77.8883	14.4833	NREGS
85	Garisalapalli	Jalalapuram	Check Dam	77.8894	14.4921	NREGS
86	Garisalapalli	Jalalapuram	Check Dam	77.8914	14.4941	NREGS
87	Garisalapalli	Nethivarampalli	Check Dam	77.8613	14.4919	NREGS
88	Garisalapalli	Nethivarampalli	Check Dam	77.8605	14.4944	NREGS
89	Garisalapalli	Nethivarampalli	Check Dam	77.8635	14.4964	NREGS
90	Garisalapalli	Nethivarampalli	Check Dam	77.8659	14.4979	NREGS
91	Apparacheruvu	Chenarayapatnam	Check Dam	77.8134	14.4776	NREGS
92	Apparacheruvu	Chenarayapatnam	Check Dam	77.8128	14.4699	NREGS
93	Apparacheruvu	Chenarayapatnam	Check Dam	77.8189	14.4709	NREGS
94	Apparacheruvu	Gummalakunta	Check Dam	77.8036	14.4904	NREGS
95	Bathalapalle	Bathalapalle	Check Dam	77.7511	14.5067	NREGS
96	Bathalapalle	Bathalapalle	Check Dam	77.7467	14.5119	NREGS
97	Bathalapalle	Bathalapalle	Check Dam	77.7447	14.5140	NREGS
98	Bathalapalle	Gantapuram	Check Dam	77.8015	14.5111	NREGS
99	Bathalapalle	Gantapuram	Check Dam	77.7769	14.4979	NREGS
100	Bathalapalle	Potlamarri	Check Dam	77.7609	14.4978	NREGS
101	Bathalapalle	Potlamarri	Check Dam	77.7495	14.4836	NREGS
102	Bathalapalle	Potlamarri	Check Dam	77.7495	14.4836	NREGS
103	Bathalapalle	Potlamarri	Check Dam	77.7419	14.4806	NREGS
104	Bathalapalle	Potlamarri	Check Dam	77.7395	14.4790	NREGS
105	Bathalapalle	Potlamarri	Check Dam	77.7390	14.4777	NREGS
106	Dampetla	Dampetla	Check Dam	77.9015	14.4628	NREGS
107	Dampetla	Dampetla	Check Dam	77.9042	14.4665	NREGS
108	Malyavantham	Ananthasagaram	Check Dam	77.7448	14.5658	NREGS
109	Malyavantham	M.Cherlopalli	Check Dam	77.7558	14.5773	NREGS
110	Malyavantham	M.Cherlopalli	Check Dam	77.7588	14.5769	NREGS
111	Malyavantham	M.Cherlopalli	Check Dam	77.7603	14.5858	NREGS
112	Malyavantham	M.Cherlopalli	Check Dam	77.7504	14.5827	NREGS
113	Malyavantham	Malyavantham	Check Dam	77.7842	14.5778	NREGS
114	Malyavantham	Malyavantham	Check Dam	77.7757	14.5850	NREGS
115	Malyavantham	Malyavantham	Check Dam	77.7760	14.5860	NREGS
116	Malyavantham	Venkatgaripalli	Check Dam	77.7695	14.5476	NREGS
117	Malyavantham	Venkatgaripalli	Check Dam	77.7725	14.5455	NREGS
118	Obulapuram	Chemakuntapalli	Check Dam	77.8471	14.4452	NREGS
119	Obulapuram	Chemakuntapalli	Check Dam	77.8365	14.4451	NREGS
120	Obulapuram	Chemakuntapalli	Check Dam	77.8349	14.4464	NREGS
121	Obulapuram	Chemakuntapalli	Check Dam	77.8327	14.4503	NREGS
122	D.cherlopalle	D.Cherlopalle	Check Dam	77.8659	14.4127	IWMP
123	D.cherlopalle	D.Cherlopalle	Check Dam	77.8683	14.4112	IWMP
124	D.cherlopalle	D.Cherlopalle	Check Dam	77.8674	14.4097	IWMP
125	D.cherlopalle	D.Cherlopalle	Check Dam	77.8659	14.4189	IWMP
126	D.cherlopalle	D.Cherlopalle	Check Dam	77.8583	14.4334	IWMP

127	D.cherlopalle	D.Cherlopalle	Check Dam	77.8716	14.4275	IWMP
128	D.cherlopalle	D.Cherlopalle	Check Dam	77.8712	14.4334	IWMP
129	D.cherlopalle	D.Cherlopalle	Check Dam	77.8706	14.4343	IWMP
130	D.cherlopalle	D.Cherlopalle	Check Dam	77.8706	14.4363	IWMP
131	D.cherlopalle	D.Cherlopalle	Check Dam	77.8692	14.4404	IWMP
132	D.cherlopalle	D.Cherlopalle	Check Dam	77.8647	14.4415	IWMP
133	D.cherlopalle	Pathyapuram	Check Dam	77.8608	14.3957	IWMP
134	D.cherlopalle	Pathyapuram	Check Dam	77.8670	14.3928	IWMP
135	D.cherlopalle	Pathyapuram	Check Dam	77.8668	14.3925	IWMP
136	D.cherlopalle	Pathyapuram	Check Dam	77.8617	14.3936	IWMP
137	D.cherlopalle	Pathyapuram	Check Dam	77.8634	14.3989	IWMP
138	D.cherlopalle	Pathyapuram	Check Dam	77.8573	14.4204	IWMP
139	D.cherlopalle	Pathyapuram	Check Dam	77.8562	14.4256	IWMP
140	D.cherlopalle	Pathyapuram	Check Dam	77.8546	14.4246	IWMP
141	D.cherlopalle	Pathyapuram	Check Dam	77.8553	14.4282	IWMP
142	D.cherlopalle	Pathyapuram	Check Dam	77.8579	14.4316	IWMP
143	D.cherlopalle	Pathyapuram	Check Dam	77.8707	14.4027	IWMP
144	D.cherlopalle	Pathyapuram	Check Dam	77.8660	14.4062	IWMP
145	D.cherlopalle	Pathyapuram	Check Dam	77.8606	14.4089	IWMP
146	D.cherlopalle	Pathyapuram	Check Dam	77.8643	14.4122	IWMP
147	D.cherlopalle	Pathyapuram	Check Dam	77.8708	14.4231	IWMP
148	D.cherlopalle	Pathyapuram	Check Dam	77.8571	14.4190	IWMP
149	D.cherlopalle	Pathyapuram	Check Dam	77.8655	14.3978	IWMP
150	D.cherlopalle	Pathyapuram	Check Dam	77.8653	14.3995	IWMP
151	D.cherlopalle	Pathyapuram	Check Dam	77.8608	14.3957	IWMP
152	D.cherlopalle	Pathyapuram	Check Dam	77.8658	14.4041	IWMP
153	D.cherlopalle	Pathyapuram	Check Dam	77.8721	14.4007	IWMP
154	Thambapuram	Jwalapuram	Check Dam	77.8225	14.4622	IWMP
155	Sangala	Sangala	Check Dam	77.8148	14.4273	IWMP
156	Sangala	Sangala	Check Dam	77.8129	14.4307	IWMP
157	Sangala	Sangala	Check Dam	77.8139	14.4311	IWMP
158	Sangala	Sangala	Check Dam	77.8140	14.4329	IWMP
159	Sangala	Sangala	Check Dam	77.8158	14.4348	IWMP
160	Sangala	Sangala	Check Dam	77.8168	14.4350	IWMP
161	Sangala	Sangala	Check Dam	77.8246	14.4471	IWMP
162	Sangala	Vardhapuram	Check Dam	77.8329	14.4504	IWMP
163	Sangala	Vardhapuram	Check Dam	77.8339	14.4560	IWMP
164	Nallaboyanapalli	Katamkunta	Check Dam	77.8968	14.4034	IWMP
165	Nallaboyanapalli	Katamkunta	Check Dam	77.8993	14.4153	IWMP
166	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8839	14.4021	IWMP
167	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8840	14.4006	IWMP
168	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8840	14.3995	IWMP
169	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8852	14.3975	IWMP

170	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8746	14.4063	IWMP
171	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8869	14.4175	IWMP
172	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8912	14.4151	IWMP
173	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8912	14.4151	IWMP
174	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8761	14.4077	IWMP
175	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8793	14.4159	IWMP
176	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8800	14.4115	IWMP
177	Nallaboyanapalli	Mudhanapalli	Check Dam	77.8815	14.4099	IWMP
178	Nallaboyanapalli	Nallaboyanapalli	Check Dam	77.8947	14.4176	IWMP
179	Garisalapalli	Jalalapuram	Check Dam	77.8883	14.4833	IWMP
180	Garisalapalli	Jalalapuram	Check Dam	77.8894	14.4921	IWMP
181	Garisalapalli	Jalalapuram	Check Dam	77.8914	14.4941	IWMP
182	Garisalapalli	Nethivarampalli	Check Dam	77.8613	14.4919	IWMP
183	Garisalapalli	Nethivarampalli	Check Dam	77.8605	14.4944	IWMP
184	Garisalapalli	Nethivarampalli	Check Dam	77.8635	14.4964	IWMP
185	Garisalapalli	Nethivarampalli	Check Dam	77.8659	14.4979	IWMP
186	Apparacheruvu	Chenarayapatnam	Check Dam	77.8134	14.4776	IWMP
187	Apparacheruvu	Chenarayapatnam	Check Dam	77.8128	14.4699	IWMP
188	Apparacheruvu	Chenarayapatnam	Check Dam	77.8189	14.4709	IWMP
189	Dampetla	Dampetla	Check Dam	77.9015	14.4628	IWMP
190	Dampetla	Dampetla	Check Dam	77.9042	14.4665	IWMP
191	Obulapuram	Chemakuntapalli	Check Dam	77.8471	14.4452	IWMP
192	Obulapuram	Chemakuntapalli	Check Dam	77.8365	14.4451	IWMP
193	Obulapuram	Chemakuntapalli	Check Dam	77.8349	14.4464	IWMP
194	Obulapuram	Chemakuntapalli	Check Dam	77.8327	14.4503	IWMP
195	D.cherlopalle	D.Cherlopalle	Check Wall	77.8766	14.4264	NREGS
196	D.cherlopalle	D.Cherlopalle	Check Wall	77.8664	14.4151	NREGS
197	D.cherlopalle	Pathyapuram	Check Wall	77.8636	14.3976	NREGS
198	Sanjeevapuram	Yerraihpalli	Check Wall	77.7089	14.5640	NREGS
199	Sanjeevapuram	Yerraihpalli	Check Wall	77.7177	14.5596	NREGS
200	Nallaboyanapalli	Katamkunta	Check Wall	77.9060	14.4049	NREGS
201	Nallaboyanapalli	Mudhanapalli	Check Wall	77.8780	14.4124	NREGS
202	Nallaboyanapalli	Mudhanapalli	Check Wall	77.8793	14.4147	NREGS
203	Garisalapalli	Nethivarampalli	Check Wall	77.8682	14.5013	NREGS
204	Malyavantham	Ananthasagaram	Check Wall	77.7548	14.5618	NREGS
205	Malyavantham	Malyavantham	Check Wall	77.7731	14.5914	NREGS
206	Malyavantham	Malyavantham	Check Wall	77.7867	14.5712	NREGS
207	Malyavantham	Malyavantham	Check Wall	77.7829	14.5802	NREGS
208	Malyavantham	Malyavantham	Check Wall	77.7890	14.5592	NREGS
209	Malyavantham	Malyavantham	Check Wall	77.7902	14.5563	NREGS
210	D.cherlopalle	D.Cherlopalle	Check Wall	77.8766	14.4264	IWMP
211	D.cherlopalle	D.Cherlopalle	Check Wall	77.8664	14.4151	IWMP
212	D.cherlopalle	Pathyapuram	Check Wall	77.8636	14.3976	IWMP

213	Nallaboyanapalli	Katamkunta	Check Wall	77.9060	14.4049	IWMP
214	Nallaboyanapalli	Mudhanapalli	Check Wall	77.8780	14.4124	IWMP
215	Nallaboyanapalli	Mudhanapalli	Check Wall	77.8793	14.4147	IWMP
216	Garisalapalli	Nethivarampalli	Check Wall	77.8682	14.5013	IWMP
217	Malyavantham	Venkatgaripalli	MPT	77.7785	14.5402	NREGS
218	Malyavantham	Venkatgaripalli	MPT	77.7803	14.5399	NREGS
219	Obulapuram	Ramapuram	MPT	77.8511	14.4747	NREGS
220	Obulapuram	Ramapuram	MPT	77.8629	14.4712	NREGS
221	Obulapuram	Ramapuram	MPT	77.8511	14.4747	IWMP
222	Obulapuram	Ramapuram	MPT	77.8629	14.4712	IWMP
223	D.cherlopalle	Pathyapuram	PT	77.8731	14.4001	NREGS
224	Mustur	EdulaMustur	PT	77.7297	14.5431	NREGS
225	Sanjeevapuram	Lingareddipalli	PT	77.7560	14.5389	NREGS
226	Sanjeevapuram	Sanjeevapuram	PT	77.7231	14.5517	NREGS
227	Sanjeevapuram	Yerraihpalli	PT	77.7228	14.5560	NREGS
228	Sanjeevapuram	Yerraihpalli	PT	77.7316	14.5658	NREGS
229	Sanjeevapuram	Yerraihpalli	PT	77.7210	14.5746	NREGS
230	Sanjeevapuram	Yerraihpalli	PT	77.7223	14.5764	NREGS
231	Nallaboyanapalli	Katamkunta	PT	77.9049	14.4084	NREGS
232	Nallaboyanapalli	Katamkunta	PT	77.8920	14.4005	NREGS
233	Nallaboyanapalli	Katamkunta	PT	77.8951	14.4215	NREGS
234	Nallaboyanapalli	Mudhanapalli	PT	77.8797	14.4035	NREGS
235	Nallaboyanapalli	Mudhanapalli	PT	77.8846	14.4172	NREGS
236	Garisalapalli	Jalalapuram	PT	77.8889	14.4905	NREGS
237	Garisalapalli	Nethivarampalli	PT	77.8624	14.4952	NREGS
238	Apparacheruvu	Chenarayapatnam	PT	77.8179	14.4682	NREGS
239	Apparacheruvu	Gummalakunta	PT	77.8016	14.4909	NREGS
240	Apparacheruvu	Gummalakunta	PT	77.8063	14.4915	NREGS
241	Apparacheruvu	Gummalakunta	PT	77.8087	14.5053	NREGS
242	Apparacheruvu	Gummalakunta	PT	77.8087	14.5126	NREGS
243	Bathalapalle	Bathalapalle	PT	77.7497	14.5146	NREGS
244	Bathalapalle	Gantapuram	PT	77.7943	14.5097	NREGS
245	Dampetla	Dampetla	PT	77.9063	14.4515	NREGS
246	Dampetla	Dampetla	PT	77.9001	14.4572	NREGS
247	Dampetla	Surayachandrapuram	PT	77.8883	14.4405	NREGS
248	Malyavantham	Malyavantham	PT	77.7843	14.5722	NREGS
249	Obulapuram	Chemakuntapalli	PT	77.8408	14.4474	NREGS
250	Obulapuram	Kodekandla	PT	77.8368	14.4673	NREGS
251	Obulapuram	Kodekandla	PT	77.8359	14.4725	NREGS
252	Obulapuram	Kodekandla	PT	77.8414	14.4875	NREGS
253	Obulapuram	Obulapuram	PT	77.8495	14.4540	NREGS
254	Obulapuram	Ramapuram	PT	77.8500	14.4793	NREGS
255	D.cherlopalle	Pathyapuram	PT	77.8731	14.4001	IWMP



256	Nallaboyanapalli	Katamkunta	PT	77.9049	14.4084	IWMP
257	Nallaboyanapalli	Katamkunta	PT	77.8920	14.4005	IWMP
258	Nallaboyanapalli	Katamkunta	PT	77.8951	14.4215	IWMP
259	Nallaboyanapalli	Mudhanapalli	PT	77.8797	14.4035	IWMP
260	Nallaboyanapalli	Mudhanapalli	PT	77.8846	14.4172	IWMP
261	Garisalapalli	Jalalapuram	PT	77.8889	14.4905	IWMP
262	Garisalapalli	Nethivarampalli	PT	77.8624	14.4952	IWMP
263	Apparacheruvu	Chenarayapatnam	PT	77.8179	14.4682	IWMP
264	Dampetla	Dampetla	PT	77.9063	14.4515	IWMP
265	Dampetla	Dampetla	PT	77.9001	14.4572	IWMP
266	Dampetla	Surayachandrapuram	PT	77.8883	14.4405	IWMP
267	Obulapuram	Chemakuntapalli	PT	77.8408	14.4474	IWMP
268	Obulapuram	Kodekandla	PT	77.8368	14.4673	IWMP
269	Obulapuram	Kodekandla	PT	77.8359	14.4725	IWMP
270	Obulapuram	Kodekandla	PT	77.8414	14.4875	IWMP
271	Obulapuram	Obulapuram	PT	77.8495	14.4540	IWMP
272	Obulapuram	Ramapuram	PT	77.8500	14.4793	IWMP

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

S.No.	Mandal	Lattitude	Longitude	Structure_Type
1	Battalapalli	14.5084	77.7336	CheckDam
2	Battalapalli	14.4863	77.7665	CheckDam
3	Battalapalli	14.4679	77.7603	CheckDam
4	Battalapalli	14.4140	77.8409	CheckDam
5	Battalapalli	14.4537	77.8942	CheckDam
6	Battalapalli	14.4502	77.8002	CheckDam
7	Battalapalli	14.4384	77.8374	CheckDam
8	Battalapalli	14.4437	77.8950	CheckDam
9	Battalapalli	14.4329	77.8973	CheckDam
10	Battalapalli	14.5096	77.7761	CheckDam
11	Battalapalli	14.5035	77.7554	CheckDam
12	Battalapalli	14.5423	77.7054	CheckDam
13	Battalapalli	14.5835	77.7433	CheckDam
14	Battalapalli	14.5310	77.7300	CheckDam
15	Battalapalli	14.4729	77.7760	Percolation Tank
16	Battalapalli	14.4569	77.7950	Percolation Tank
17	Battalapalli	14.4637	77.7824	Percolation Tank
18	Battalapalli	14.4363	77.7946	Percolation Tank
19	Battalapalli	14.4221	77.8161	Percolation Tank
20	Battalapalli	14.4088	77.8481	Percolation Tank
21	Battalapalli	14.3987	77.8481	Percolation Tank

Fig.1

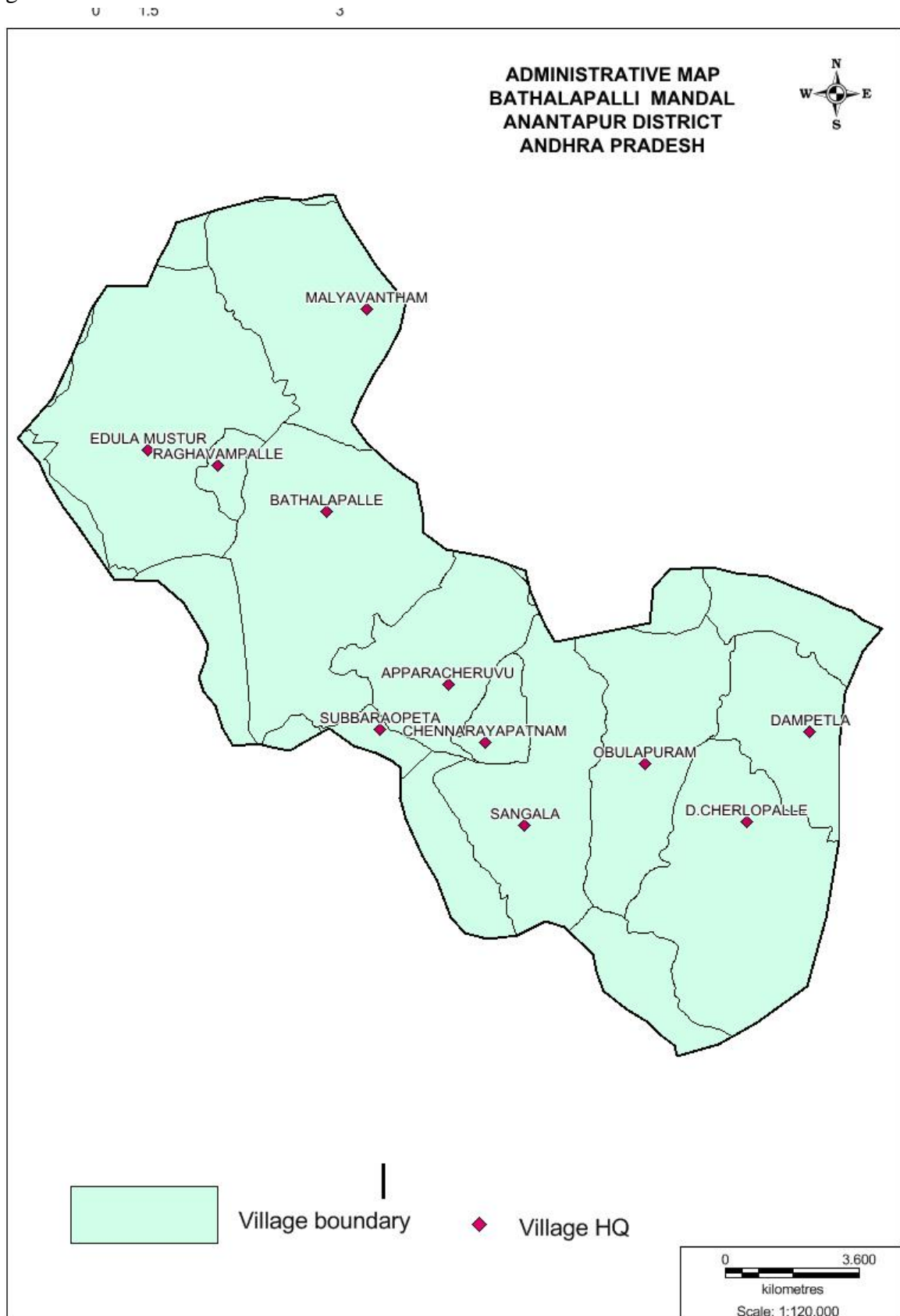


Fig.2

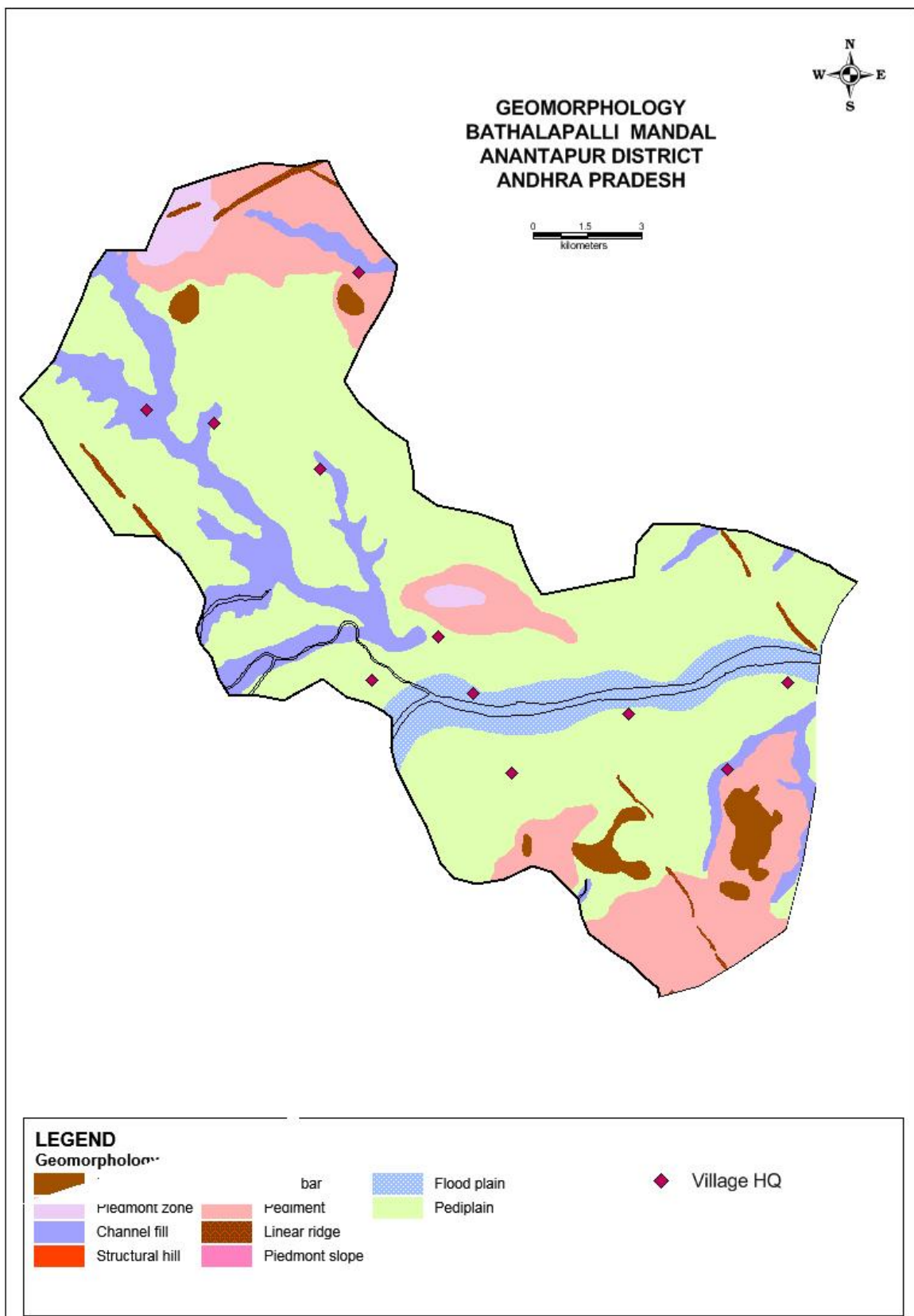


Fig.3

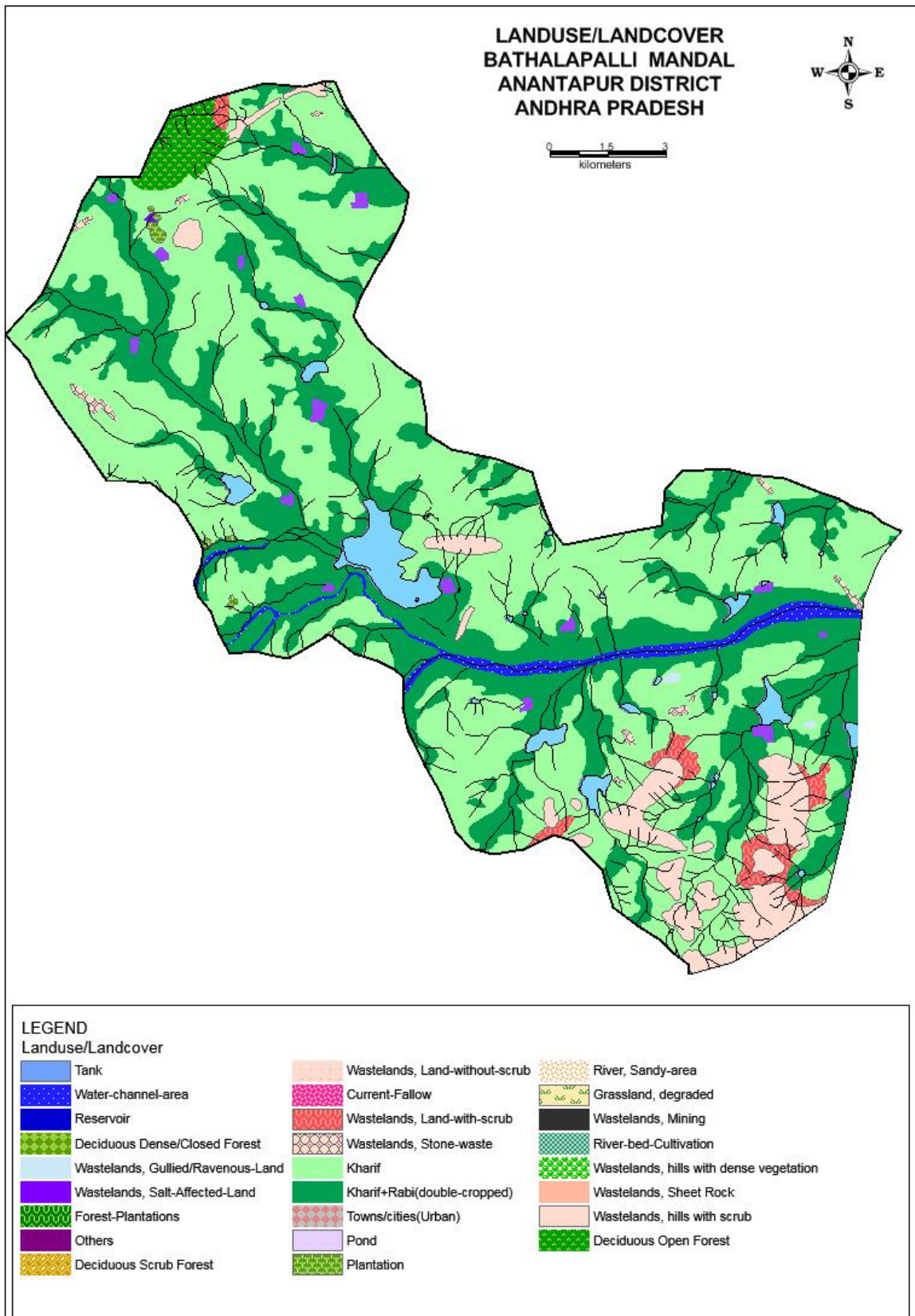


Fig.4

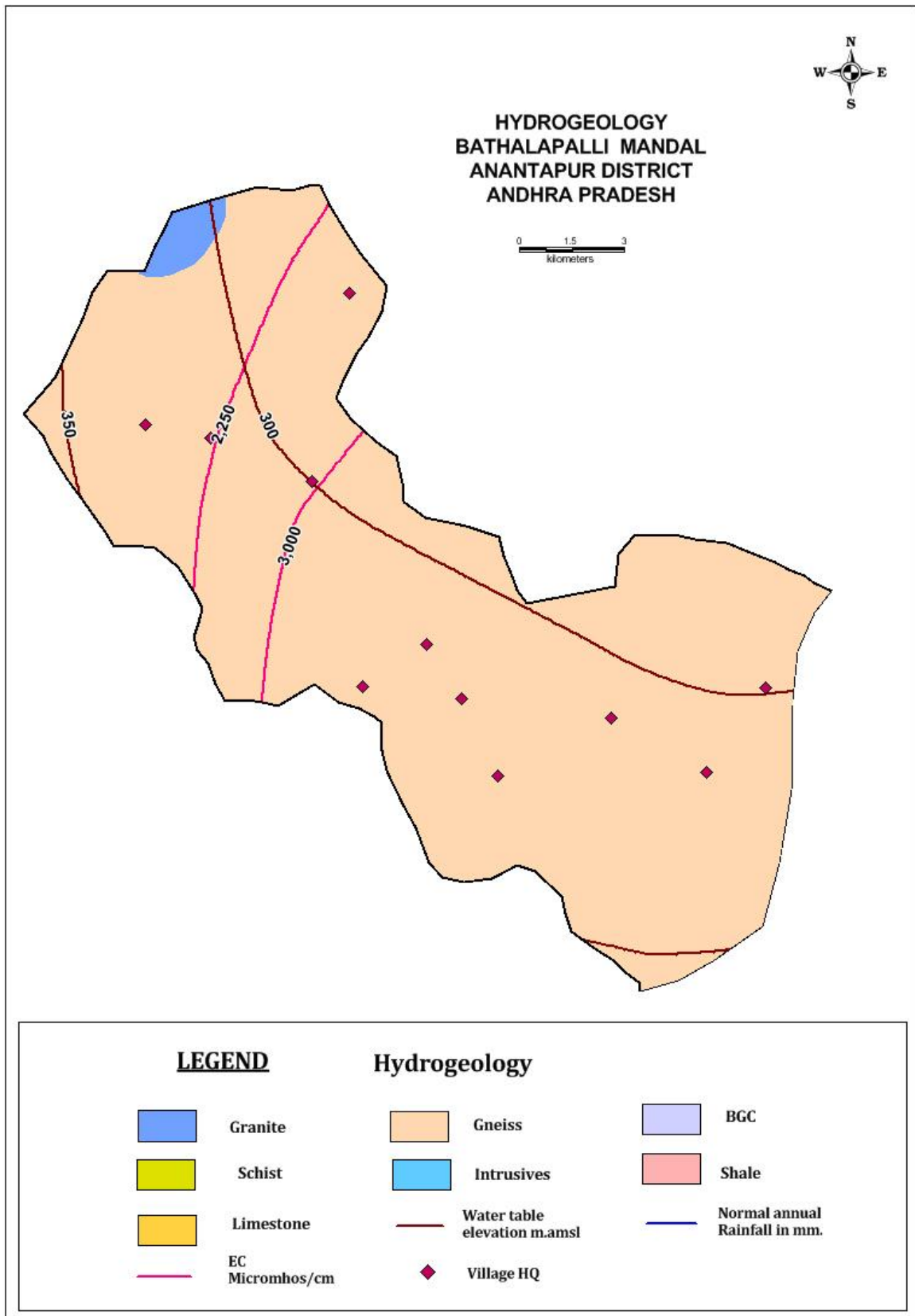


Fig.5

