

State Profile

Ground Water Scenario of Andhra Pradesh

Area (Sq. km)	1,63,000
Physiography	A low relief terrain with three major physiographic units- <ul style="list-style-type: none"> ▪ The Coastal Plains ▪ The Eastern Ghats ▪ The Western Pedepain
Drainage	The State is drained by three major perennial rivers viz. Godavari, Krishna and Pennar, ten medium rivers and several other rivers of lesser significance
Irrigation	Gross Area irrigated is 41,54,322 Ha, out of which area irrigated by ground water is 15,61,170 Ha(37.6%) and the area irrigated by surface water is 24,49,665 Ha (59%).
Rainfall	Varies from 574 mm in Anantapur district to 1166 mm in Srikakulam district. It increases from less than 800 mm in the south and south-west part of the state to more than 1200 mm in north and north-east part of the state. The mean annual rainfall of the state is 950 mm of which southwest monsoon season (June-September) contributes about 58% of the annual rainfall and northeast monsoon season contributes 305 mm of the annual rainfall.
Total Districts / Mandals	13 Districts / 670 Mandals

Hydrogeology : Andhra Pradesh is characterized by various geological formations ranging in age from Archaean to Recent. Nearly 67percent of the State is underlain by hard rock formations consisting of granites, gneisses, metamorphics and intrusives (Archaeans), Precambrian quartzites, shales and limestones (Cuddapahs & Kurnools), Mesozoic Deccan Trap basalts etc., while the remaining area is underlain by Gondwana, Tertiary sedimentaries and Sub Recent-Recent alluvium. The occurrence and movement of ground water in hard rocks is chiefly controlled by thickness of weathering and structural features like fractures and solution cavities. In general, the depth of weathering varies from 5 to 20 m and occasionally upto 40 m. Ground water is developed generally by means of shallow-deep bore wells ranging in depth down to 100 m, occasionally even beyond 100 m with discharges generally ranging from 2-5 lps. The semi-consolidated formations of Gondwana & Tertiary comprising sandstones, shales, siltstones, conglomerates form thick and multi aquifer systems down to 600 m bgl under confining conditions. The aquifers are often prolific with discharges varying upto as high as 100 lps.

Ground water in coastal alluvium, deltaic alluvium representing un-consolidated formations is generally saline with fresh water restricting to shallow depths (< 20 m).

Ground Water Regime Monitoring: Ground water monitoring is carried out 4 times in a year (January, May, August and November) and ground water quality one time (May). As on 31/03/2016, total of 848 Ground Water Monitoring Stations (GWMS) (Dug wells: 745 and Piezometer wells: 103) exist. There are 164 dug wells which are being monitored on participatory mode.

**District-wise details of NHS wells (as on March 2016)
Andhra Pradesh state**

S No	District	Dug wells	Piezometer	Total
1	Anantapur	35	20	55
2	Chittoor	47	0	47
3	East Godavari	95	13	108
4	Guntur	90	13	103
5	Kadapa	32	3	35
6	Krishna	70	7	77
7	Kurnool	39	18	57
8	Nellore	61	2	63
9	Prakasam	53	14	67
10	Srikakulam	45	0	45
11	Visakhapatnam	69	4	73
12	Vizianagaram	47	0	47
13	West Godavari	62	9	71
Total		745	103	848

GROUND WATER SCENARIO

Ground water monitoring is carried out as part of National ground water monitoring programme 4 times a year (January, May, August and November) and ground water quality 1 time (May). As on 31/03/2016, total of 848 (DW: 745 and Pz: 103) Ground Water Monitoring Wells (GWMS) are in existence. There are total 164 parahydrogeologist are appointed to monitor GWMS on participatory mode (all dug wells).

In general, the water levels are deep during May and shallow during November months. During May (pre-monsoon season) water levels are in the range of 0.02 m bgl to

49.3 m bgl and water levels in the range of 5-10 m bgl are more predominant occupying ~47 % of the area followed by 2-5 mbgl (30 % of area). During August (mid-monsoon season) water levels are in the range of 0.05 m bgl to 47.45 m bgl and water levels in the range of 5-10 m bgl are more predominant occupying ~39 % of the area followed by 2-5 mbgl (27% area). Moderate water levels (10-20 mbgl) occupy ~19 % and deep water levels (>20 mbgl) occupy ~2 % of the area.

During November (post-monsoon season) water levels are in the range of 0.23 m bgl to 44.5 m bgl and water levels in the range of 2 to 5 m bgl are more predominant occupying ~37 % of the area followed by 5-10 mbgl (34 % area). Moderate water levels (10-20 mbgl) occupy ~6 % and deep water levels (>20 mbgl) occupy ~2 % of the area. During January-16, water levels are in the range of 0.02 m bgl to 43.5 m bgl and water levels in the range of 2-5 m bgl are more predominant occupying ~47 % of the area followed by 5-10 mbgl (32 % area). Deep water levels (>20 mbgl) occupy ~2 % of the area.

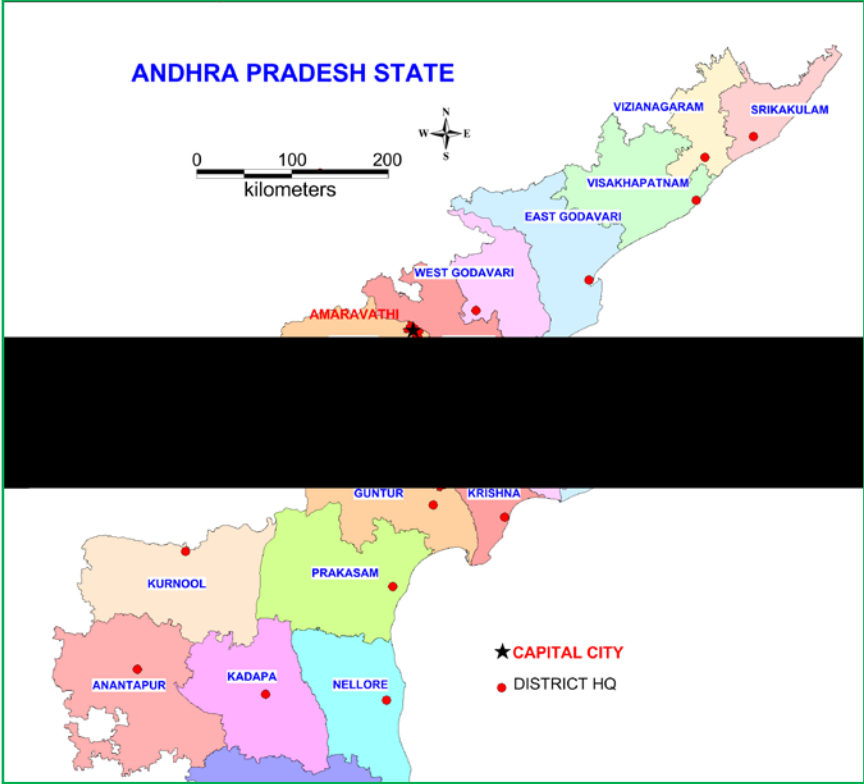
Dynamic Ground Water Resources (As on March 2013)	
Annual Replenishable Ground water Resource	20.39 BCM
Net Annual Ground Water Availability	18.47 BCM
Annual Ground Water Draft	8.10 BCM
Stage of Ground Water Development	44 %
CATEGORIZATION	
Over Exploited	61 Mandals
Critical	17 Mandals
Semi- critical	54 Mandals
Saline	41 Mandals
ARTIFICIAL RECHARGE	
Artificial Recharge to Ground Water (Artificial Recharge feasibility structures in the Over-exploited mandals of the state based on 2011 GEC estimation)	<ul style="list-style-type: none"> ▪ ▪ Area identified for Artificial Recharge: 8946 sq. km ▪ Volume of water to be harnessed: 376 MCM ▪ Feasible AR structures: <ul style="list-style-type: none"> •Percolation tanks – 428 •Check Dams -2096 •Recharge shaft -3104 •RDR with RS -1620 •Form Ponds -16300 •Sprinklers -81,500 •Piezometers -813

<p>As per the master plan on Artificial Recharge to Ground Water , number of structures feasible in water stressed areas where ground water development was semi-critical, critical and over-exploited based on GEC 2009 estimation.</p>	<ul style="list-style-type: none"> ▪ Area identified for Artificial Recharge- 24078 sq. km. ▪ Volume of water to be harnessed: 980.9 MCM ▪ Feasible AR structures <ul style="list-style-type: none"> ❖ 1635 Percolation tanks ❖ 12261 check dams
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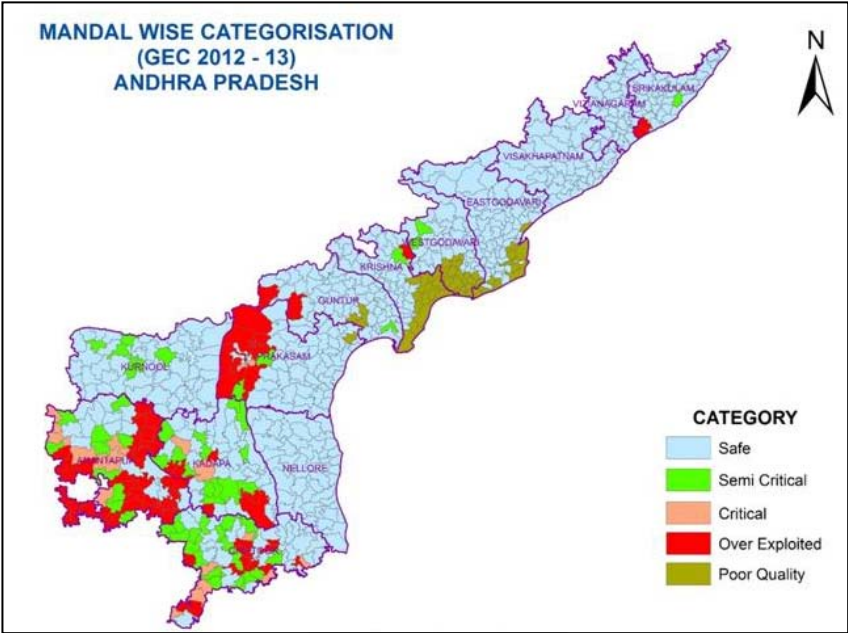
Ground Water Quality Problems	
Contaminants	Districts affected (in part)
Salinity (EC > 3000 μ S/cm at 25 ° C)	Ananthapur, East-Godavari, Guntur, Kadapa, Krishna, Kurnool, Nellore, Prakasam, Srikakulam, Visakhapatnam, West-Godavari
Fluoride (>1.5 mg/l)	Anantpur, Guntur, Kadapa, Kurnool, and Prakasam,
Iron (>1.0 mg/l)	Chittoor, Cuddapah, Nellore, anantapur, Prakasam, West Godavari, Visakhapatnam and Srikakulam
Nitrate (>45 mg/l)	All the districts of the state

Central Ground Water Authority

<p>Areas Notified for Regulation of ground water development</p>	<ul style="list-style-type: none"> ▪ Tirupathi (rural) Mandal of Chittoor District ▪ Vempalli Mandal of Cuddapah District ▪ Chilmathur mandal of Anantapur District ▪ Narpala mandal (Non-Command) of Anantapur District ▪ Giddaluru mandal of Prakasam District
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Administrative Map of Andhra Pradesh state



Categorization map of Andhra Pradesh