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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  
RACHERLA MANDAL, PRAKASAM DISTRICT,  
ANDHRA PRADESH STATE

SOUTHERN REGION  
HYDERABAD  
AUGUST-2016

PLAN ON  
ARTIFICIAL RECHARGE TO GROUNDWATER AND  
WATER CONSERVATION IN  
RACHERLA MANDAL, PRAKASAM DISTRICT,  
ANDHRA PRADESH STATE

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AT A GLANCE

Name of the Mandal	RACHERLA
District	PRAKASHAM
State	ANDHRA PRADESH
Total Area sq.km.	424
Area suitable for Artificial Recharge (sq.km.)	48
Latitude and Longitude	15.375730 to 15.630730 and 78.779260 to 79.110000.
Average Annual Rainfall (mm)	618
Geology	Shale and Quartzite
Average Depth To Water Level (Decadal) (Pre Monsoon)	24.1
Average Depth To Water Level (Decadal) (Post Monsoon)	8.30
Ground Water Resources (2011)	
Annual Replenishable Ground Water Resources (MCM/yr)	11.40
Net Annual Ground Water Availability(MCM)/yr	10.26
Net Annual Ground Water Draft(MCM)/yr	13.35
Projected Demand for Domestic and Industrial Use(MCM)/yr	0.28
Stage of Ground Water Development (%)	130
Uncommitted surface runoff available (Utilizable Yield) (MCM)/yr	4.32
Total Storage Created in the Mandal by Various Agencies (MCM)/yr	1.51
Artificial Recharge/Conservation Measures	
Recharge Structures Proposed (No.s)	Farm ponds: 280, Recharge Shafts: 107
Improving Water use Efficiency	Micro Irrigation System -1400 ha
Tentative Total Cost in Lakhs (Rs.)	1055.15
Expected Recharge/Savings (MCM)/yr	5.41

## 1. INTRODUCTION

Racherla Mandal is one of over-exploited mandal in Prakasham district, Andhra Pradesh State, which is economically backward and chronically drought affected. The mandal has 12 inhabited villages and 2 un inhabited villages with 14 gram panchayats.

## 2. LOCATION

The mandal lies between north latitudes 15.375730 to 15.630730 and between east longitudes 78.779260 to 79.110000. The mandal occupies the South-west part of the Prakasham district and is bounded on the north by Cumbum mandal, on the east by Bestawaripeta mandal, on the south by Komarolu mandal and west by Giddaluru mandal. (Fig.1)The geographical area of the mandal is 424 sq.km.

## 3. PHYSIOGRAPHY AND DRAINAGE:

The area is drained by streams which are tributaries of Musi 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 618 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 424 sq.km, the area covered by forest is 122.94 sq.km and the net area sown is 91.81 sq.km. Barren and uncultivable land is 35.48 sq.km. The land for non agricultural use accounts for 21.27 sq.km.(Fig.3)

## 6. HYDROGEOLOGY

The area is underlain by Meta sedimentary formations comprising of Shales and Lime stones and slates of Pre-Cambrian 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 20 m depth, which are mostly dry now. Ground water occurs in the fractured rock formations up to 200 m bgl. However, the potential fractures are encountered between 50-100 m bgl. The cumulative yield varies from 2-5 lps.

## 7. GROUND WATER LEVEL SCENARIO

The depth to water level during the pre-monsoon and post-monsoon varies from 2 to 10 m. The average depth to water level (decadal) during pre and post monsoon is 24.1 and 8.3 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 Racherla Mandal Prakasham District is given in Table-1.

Table-1 Ground water resources of Racherla Mandal, Prakasham District.

Annual Replenishable Ground water resources (MCM)	11.40
Net Annual Ground Water Availability(MCM)/yr	10.26
Net Annual Ground Water Draft(MCM)/yr	13.35
Projected Demand for Domestic and Industrial use up to 2025. (MCM)	0.28
Stage of Ground water development (%).	130
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 30 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

Racherla Mandal falls under high stage of ground water development i.e., 130 % 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)	424
Hilly Area (Sq.kms)	376
Area suitable for Artificial Recharge (sq.km.)	48
Runoff Yield in MCM/yr.	4.32
Existing No. of Check Dams	81
Storage created MCM/yr.	0.57
Existing No. of Percolation Tanks	132
Storage created MCM/yr.	0.93
Total Existing Storage Created	1.51

## 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 2.81 MCM/yr, which could be considered for further planning of artificial recharge. However, the number of artificial recharge structures feasible has been recommended in areas, by considering the utilizable yield, number of existing structures, land use, drainage pattern and also where the post monsoon water levels (decadal mean) are more than 5 m bgl., and or decadal trends are either falling or showing insignificant raising trend.

### A). Recharge 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 41 and 66 recharge shafts of 165 mm dia with 30 m depth in the existing check dams and percolation tanks respectively.

### B). Farm Pond

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

#### Advantages of Farm Ponds

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

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

As per the Land use classification, majority of the area is covered by the agricultural field. Hence, it is proposed to construct 280 farm ponds in 14 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 1400 ha @ 100 ha per village.

13. TENTATIVE COST ESTIMATES (RACHERLA MANDAL)

S.No.	Feasible Artificial Recharge & Water Conservation structures/	No. of Structures/ Quantity	Total Volume (MCM)	Tentative unit cost (in Rs lakh)	Total tentative cost (in Rs Lakh)	Expected Annual GW recharge/savings (MCM)
1	Proposed Masonry Check dams Crest Length -10-15 m, Height-1-2 m) (0.007 MCM*4 fillings)	0	0	5	0	0
2	Recharge shaft in Check dam (50% of the existing Check dams)	41	0.451	0.5	20.5	0.451
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)	66	0.726	1	66	0.726
5	Proposed Farm Pond (6 filling) 5*5*1.5 dimension @ 20 farm ponds per each village	280	0.04032	0.25	70	0.036288
6	Proposed Sprinkler/drip/HDPE pipes for 100 ha in each village	1400	8.4	0.6	840	4.2
7	Proposed Piezometers up to 50 mbgl @ one PZ per Village	14	0	0.6	8.4	0
8 (i)	Total (No. of AR Structures)	401	1.22		164.9	1.213
8 (ii)	Total (ha)	1400			840	4.2
	Total (8(i) + 8 (ii))				<b>1004.9</b>	<b>5.413</b>
9	Impact Assessment & O & M -5 % of Total cost of the Scheme				<b>50.245</b>	
	<b>Grand Total</b>				<b>1055.145</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 5.41 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 130% to 85% (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  
RACHERLA MANDAL, PRAKASAM DISTRICT, AP.

S.no	Gram Panchayat	Habitation	Structure Type	Longitude	Latitude	Scheme
1	Jallyvanipullalacheruvu	Jallivanipullalacher	Check Dam	78.9196	15.4911	NREGS
2	Jallyvanipullalacheruvu	Jallivanipullalacher	Check Dam	78.9342	15.4984	NREGS
3	Gowthavaram	Gowthavaram	Check Dam	78.9964	15.4802	NREGS
4	Gowthavaram	Gowthavaram	Check Dam	78.9981	15.4859	NREGS
5	Gowthavaram	Gowthavaram	Check Dam	78.9971	15.4875	NREGS
6	Gowthavaram	Gowthavaram	Check Dam	78.9854	15.4873	NREGS
7	Gowthavaram	Gowthavaram	Check Dam	78.9866	15.4846	NREGS
8	Somidevipalli	Sangampeta	Check Dam	79.0505	15.4771	NREGS
9	Somidevipalli	Sangampeta	Check Dam	79.0544	15.4860	NREGS
10	Somidevipalli	SomideviPalli	Check Dam	79.0458	15.4689	NREGS
11	Somidevipalli	SomideviPalli	Check Dam	79.0410	15.4678	NREGS
12	Somidevipalli	SomideviPalli	Check Dam	79.0306	15.4571	NREGS
13	Kalvapalli	Gangampalli	Check Dam	78.9818	15.4413	NREGS
14	Anumalapalli	AnumalaPalli	Check Dam	78.9519	15.4907	NREGS
15	Anumalapalli	AnumalaPalli	Check Dam	78.9504	15.4863	NREGS
16	Chinaganipalli	VenthurlaPadu	Check Dam	78.9091	15.5350	NREGS
17	Chollaveedu	Akkapalli	Check Dam	78.9588	15.5156	NREGS
18	Chollaveedu	Akkapalli	Check Dam	78.9485	15.5059	NREGS
19	Chollaveedu	Akkapalli	Check Dam	78.9451	15.5039	NREGS
20	Chollaveedu	Chollaveedu	Check Dam	78.9492	15.5145	NREGS
21	Chollaveedu	Chollaveedu	Check Dam	78.9510	15.5146	NREGS
22	Chollaveedu	Chollaveedu	Check Dam	78.9448	15.5144	NREGS
23	Edavalli	Edavalli	Check Dam	78.9870	15.3958	NREGS
24	Edavalli	Edavalli	Check Dam	78.9899	15.4055	NREGS
25	Oddulavagupalli	Atchampalli	Check Dam	78.9985	15.4180	NREGS
26	Oddulavagupalli	Atchampalli	Check Dam	78.9981	15.4113	NREGS
27	Oddulavagupalli	OddulavaguPalli	Check Dam	79.0051	15.4273	NREGS
28	Palakaveedu	Anumalaveedu	Check Dam	78.9895	15.4722	NREGS
29	Palakaveedu	ObulareddyPalli	Check Dam	78.9948	15.4467	NREGS
30	Palakaveedu	Palakaveedu	Check Dam	79.0222	15.4461	NREGS
31	Satyavolu	RangareddyPalli	Check Dam	78.9778	15.3963	NREGS
32	Satyavolu	Satyavolu	Check Dam	78.9817	15.4048	NREGS
33	Satyavolu	Satyavolu	Check Dam	78.9798	15.4065	NREGS
34	Gudimetla	Gudimetla	Check Dam	79.0119	15.4289	NREGS
35	Gudimetla	Gudimetla	Check Dam	79.0233	15.4219	NREGS
36	Gudimetla	Gudimetla	Check Dam	79.0228	15.4270	NREGS
37	Gudimetla	Kothapalli	Check Dam	79.0307	15.4039	NREGS
38	Gudimetla	Kothapalli	Check Dam	79.0318	15.4083	NREGS
39	Gudimetla	Ramapuram	Check Dam	79.0233	15.4318	NREGS
40	Akaveedu	Akaveedu	Check Dam	78.9615	15.5578	NREGS
41	Akaveedu	Akaveedu	Check Dam	78.9609	15.5529	NREGS

42	Akaveedu	Akaveedu	Check Dam	78.9594	15.5516	NREGS
43	Akaveedu	Akaveedu	Check Dam	78.9619	15.5477	NREGS
44	Akaveedu	Akaveedu	Check Dam	78.9564	15.5633	NREGS
45	Akaveedu	Araveetikota	Check Dam	78.9172	15.5725	NREGS
46	Akaveedu	Araveetikota	Check Dam	78.9172	15.5701	NREGS
47	Akaveedu	Araveetikota	Check Dam	78.9156	15.5668	NREGS
48	Akaveedu	Kothuru	Check Dam	78.9275	15.6022	NREGS
49	Akaveedu	Kothuru	Check Dam	78.9286	15.6006	NREGS
50	Akaveedu	Kothuru	Check Dam	78.9323	15.5997	NREGS
51	Akaveedu	Kothuru	Check Dam	78.9291	15.5948	NREGS
52	Gowthavaram	Gowthavaram	Check Dam	78.9964	15.4802	IWMP
53	Gowthavaram	Gowthavaram	Check Dam	78.9981	15.4859	IWMP
54	Gowthavaram	Gowthavaram	Check Dam	78.9971	15.4875	IWMP
55	Gowthavaram	Gowthavaram	Check Dam	78.9854	15.4873	IWMP
56	Gowthavaram	Gowthavaram	Check Dam	78.9866	15.4846	IWMP
57	Somidevipalli	Sangampeta	Check Dam	79.0505	15.4771	IWMP
58	Somidevipalli	Sangampeta	Check Dam	79.0544	15.4860	IWMP
59	Somidevipalli	SomideviPalli	Check Dam	79.0458	15.4689	IWMP
60	Somidevipalli	SomideviPalli	Check Dam	79.0410	15.4678	IWMP
61	Somidevipalli	SomideviPalli	Check Dam	79.0306	15.4571	IWMP
62	Kalvapalli	Gangampalli	Check Dam	78.9818	15.4413	IWMP
63	Anumalapalli	AnumalaPalli	Check Dam	78.9519	15.4907	IWMP
64	Anumalapalli	AnumalaPalli	Check Dam	78.9504	15.4863	IWMP
65	Edavalli	Edavalli	Check Dam	78.9870	15.3958	IWMP
66	Edavalli	Edavalli	Check Dam	78.9899	15.4055	IWMP
67	Oddulavagupalli	Atchampalli	Check Dam	78.9985	15.4180	IWMP
68	Oddulavagupalli	Atchampalli	Check Dam	78.9981	15.4113	IWMP
69	Oddulavagupalli	OddulavaguPalli	Check Dam	79.0051	15.4273	IWMP
70	Palakaveedu	Anumalaveedu	Check Dam	78.9895	15.4722	IWMP
71	Palakaveedu	ObulareddyPalli	Check Dam	78.9948	15.4467	IWMP
72	Palakaveedu	Palakaveedu	Check Dam	79.0222	15.4461	IWMP
73	Satyavolu	RangareddyPalli	Check Dam	78.9778	15.3963	IWMP
74	Satyavolu	Satyavolu	Check Dam	78.9817	15.4048	IWMP
75	Satyavolu	Satyavolu	Check Dam	78.9798	15.4065	IWMP
76	Gudimetla	Gudimetla	Check Dam	79.0119	15.4289	IWMP
77	Gudimetla	Gudimetla	Check Dam	79.0233	15.4219	IWMP
78	Gudimetla	Gudimetla	Check Dam	79.0228	15.4270	IWMP
79	Gudimetla	Kothapalli	Check Dam	79.0307	15.4039	IWMP
80	Gudimetla	Kothapalli	Check Dam	79.0318	15.4083	IWMP
81	Gudimetla	Ramapuram	Check Dam	79.0233	15.4318	IWMP
82	Jallyvanipullalacheruvu	Jallivanipullalacher	MPT	78.9212	15.4914	NREGS
83	Jallyvanipullalacheruvu	Jallivanipullalacher	MPT	78.9264	15.4894	NREGS
84	Jallyvanipullalacheruvu	Jallivanipullalacher	MPT	78.9273	15.4918	NREGS
85	Somidevipalli	Sangampeta	MPT	79.0453	15.4740	NREGS

86	Kalvapalli	Gangampalli	MPT	78.9788	15.4394	NREGS
87	Kalvapalli	Gangampalli	MPT	78.9829	15.4408	NREGS
88	Kalvapalli	Gangampalli	MPT	78.9816	15.4404	NREGS
89	Kalvapalli	Gangampalli	MPT	78.9819	15.4390	NREGS
90	Kalvapalli	Gangampalli	MPT	78.9821	15.4357	NREGS
91	Kalvapalli	Kalvapalli	MPT	78.9657	15.4317	NREGS
92	Kalvapalli	Kalvapalli	MPT	78.9657	15.4311	NREGS
93	Chinaganipalli	VenthurlaPadu	MPT	78.9075	15.5417	NREGS
94	Chinaganipalli	VenthurlaPadu	MPT	78.9125	15.5433	NREGS
95	Chollaveedu	Akkapalli	MPT	78.9731	15.5167	NREGS
96	Chollaveedu	Akkapalli	MPT	78.9714	15.5178	NREGS
97	Chollaveedu	Akkapalli	MPT	78.9539	15.5147	NREGS
98	Chollaveedu	Chollaveedu	MPT	78.9364	15.5108	NREGS
99	Edavalli	Edavalli	MPT	78.9899	15.4047	NREGS
100	Edavalli	Edavalli	MPT	78.9895	15.4043	NREGS
101	Edavalli	Edavalli	MPT	78.9740	15.3796	NREGS
102	Oddulavagupalli	MedamvariPalli	MPT	79.0132	15.4352	NREGS
103	Oddulavagupalli	OddulavaguPalli	MPT	78.9893	15.4151	NREGS
104	Palakaveedu	Anumalaveedu	MPT	78.9937	15.4722	NREGS
105	Palakaveedu	Anumalaveedu	MPT	79.0011	15.4711	NREGS
106	Palakaveedu	Anumalaveedu	MPT	79.0017	15.4678	NREGS
107	Palakaveedu	ObulareddyPalli	MPT	79.0010	15.4468	NREGS
108	Palakaveedu	ObulareddyPalli	MPT	79.0032	15.4407	NREGS
109	Palakaveedu	Palakaveedu	MPT	79.0339	15.4717	NREGS
110	Palakaveedu	Palakaveedu	MPT	79.0322	15.4723	NREGS
111	Palakaveedu	Palakaveedu	MPT	79.0355	15.4721	NREGS
112	Palakaveedu	Palakaveedu	MPT	79.0365	15.4719	NREGS
113	Palakaveedu	Palakaveedu	MPT	79.0363	15.4656	NREGS
114	Palakaveedu	Palakaveedu	MPT	79.0219	15.4547	NREGS
115	Racherla	PaluguntaPalli	MPT	78.9503	15.4722	NREGS
116	Satyavolu	RangareddyPalli	MPT	78.9602	15.3761	NREGS
117	Satyavolu	Satyavolu	MPT	78.9719	15.4129	NREGS
118	Satyavolu	Satyavolu	MPT	78.9776	15.4091	NREGS
119	Satyavolu	Satyavolu	MPT	78.9737	15.4137	NREGS
120	Gudimetla	Gudimetla	MPT	79.0245	15.4205	NREGS
121	Gudimetla	Gudimetla	MPT	79.0079	15.4278	NREGS
122	Gudimetla	Gudimetla	MPT	79.0085	15.4265	NREGS
123	Gudimetla	Kothapalli	MPT	79.0323	15.4001	NREGS
124	Gudimetla	Kothapalli	MPT	79.0352	15.4079	NREGS
125	Gudimetla	Kothapalli	MPT	79.0209	15.4011	NREGS
126	Gudimetla	Kothapalli	MPT	79.0149	15.4010	NREGS
127	Gudimetla	Ramapuram	MPT	79.0252	15.4297	NREGS
128	Gudimetla	Ramapuram	MPT	79.0313	15.4291	NREGS
129	Gudimetla	Ramapuram	MPT	79.0331	15.4385	NREGS

130	Akaveedu	Akaveedu	MPT	78.9632	15.5821	NREGS
131	Akaveedu	Akaveedu	MPT	78.9202	15.5633	NREGS
132	Akaveedu	Akaveedu	MPT	78.9326	15.5851	NREGS
133	Akaveedu	Akaveedu	MPT	78.9629	15.5817	NREGS
134	Akaveedu	Akaveedu	MPT	78.9625	15.5825	NREGS
135	Akaveedu	Akaveedu	MPT	78.9655	15.5808	NREGS
136	Akaveedu	Akaveedu	MPT	78.9641	15.5754	NREGS
137	Akaveedu	Akaveedu	MPT	78.9220	15.5630	NREGS
138	Akaveedu	Akaveedu	MPT	78.9211	15.5633	NREGS
139	Somidevipalli	Sangampeta	MPT	79.0453	15.4740	IWMP
140	Kalvapalli	Gangampalli	MPT	78.9788	15.4394	IWMP
141	Kalvapalli	Gangampalli	MPT	78.9829	15.4408	IWMP
142	Kalvapalli	Gangampalli	MPT	78.9816	15.4404	IWMP
143	Kalvapalli	Gangampalli	MPT	78.9819	15.4390	IWMP
144	Kalvapalli	Gangampalli	MPT	78.9821	15.4357	IWMP
145	Kalvapalli	Kalvapalli	MPT	78.9657	15.4317	IWMP
146	Kalvapalli	Kalvapalli	MPT	78.9657	15.4311	IWMP
147	Edavalli	Edavalli	MPT	78.9899	15.4047	IWMP
148	Edavalli	Edavalli	MPT	78.9895	15.4043	IWMP
149	Edavalli	Edavalli	MPT	78.9740	15.3796	IWMP
150	Oddulavagupalli	MedamvariPalli	MPT	79.0132	15.4352	IWMP
151	Oddulavagupalli	OddulavaguPalli	MPT	78.9893	15.4151	IWMP
152	Palakaveedu	Anumalaveedu	MPT	78.9937	15.4722	IWMP
153	Palakaveedu	Anumalaveedu	MPT	79.0011	15.4711	IWMP
154	Palakaveedu	Anumalaveedu	MPT	79.0017	15.4678	IWMP
155	Palakaveedu	ObulareddyPalli	MPT	79.0010	15.4468	IWMP
156	Palakaveedu	ObulareddyPalli	MPT	79.0032	15.4407	IWMP
157	Palakaveedu	Palakaveedu	MPT	79.0339	15.4717	IWMP
158	Palakaveedu	Palakaveedu	MPT	79.0322	15.4723	IWMP
159	Palakaveedu	Palakaveedu	MPT	79.0355	15.4721	IWMP
160	Palakaveedu	Palakaveedu	MPT	79.0365	15.4719	IWMP
161	Palakaveedu	Palakaveedu	MPT	79.0363	15.4656	IWMP
162	Palakaveedu	Palakaveedu	MPT	79.0219	15.4547	IWMP
163	Racherla	PaluguntaPalli	MPT	78.9503	15.4722	IWMP
164	Satyavolu	RangareddyPalli	MPT	78.9602	15.3761	IWMP
165	Satyavolu	Satyavolu	MPT	78.9719	15.4129	IWMP
166	Satyavolu	Satyavolu	MPT	78.9776	15.4091	IWMP
167	Satyavolu	Satyavolu	MPT	78.9737	15.4137	IWMP
168	Gudimetla	Gudimetla	MPT	79.0245	15.4205	IWMP
169	Gudimetla	Gudimetla	MPT	79.0079	15.4278	IWMP
170	Gudimetla	Gudimetla	MPT	79.0085	15.4265	IWMP
171	Gudimetla	Kothapalli	MPT	79.0323	15.4001	IWMP
172	Gudimetla	Kothapalli	MPT	79.0352	15.4079	IWMP
173	Gudimetla	Kothapalli	MPT	79.0209	15.4011	IWMP

174	Gudimetla	Kothapalli	MPT	79.0149	15.4010	IWMP
175	Gudimetla	Ramapuram	MPT	79.0252	15.4297	IWMP
176	Gudimetla	Ramapuram	MPT	79.0313	15.4291	IWMP
177	Gudimetla	Ramapuram	MPT	79.0331	15.4385	IWMP
178	Jallyvanipullalacheruvu	Jallivanipullalacher	PT	78.9077	15.4940	NREGS
179	Jallyvanipullalacheruvu	Jallivanipullalacher	PT	78.9291	15.4914	NREGS
180	Kalvapalli	Gangampalli	PT	78.9731	15.4365	NREGS
181	Kalvapalli	Gangampalli	PT	78.9767	15.4356	NREGS
182	Kalvapalli	Kalvapalli	PT	78.9678	15.4303	NREGS
183	Kalvapalli	Kalvapalli	PT	78.9665	15.4294	NREGS
184	Anumalapalli	AnumalaPalli	PT	78.9442	15.4926	NREGS
185	Anumalapalli	AnumalaPalli	PT	78.9483	15.4883	NREGS
186	Palakaveedu	Anumalaveedu	PT	78.9928	15.4385	NREGS
187	Palakaveedu	Anumalaveedu	PT	78.9952	15.4735	NREGS
188	Palakaveedu	Anumalaveedu	PT	79.0026	15.4713	NREGS
189	Palakaveedu	Palakaveedu	PT	79.0281	15.4609	NREGS
190	Racherla	PaluguntaPalli	PT	78.9436	15.4722	NREGS
191	Racherla	Racherla	PT	78.9411	15.4501	NREGS
192	Racherla	Racherla Form	PT	78.9446	15.4275	NREGS
193	Satyavolu	RangareddyPalli	PT	78.9763	15.3903	NREGS
194	Satyavolu	RangareddyPalli	PT	78.9695	15.3894	NREGS
195	Gudimetla	Kothapalli	PT	79.0293	15.4085	NREGS
196	Gudimetla	Ramapuram	PT	79.0130	15.4314	NREGS
197	Kalvapalli	Gangampalli	PT	78.9731	15.4365	IWMP
198	Kalvapalli	Gangampalli	PT	78.9767	15.4356	IWMP
199	Kalvapalli	Kalvapalli	PT	78.9678	15.4303	IWMP
200	Kalvapalli	Kalvapalli	PT	78.9665	15.4294	IWMP
201	Anumalapalli	AnumalaPalli	PT	78.9442	15.4926	IWMP
202	Anumalapalli	AnumalaPalli	PT	78.9483	15.4883	IWMP
203	Palakaveedu	Anumalaveedu	PT	78.9928	15.4385	IWMP
204	Palakaveedu	Anumalaveedu	PT	78.9952	15.4735	IWMP
205	Palakaveedu	Anumalaveedu	PT	79.0026	15.4713	IWMP
206	Palakaveedu	Palakaveedu	PT	79.0281	15.4609	IWMP
207	Racherla	PaluguntaPalli	PT	78.9436	15.4722	IWMP
208	Racherla	Racherla	PT	78.9411	15.4501	IWMP
209	Racherla	Racherla Form	PT	78.9446	15.4275	IWMP
210	Satyavolu	RangareddyPalli	PT	78.9763	15.3903	IWMP
211	Satyavolu	RangareddyPalli	PT	78.9695	15.3894	IWMP
212	Gudimetla	Kothapalli	PT	79.0293	15.4085	IWMP
213	Gudimetla	Ramapuram	PT	79.0130	15.4314	IWMP

Fig.1

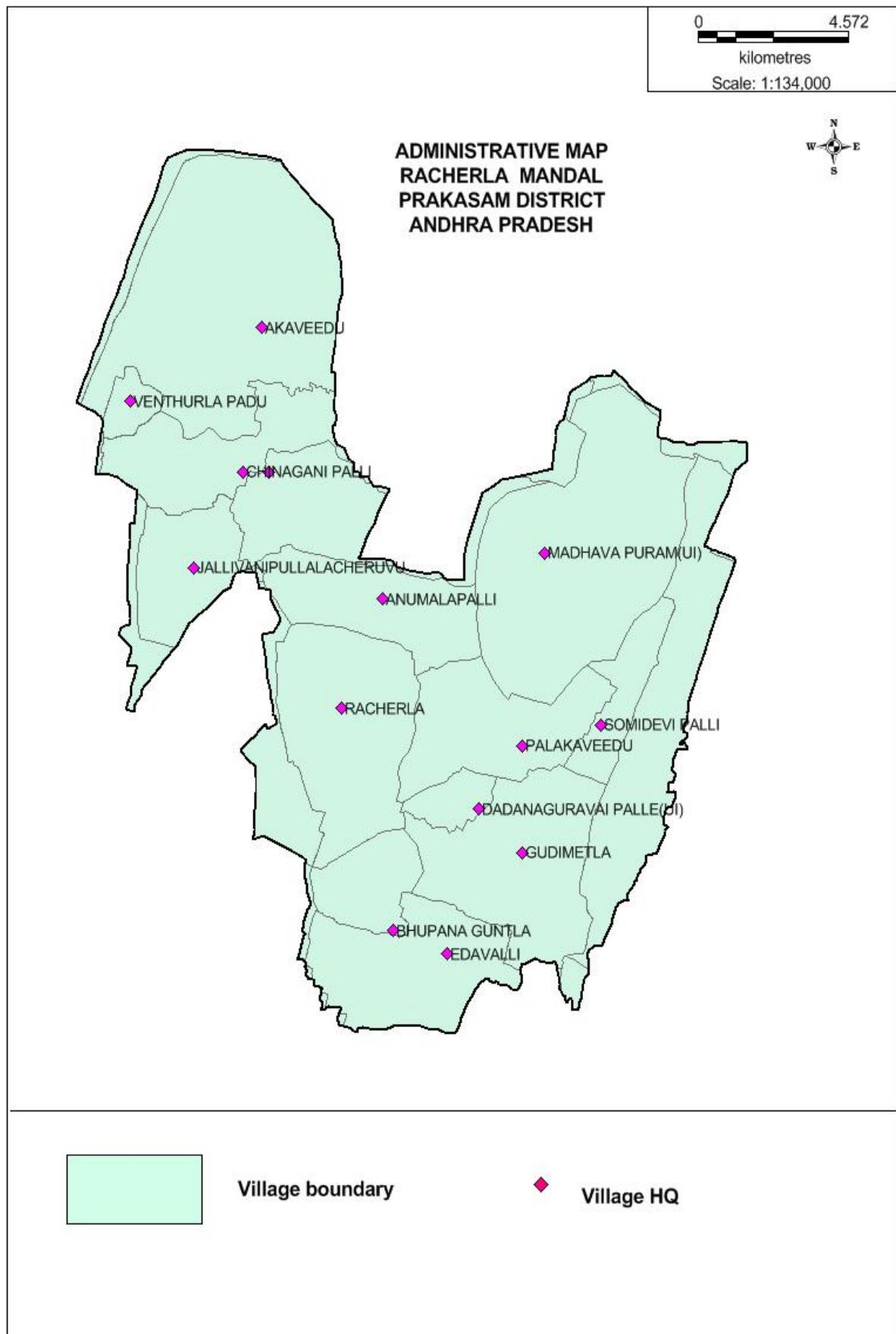


Fig.2

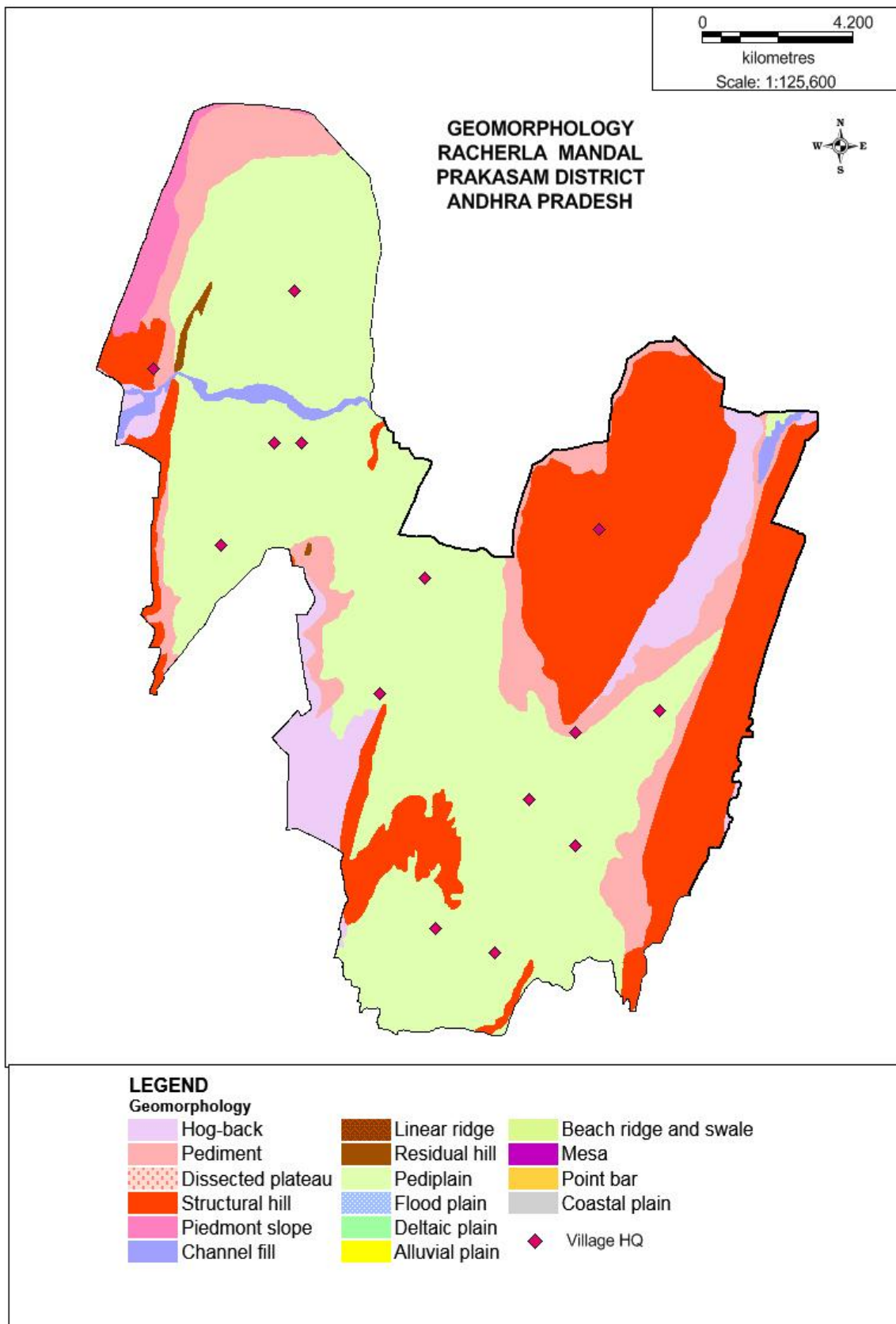




Fig.3

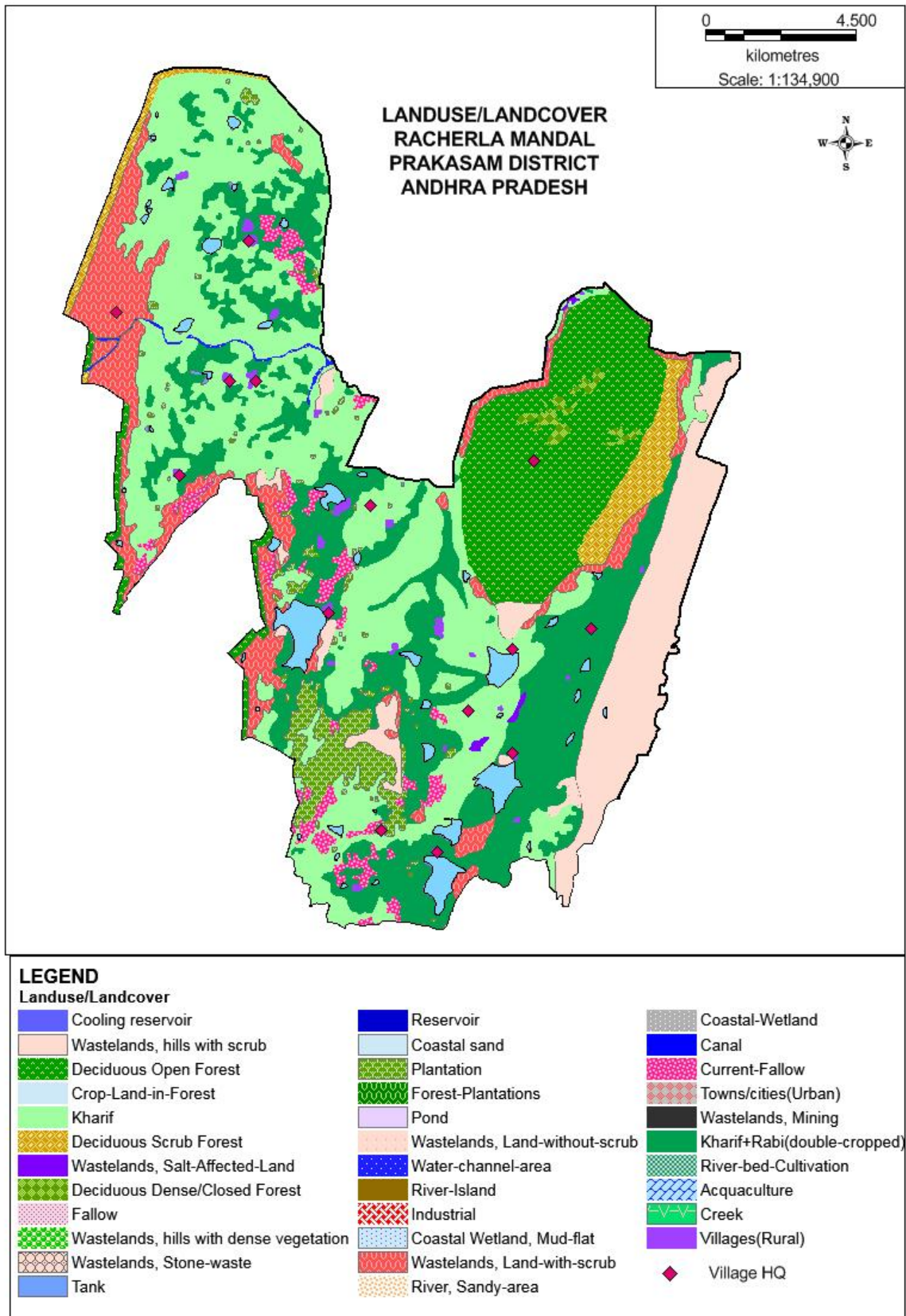


Fig.4

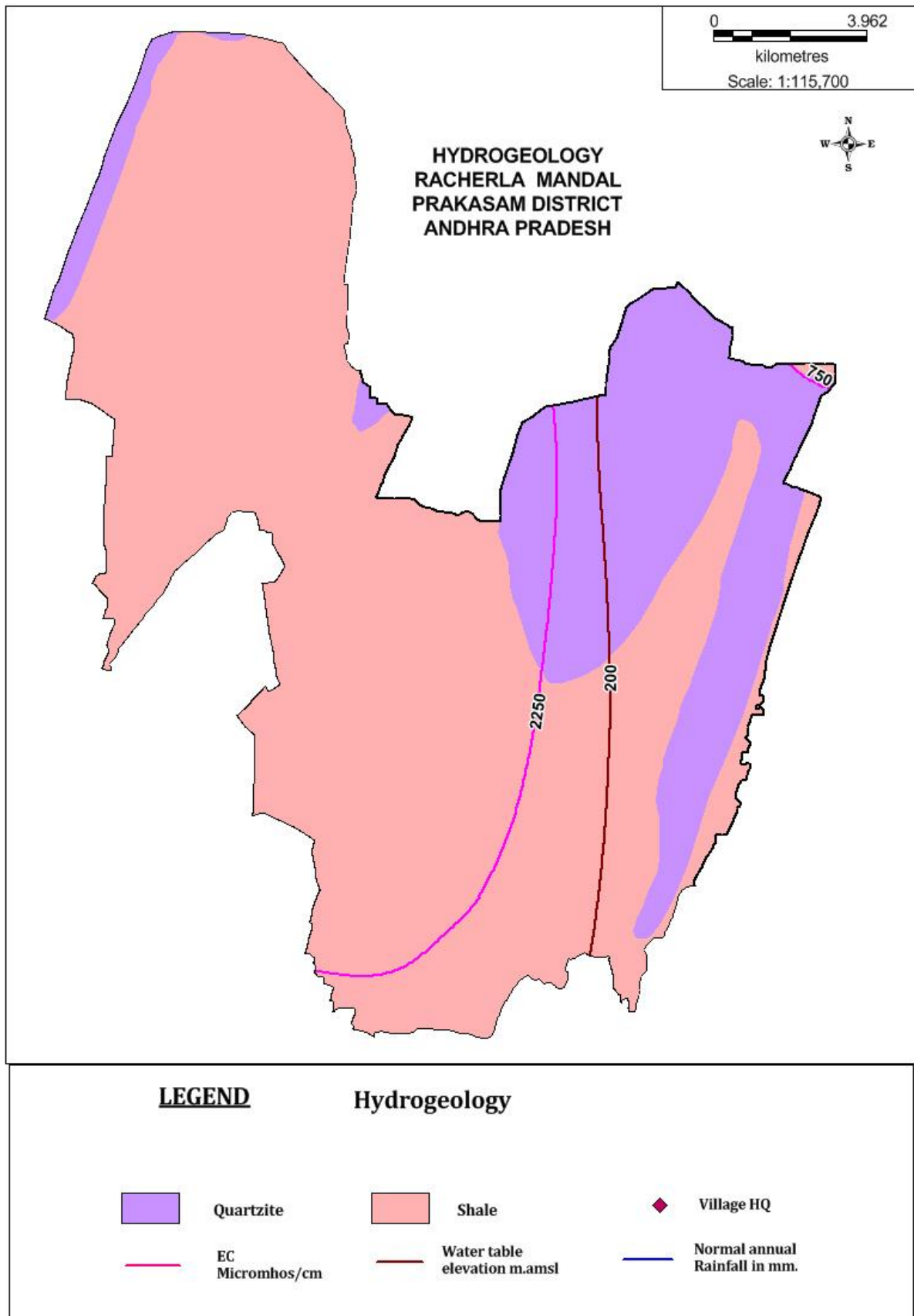


Fig.5

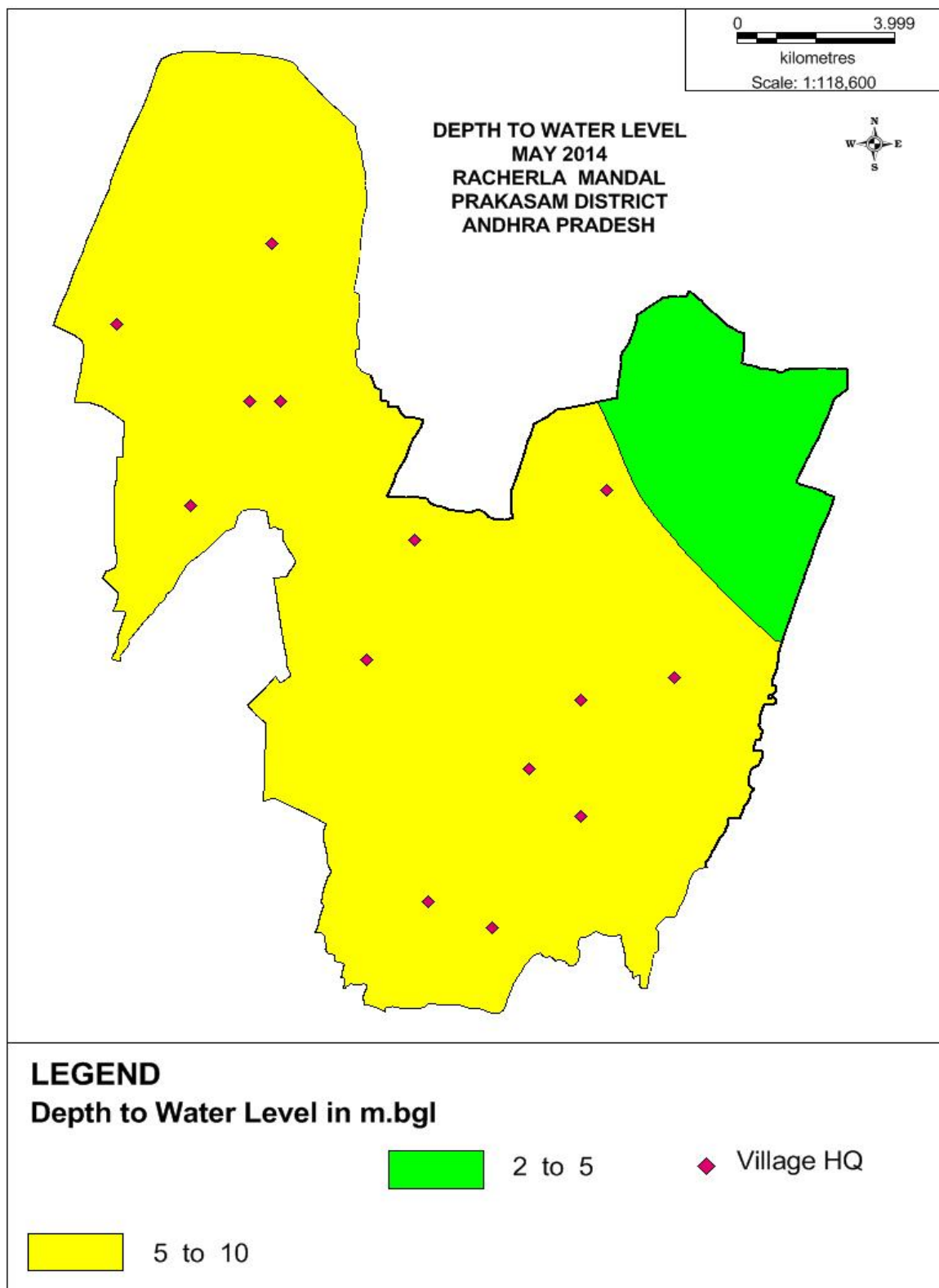


Fig.6

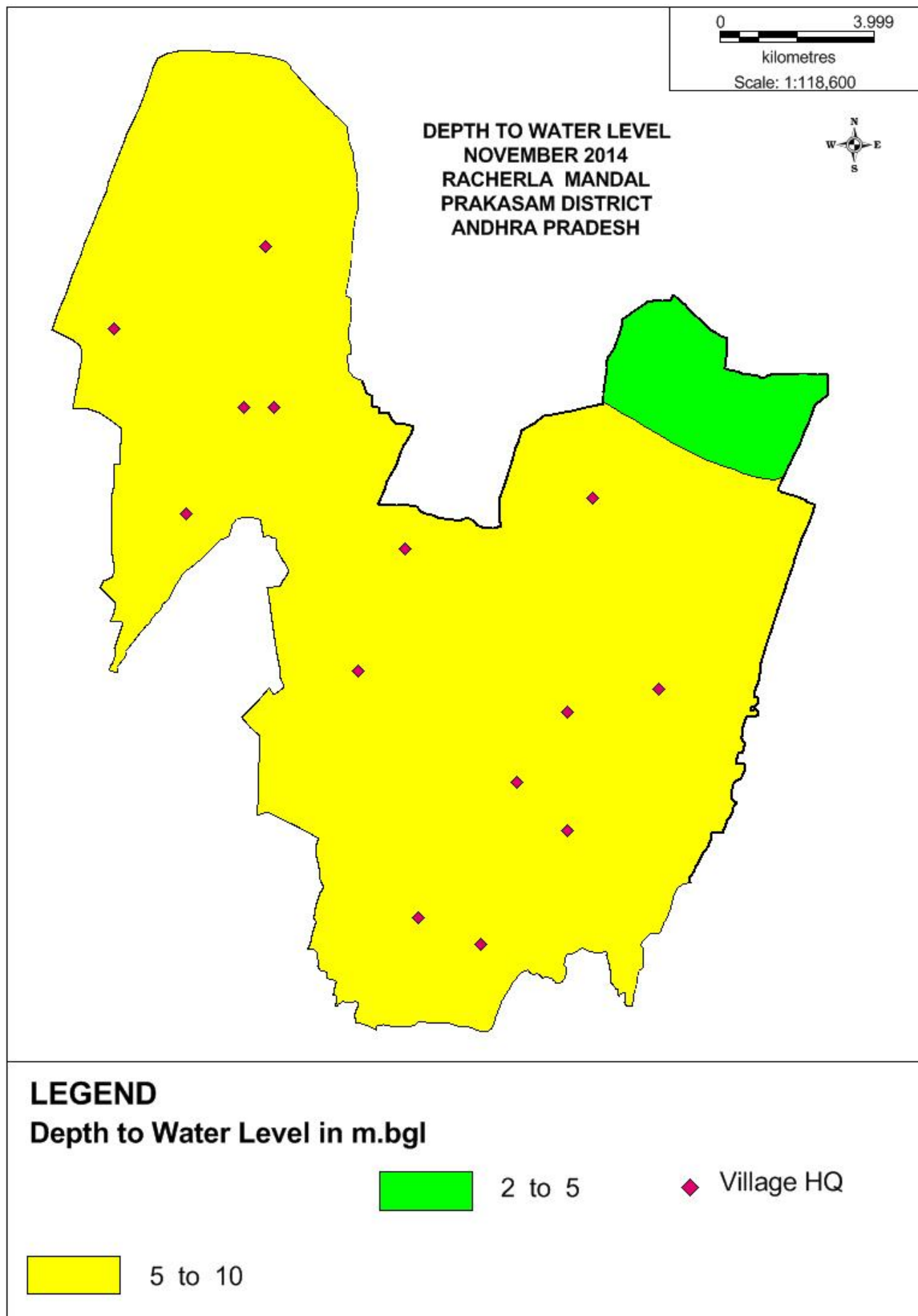


Fig.7

