DYNAMIC GROUND WATER RESOURCES OF INDIA

(AS ON MARCH, 2004)

CENTRAL GROUND WATER BOARD
MINISTRY OF WATER RESOURCES
GOVERNMENT OF INDIA
FARIDABAD
2006

FOREWORD

The sustainable development of ground water resource requires precise quantitative assessment based on reasonably valid scientific principles. The assessment of ground water resource is a complex task which involves computation and estimation of different parameters associated with the inflow and the outflow of this natural resource. In order to ascertain the ground water resource in the shallow aquifers that gets annually recharged through rainfall and other sources under varied hydrogeological conditions in the country, scientific methodology following well defined norms, need to be adopted.

The first systematic approach to estimate the ground water resources of the country was made by Ground Water Exploitation Committee in 1979. The exercise of assessment of ground water resource based on scientific and reliable data, was done in the country following the methodology detailed in the report of the Ground Water Estimation Committee, that was released in March 1984. Since then, the Central Ground Water Board, State Ground Water Organizations, Universities and other organizations, have undertaken a number of studies on ground water assessment. The data base generated from these studies and changing ground water utilization scenario, indicated the necessity, to modify the methodology, suggested by the committee in 1984. Another Ground Water Estimation Committee, was formed in 1995 which submitted its report in 1997 suggesting modified methodology that is referred to as GEC'97.

This report presents the Dynamic Ground Water Resources of India based on GEC'97 with base year as 2004. It identifies the areas where ground water development is at low key and the areas, where ground water development is alarmingly high. The estimation for the individual state was jointly done by the Ground Water Wing of the State Govt. and the concerned Regional Office of Central Ground Water Board. The technical guidance for the state level estimate and national level compilation was given by R&D Advisory Committee on Ground Water Estimation. The committee headed by the Chairman, Central Ground Water Board, has drawn experts from Central Ground Water Board, NABARD, State Governments of Karnataka and Maharashtra. The individual State ground water estimation reports were approved at the respective State Level Committees, which are mostly headed by the State Secretary In-charge, Water Resources and include as its members - Ground Water Department, Regional Office of Central Ground Water Board, NABARD, Irrigation Department, Public Health Department etc. The efforts made by the officials from Central Ground Water Board and State Ground Water Departments - involved in the resource estimation are commendable. The contributions of the members of the R&D Advisory Committee on Ground Water Estimation and State Level Committees are equally praise-worthy.

I am of firm conviction that the present report will go a long way to help the planners and executors, in the ground water sector to formulate future ground water development and management plans in the country.

(Dr. Saleem Romani)
Chairman
Central Ground Water Board

PREFACE

The country is endowed with ground water resources, whose utilization in a planned manner on scientific principles will enhance its prospects for the years to come. Periodic assessment of ground water resource, using advanced methodology therefore assumes significance.

The present report brings out the assessment of 'Dynamic Ground Water Resources' of the country. In addition to the dynamic ground water resource, there exists a huge ground water resource in the deeper parts of the unconfined aquifers below the active recharge zone and also in the deeper confined aquifers in the areas covered by alluvial sediments. The dynamic ground water exploited from the shallow aquifer contributes significantly in meeting the water demand of various sectors and hence its precise assessment on scientific basis is of utmost importance.

As per the norms detailed in the Ground Water Estimation Committee report of 1997 (GEC'97) ground water assessment was made season wise separately. Categorization of areas for ground water development is based on stage of ground water development and long term trends of ground water levels.

It is envisaged that present report based on the revised ground water resource estimation methodology of GEC'97 will be useful and will serve as a guide for the scientists and engineers working in the water sector.

The contributions in bringing out this report by the scientists and engineers of CGWB, State Ground Water Organizations, NABARD and other States and Central departments are praise worthy. A special mention is to be made of S/Sh. John Kurien, Chief General Manager, NABARD, Shobhnath, Member (ED & MM), Central Ground Water Board, V.S. Prakash, Director, Drought Monitoring Cell, Govt. of Karnataka and V. Krishnamurthy, GSDA, Govt. of Maharashtra. The report at the national level was compiled by Sh. Rana Chatterjee, Scientist 'D', Central Ground Water Board with the assistance of Sh. S.K. Sinha, Scientist 'C', Central Ground Water Board ably supported by Sh. S.C. Gupta, Asstt. Hydrologist of Central Ground Water Board.

(B. M. Jha)
Member (SAM)
Central Ground Water Board

DYNAMIC GROUND WATER RESOURCES OF INDIA

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DYNAMIC GROUND WATER RESOURCES OF INDIA

AT A GLANCE

(As on March, 2004)

1.	Annual Replenishable Ground Water Resources	433 bcm
2.	Net Annual Ground Water Availability	399 bcm
3.	Annual Ground Water Draft for Irrigation, Domestic & Industrial uses	231 bcm
4.	Stage of Ground Water Development	58%
5.	Categorization of Blocks/Mandals/Talukas	
	Total Assessed units	5723
	Safe	4078
	Semi-Critical	550
	Critical	226
	Over-Exploited	839
	Saline	30

CHAPTER 1

INTRODUCTION

Ground water is an important resource for meeting the water requirements for irrigation, domestic and industrial uses. Ground water is annually replenishable resource but its availability is non-uniform in space and time. Hence, the sustainable development of ground water resources warrants precise quantitative assessment based on reasonably valid scientific principles. National Water Policy, 2002 has also laid emphasis on periodic assessment of ground water resources on scientific basis. The policy also reiterates that the exploitable quantity of ground water should be limited to the amount, which is being recharged annually, more commonly known as Dynamic Ground Water Resource. Technically, the dynamic ground water refers to the quantity of ground water available in the zone of water level fluctuation, which is active recharge zone and replenished annually. In addition to the dynamic ground water resource, there exists a huge ground water reservoir in the deeper zones below the active recharge zone and in the confined aquifers in areas covered by alluvial sediments of river basins, coastal and deltaic tracts constituting the unconsolidated formations. As 55% of water demand for agriculture and irrigation is met from ground water, the development of shallow aquifers plays an important part for sustainability of tube wells. Thus, correct assessment of dynamic ground water resources becomes significant for a planned agricultural growth.

The present report is an outcome of the concerted efforts made by the Central Ground Water Board and respective State Ground Water Departments to bring out the status of dynamic ground water resources of the country based on the methodology recommended by Ground Water Resource Estimation Committee, 1997 (GEC'97).

1.1 BACKGROUND

The first systematic approach to estimate the ground water resources of the country was made by Ground Water Over Exploitation Committee in 1979. The committee was constituted by Agriculture Refinance and Development Corporation (ARDC) and was headed by Chairman, CGWB with members from – State Ground Water Organizations and Financial Institutions. Based on the norms suggested by the committee, country's Gross Ground Water Recharge had been assessed as about 460 billion cubic metre (bcm) and the Net Recharge as 320 billion cubic metre.

In the year 1982, Government of India constituted 'Ground Water Estimation Committee' (GEC) drawing members from various states/central organizations engaged in hydrogeological studies and ground water development. The committee submitted its recommendations in the year 1984 and suggested methodology (GEC'84) for estimation of dynamic ground water resource. As per the recommendations of the GEC'84, the State Governments were advised to constitute Working Groups for assessment of

ground water potential. The Working Groups were headed by Irrigation Secretaries-Incharge of Ground Water Development and included heads of State Ground Water Departments, State Agriculture Departments, representatives from Agriculture Universities and NABARD. Director, CGWB was the convenor of the group. The base year for computation of the resource mostly varied between 1991 to 1993 and a National report on Ground Water Resources of India was brought out in 1995 by compiling the data of all the states and Union Territories of the country. As per the report, the total Replenishable Ground Water Resources in India were estimat1ed to be about 432 billion cubic meter. The ground water resource available for irrigation purpose was about 361 billion cubic meter. The Net Ground Water Draft for Irrigation uses was around 115 billion cubic meter and the level of development was 32%. The volumetric resource was converted in terms of area and the Utilizable Irrigation Potential from ground water of the country was worked out to be 64 million hectare.

Increasing thrust on ground water and changed scenario of data acquisition led the Government of India to form another committee in 1995, to review the existing methodology for ground water resource estimation and suggest revisions, if necessary. The committee submitted its report in 1997 wherein a revised and elaborate methodology for resource estimation has been suggested, more commonly called as GEC'97. While estimating the ground water resources in the hard rock terrains, some limitations were observed. To address these limitations, another committee on Ground Water Estimation Methodology in Hard Rock terrain was formed in 2001 to review the existing methodology for resource estimation in hard rock terrains. The committee made certain suggestions on the criteria for categorization of blocks to be adopted for the entire country irrespective of the terrain conditions.

At the initiative of Government of India, the State Level Working Groups/ Technical Committees on ground water estimation were revived to re-estimate the ground water resource based on the guidelines of GEC'97. The State Ground Water Departments and Central Ground Water Board jointly undertook the task of resource assessment under the guidance of Study Groups/ Technical Committees.

As per the recommendations of the committee on Ground Water Estimation Methodology in Hard Rock terrain, a Standing Committee named R&D Advisory Committee on Ground Water Resource Estimation was formed by Govt. of India in 2004 to look into the various aspects of resource estimation. The committee was headed by the Chairman, Central Ground Water Board and includes as its members – Chief General Manager, NABARD, Member (SAM), CGWB, Director, Drought Monitoring Cell, Govt. of Karnataka, Director, Ground Water Survey & Development Agency, Govt. of Maharashtra and Scientist 'D', Central Ground Water Board as its Member Secretary.

This committee played the proactive role by providing technical guidance and sorting out the issues and constraints faced by the concerned departments in computation of ground water resources. Further, to expedite the process, the representatives of the concerned State Departments and Central Ground Water Board had been invited to discuss the problems. The final assessment figures were presented before the R&D Advisory Committee on Ground Water Estimation for technical scrutiny. Based on the

suggestions of the R&D Advisory Committee, the reports were modified and final reports were approved by the respective State level Study Groups/Technical Committees on Ground Water Resource Estimation. The R & D Advisory Committee held six meetings in New Delhi, Chandigarh and Guwahati from August, 2004 to March, 2005.

The National level report on Ground Water Resources of India was finalized and approved by the R&D Advisory Committee in its seventh meeting held at New Delhi on 19th August, 2005.

CHAPTER 2

HYDROGEOLOGICAL SETUP OF THE COUNTRY

The ground water behaviour in the Indian sub-continent is highly complicated due to the occurrence of diversified geological formations with considerable lithological and chronological variations, complex tectonic framework, climatological dissimilarities and various hydrochemical conditions. Studies carried out over the years have revealed that aquifer groups in alluvial / soft rocks even transcend the surface basin boundaries. Broadly two groups of rock formations have been identified depending on characteristically different hydraulics of ground water viz. Porous Formations and Fissured Formations.

2.1 POROUS FORMATIONS

Porous formations have been further subdivided into Unconsolidated and Semi – consolidated formations.

2.1.1 UNCONSOLIDATED FORMATIONS

The areas covered by alluvial sediments of river basins, coastal and deltaic tracts constitute the unconsolidated formations. These are by far the most significant ground water reservoirs for large scale and extensive development. The hydrogeological environment and ground water regime conditions in the Indo-Ganga-Brahmaputra basin indicate the existence of potential aquifers having enormous fresh ground water reservoir. Bestowed with high incidence of rainfall and covered by a thick pile of porous sediments, these ground water reservoirs get replenished every year and are being used heavily. In these areas, in addition to the Annual Replenishable Ground Water Resources available in the zone of Water Level Fluctuation (Dynamic Ground Water Resource), there exists a huge ground water reserve in the deeper passive recharge zone below the zone of fluctuation as well as in the deeper confined aquifers which is nearly unexplored. Although the mode of development of ground water is primarily through dug wells, dug cum borewells and cavity wells, thousands of tube wells have been constructed during last few decades.

2.1.2 SEMI-CONSOLIDATED FORMATIONS

The semi-consolidated formations normally occur in narrow valleys or structurally faulted basins. The Gondwanas, Lathis, Tipams, Cuddalore sandstones and their equivalents are the most extensive productive aquifers. Under favourable situations, these formations give rise to free flowing wells. In selected tracts of northeastern India, these water-bearing formations are quite productive. The Upper Gondwanas, which are generally arenaceous, constitute prolific aquifers.

2.2 FISSURED FORMATIONS (CONSOLIDATED FORMATIONS)

The consolidated formations occupy almost two-third part of the country. The consolidated formations except vesicular volcanic rocks have negligible primary porosity. From the hydrogeological point of view, fissured rocks are broadly classified into four types viz. Igneous and metamorphic rocks excluding volcanic and carbonate rocks, Volcanic rocks, Consolidated sedimentary rocks excluding carbonate rocks and Carbonate rocks.

2.2.1 IGNEOUS AND METAMORPHIC ROCKS EXCLUDING VOLCANIC AND CARBONATE ROCKS

The most common rock types are granites, gneisses, charnockites, khondalites, quartzites, schists and associated phyllites, slates, etc. These rocks possess negligible primary porosity but attain porosity and permeability due to fracturing and weathering. Ground water yield also depends on rock type and possibly on the grade of metamorphism. Rock formations like granite, khondalite and biotite gneiss are better sources than charnockites.

2.2.2 VOLCANIC ROCKS

The pre-dominant types of the volcanic rocks are the basaltic lava flows of Deccan Plateau. The contrasting water bearing properties of different flow units control ground water occurrence in Deccan Traps. The Deccan Traps have usually poor to moderate permeabilities depending on the presence of primary and secondary fractures.

2.2.3 CONSOLIDATED SEDIMENTARY ROCKS EXCLUDING CARBONATE ROCKS

Consolidated sedimentary rocks occur in Cuddapahs, Vindhyans and their equivalents. The formations consist of conglomerates, sandstones, shales, slates and quartzites. The presence of bedding planes, joints, contact zones and fractures controls the ground water occurence, movement and yield potential.

2.2.4 CARBONATE ROCKS

Limestones in the Cuddapah, Vindhyan and Bijawar group of rocks dominate the carbonate rocks other than the marbles and dolomites. In carbonate rocks, the circulation of water creates solution cavities thereby increasing the permeability of the aquifers. The solution activity leads to widely contrasting permeability within short distances.

2.3 HYDROGEOLOGICAL UNITS AND THEIR POTENTIAL IN INDIA

Hydrogeological map of India is depicted in Plate I and the distribution of hydrogeological units in the country is given in Table I.

Hydrogeological Map of India

Legend

Ground Water Potential (Yield Litres/sec)

>40 25-40 10-25 <10	Unconsolidated Formations
1-25 1-10 1-5	Consolidated /Semi-Consolidated Formations
<1	Hilly Areas

Table I.

Distribution of Hydrogeological Units in the Country and their Potential

Geological Age		Rock Formations	States / Hydrogeological Characters
CONSOLIDATED FORMATIONS :			
Jurrasic, Upper Cretaceous to Eocene	Rajmahal Traps, Deccan Traps	Basalts, Dolerites, Diorites and other acidic derivatives of Basaltic magma	Occur in West Bengal, Bihar, Madhya Pradesh, Gujarat, Maharashtra, Andhra Pradesh, Karnataka. Unconfined shallow aquifers and leaky- confined / confined deeper aquifers.
Pre-cambrian	Cuddapah, Delhi & equivalent systems	a) Consolidated sandstones, shales, conglomerates b) Limestones, Dolomites c) Quartzite, Marble d) Intrusive Granites & Malani Volcanics	Occur in all states. Granites and granite gneisses are the most productive aquifers.
Archaean	Archaean Complex Dharwars, Aravallis & Equivalent formations.	a) Granites, Gneisses, Charnokites & Khondalites b) Schists, Slates, Phyllites Granulites. c) Banded Hematite Quartzites (Iron ore series)	
SEMI-CONSOLIDATED FORMATIONS :			
Tertiary		a) Nummulitic shales and Limestones b) Carbonaceous Shales c) Sandstones d) Shales e) Conglomerates f) Ferrugineous Sandstones g) Calcareous sandstone h) Pebble Beds and Boulder-Conglomerate i) Sands j) Clays	The Hydrogeological potential of these formations is relevant only in the valley areas. Lower Siwaliks and their equivalents in Himachal Pradesh, Jammu & Kashmir, Assam, Punjab, Haryana, Uttar Pradesh, Sikkim generally do not form potential aquifers. The Upper Siwaliks have moderate ground water potential in suitable topographic locations.

Geological Age		Rock Formations	States / Hydrogeological Characters
Tertiary			Tertiary sandstones of Rajasthan, Gujarat, Kutch, Kerala, Orissa, Tamil Nadu, Andhra Pradesh, West Bengal and North Eastern States have moderate to moderately good yield potentials.
Upper Carboniferous to Jurassic	Gondwanas	a) Boulder-Pebble Beds b) Sandstones c) Shales d) Coal Seams	Occur in Bihar, Maharashtra Andhra Pradesh, Orissa, Madhya Pradesh, Gujarat, Rajasthan and Tamil Nadu. These formations do not have wide Regional distribution. Karstified limestones are good water yielders. Friable sandstones in Barakars and Kamthis (Lower Gondwana) and their equivalent formations possess moderately good potential.
	Jurrasic of Kutch and Rajasthan Bagh beds Lametas and Equivalents	a) Sandstones b) Calcareous Sandstone c) Shales d) Quartzites e) Limestones	
UNCONSOLIDATED FORMATIONS :			
Pleistocene to Recent	a) Fluvio-Glacial deposits b) Glacio-Lacustrine deposits	a) Mixed Boulders, Cobbles, Sands and Silts b) Conglomerates, Sands Gravels, Carbanaceous Shales and Blue Clays	The morainic deposits occupy valleys and gorges in interior Himalayas. Karewas (Kashmir Valley) are lacustrine deposits displaying cyclic layers of clayey, silty and coarser deposits with intervening boulder beds. Locally significant hydrogeological potential.
	c) Piedmont and Himalayan Foot Hill deposits	c) Boulders, Cobbles, Pebble Beds, Gravels, Sands, Silt and Clays	The Bhabhar piedmont belt contains many productive boulders – cobble-gravel-sand aquifers. The water table is deep. Forms recharge zone for deeper aquifer of alluvial plains in south. Terai belt is down slope continuation of Bhabhar aquifers. The deeper confined aquifers display flowing artesian conditions.

Geological Age		Rock Formations	States / Hydrogeological Characters
	d) Alluvial Plains (Older & Newer Alluvium)	d) Clays & silts, Gravels and Sands of different mix. Lenses of Peat & Organic matter, Carbonate and Siliceous Concretions (Kankar).	Occur widespread in the Indo-Ganga-Brahmaputra alluvial plains and form highly productive aquifers. The potentials of peninsular river alluvium are rather moderate. But the alluvial valley fill deposits of Narmada, Tapi, Purna basins, 100 m thick, sustain good yield. Multilayer aquifers of North Gujarat are moderate to highly potential aquifers. The quality of ground water at deeper level is inferior. Thick alluvial sequences in deltas of major rivers on the eastern coast and estuarine tracts in Gujarat. Hydrogeological potential limited by salinity hazards.
	e) Aeolian deposits (Sandstones)	e) Very fine to fine Sand and Silt.	The Aeolian deposits occurring in Western Rajasthan, Gujarat, Haryana, Delhi, Punjab have moderate to high yield potentials; are well sorted and permeable; lie in arid region; natural recharge is poor and water table is deep.

CHAPTER 3

GROUND WATER RESOURCES ESTIMATION METHODOLOGY-1997

The ground water resource estimation of the entire country has been done broadly within the guidelines and recommendations of the GEC'97. In most of the states, the unit for assessment of ground water resources has been the administrative unit (Block/Taluka/Mandal) except for the states of Andhra Pradesh, Karnataka and Maharashtra where watershed has been taken as unit. The hilly areas (slope greater than 20%) have been excluded from the computations. The ground water resources in the poor quality areas have been computed separately. The assessment unit has been divided into command and non-command areas depending upon the availability of data pertaining to computation of ground water resources separately for command and non-command areas. The ground water recharge in the monsoon season and non-monsoon season has been estimated separately.

3.1 GROUND WATER RECHARGE DURING MONSOON SEASON

The two approaches adopted for estimation of rainfall recharge are Water Level Fluctuation (WLF) Method and Rainfall Infiltration Factor (RIF) Method.

3.1.1 WATER LEVEL FLUCTUATION (WLF) METHOD

Under this method the change in storage has been computed by multiplying water level fluctuations between pre and post monsoon periods with the area of assessment and specific yield. The ground water resources during monsoon season have been estimated as the sum of change in storage and gross draft which can be expressed as :

$$R = (h \times Sy \times A) + DG$$

Where,

h = rise in water level in the monsoon season, A = area for computation of recharge, Sy = specific yield, DG = gross ground water draft.

The specific yield values considered in the computations have been taken preferably from field tests, in absence of which, the recommended values of specific yield have been considered. The range of specific yield considered for different formations are given in the table II.

TABLE II SPECIFIC YIELD FOR DIFFERENT FORMATIONS

Formation		Range of Specific Yield
Unconsolidated formations	Alluvium	0.04 to 0.20
Semi-consolidated formations	Sedimentary rocks	0.01 to 0.15
Consolidated formations	Crystallines and other hard rocks	0.002 to 0.04

The ground water recharge calculated from above relation gives the recharge from rainfall and other sources during the monsoon period. In order to segregate the rainfall recharge, contribution from the other sources such as recharge from recycled water from irrigation, seepage from canal, recharge from tanks and ponds and recharge from water conservation structures have been estimated separately based on the recommended norms as given in table III. The rainfall recharge has been normalized for the normal monsoon season rainfall.

TABLE III ESTIMATION OF RECHARGE FROM OTHER SOURCES

Parameters		Range of Parameters
Canal seepage factor	Unlined canals	15 to 30 ham/day/million sq.m. of wetted area
	Lined canals	20% of above value for unlined canals
Return flow factor	Surface water Irrigation	0.10 – 0.50
	Ground water Irrigation	0.05 – 0.45
Seepage from water bodies	1.4 mm/day based on average area of water spread	

3.1.2 RAINFALL INFILTRATION FACTOR (RIF) METHOD

The recharge from rainfall has been estimated as given below

Rrf = f X A X normal monsoon rainfall

Where;

f = rainfall infiltration factor

A = area

The same Rainfall Infiltration Factor has been used for computation of recharge due to monsoon and non-monsoon rainfall.

The norms adopted for computation of recharge from rainfall are given in Table – IV.

TABLE – IV RAINFALL INFILTRATION FACTOR FOR DIFFERENT FORMATIONS

Formation		Range of Rainfall Infiltration Factor
Unconsolidated formations	Alluvium	0.08 to 0.25
Semi-consolidated formations	Sedimentary rocks	0.03 to 0.14
Consolidated formations	Crystallines and other hard rocks	0.01 to 0.12

The rainfall recharge computed by WLF method has been compared with recharge computed by RIF method. In case the difference between the two sets of data are more than 20%, then RIF figure has been considered, otherwise monsoon recharge from WLF has been considered. While adopting the rainfall recharge figures, weightage has been given to WLF method over adhoc norms method of RIF. Hence, wherever the difference between RIF & WLF is more than 20%, data have been scrutinized and corrected accordingly.

The total recharge in monsoon season is the sum of the normalized rainfall recharge and recharge from other sources.

3.2 GROUND WATER RECHARGE IN NON-MONSOON SEASON

The recharge from rainfall during the non-monsoon season has been estimated by Rainfall Infiltration Factor (RIF) method provided the normal rainfall in the non-monsoon season is greater than 10% of the normal annual rainfall. If the rainfall is less than 10%, the recharge due to rainfall has been taken as zero. The total recharge in non-monsoon has been obtained as the sum of recharge from rainfall and recharge from other sources.

3.3 ANNUAL REPLENISHABLE GROUND WATER RESOURCE

The Annual Replenishable Ground Water Resource of the area has been worked out by adding monsoon and non-monsoon recharge. An allowance has been kept for natural discharge in the non-monsoon season by deducting 5% of Annual Replenishable Ground Water Resource, where ever WLF method has been employed to compute rainfall recharge during monsoon and 10% if RIF method has been used.

3.4 NET ANNUAL GROUND WATER AVAILABILITY

The Net annual ground water availability has been computed after deducting the natural discharge from the Annual Replenishable Ground Water Resource and can be expressed as:

Net Annual Ground Water Availability = Annual Replenishable Ground Water Resource – Natural Discharge during non-monsoon season.

3.5 ANNUAL GROUND WATER DRAFT

The Annual ground water draft has been computed for Irrigation, Domestic and Industrial uses which includes the ground water extraction from all existing ground water structures during monsoon as well as non-monsoon period.

3.6 FUTURE UTILIZATION OF GROUND WATER RESOURCE

The demand for domestic and industrial water supply has been kept based on projected population for the year 2025. The ground water available for future irrigation has been obtained by deducting the sum of projected demand for Domestic and Industrial use and existing irrigation draft from the Net Annual Ground Water Availability.

3.7 STAGE OF GROUND WATER DEVELOPMENT

The stage of Ground water Development has been computed as given below,

$$\text{Stage of Ground water Development (\%)} = \frac{\text{Annual Ground Water Draft}}{\text{Net Annual Ground Water Availability}} \times 100$$

3.8 CATEGORIZATION OF ASSESSMENT UNITS

The assessment units have been categorized for ground water development based on two criteria – a) stage of ground water development, and b) long-term trend of pre and post monsoon water levels. The long term ground water level trends have been computed generally for the period of 10 years. The significant rate of water level decline has been taken between 10 to 20 cm per year depending upon the local hydrogeological conditions. There are four categories, namely – 'Safe' areas which have ground water potential for development; 'Semi-critical' areas where cautious ground water development is recommended; 'Critical' areas; and 'Over-exploited' areas where there should be intensive monitoring and evaluation and future ground water development be linked with water conservation measures. The details of criteria for categorization of assessment units are given in Table V.

TABLE - V CRITERIA FOR CATEGORIZATION OF ASSESSMENT UNITS

Sl. No.	Stage of Ground Water Development	Significant Long term Decline		Categorization
		Pre-monsoon	Post-monsoon	
1	<=70%	No	No	Safe
2	> 70% and <= 90%	No	No	Safe
		Yes/No	No/Yes	Semi- Critical
3	> 90% and <= 100%	Yes/No	No/Yes	Semi-Critical
		Yes	Yes	Critical
4	> 100%	Yes/No	No/Yes	Over- Exploited
		Yes	Yes	Over- Exploited

CHAPTER 4

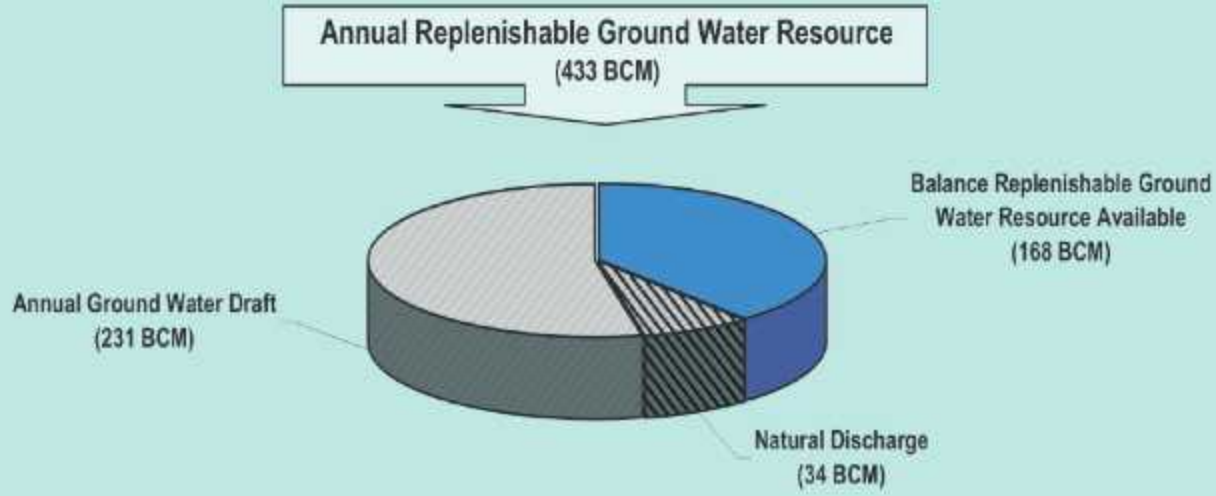
GROUND WATER RESOURCES OF INDIA

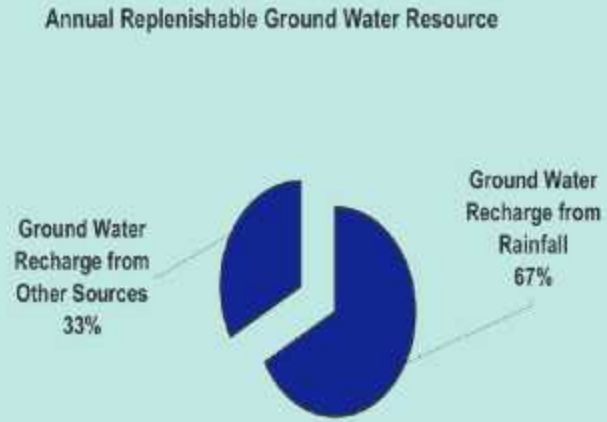
4.1 DYNAMIC FRESH GROUND WATER RESOURCES

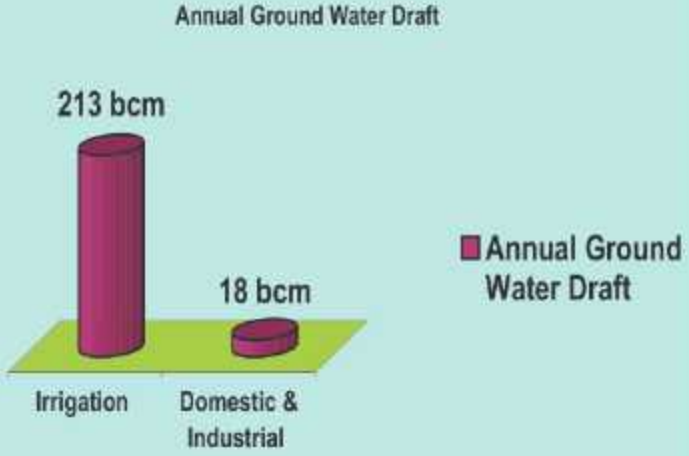
The ground water resource of the country has been estimated based on the reports of all the states and UTs as per the technical guidance of R & D Advisory Committee on ground water estimation. Ground water resources have been estimated for fresh water as per GEC'97 methodology. The year of assessment is different for different states varying from 1998 to 2004. The ground water draft figures were projected upto March, 2004 to bring ground water estimation figures of different states on a common datum.

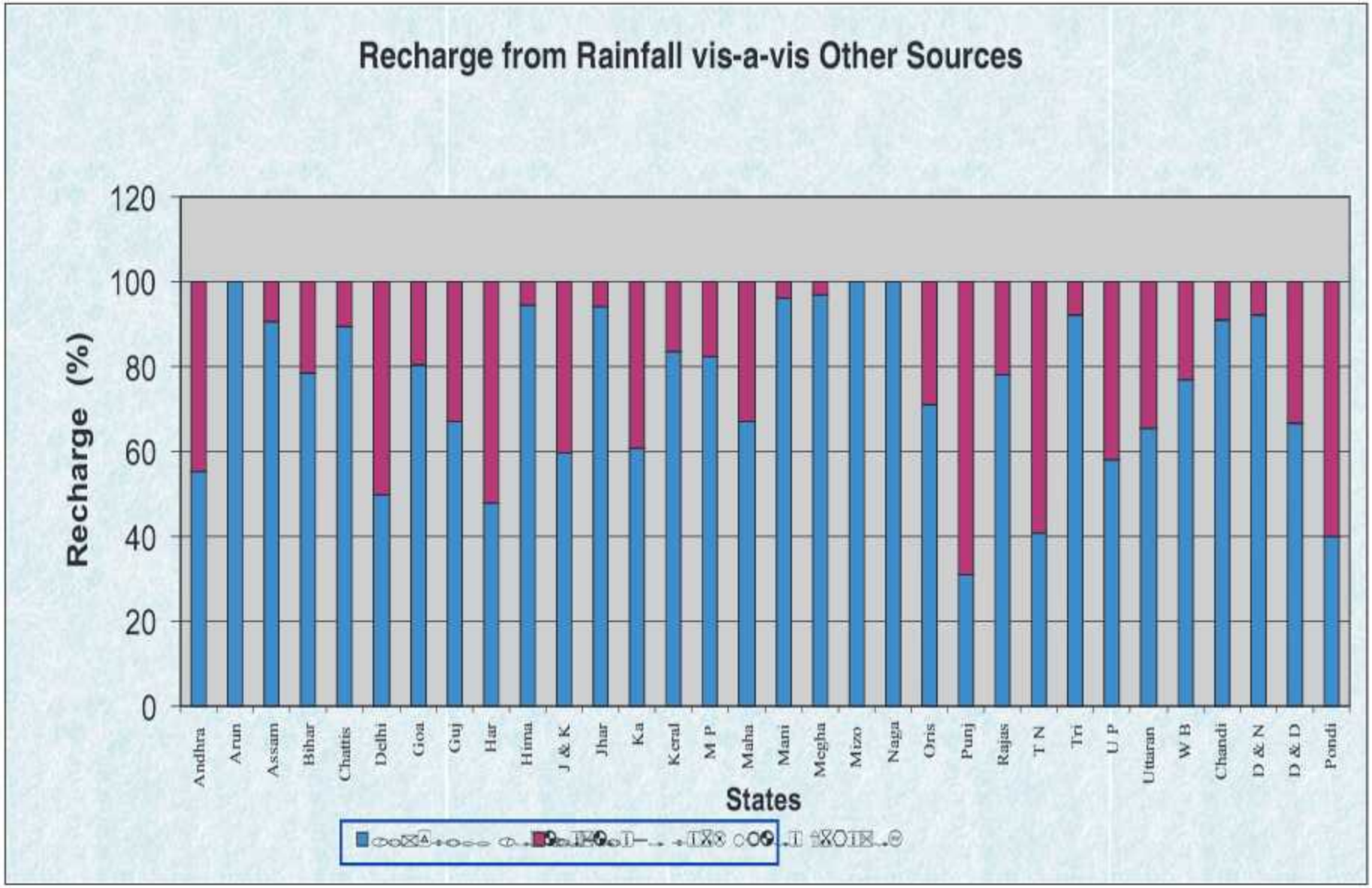
The Annual Replenishable Ground Water Resource for the entire country is 433 billion cubic metre (bcm). Plate II presents the over-all scenario of ground water resource utilization and availability in the country. The ground water assessed is the dynamic resource which is replenished each year. The Annual Replenishable Ground Water Resource is contributed by two major sources – rainfall and other sources that include canal seepage, return flow from irrigation, seepage from water bodies and artificial recharge due to water conservation structures. The overall contribution of rainfall to country's Annual Replenishable Ground Water Resource is 67% and the share of other sources taken together is 33%. State-wise Ground Water Resources of India as on March, 2004 is given in Annexure – I and the district-wise figures are given in Annexure - II. The contribution from other sources such as canal seepage, return flow from irrigation, seepage from water bodies etc. in Annual Replenishable Ground Water Resource is more than 33% in the states of Andhra Pradesh, Delhi, Haryana, Jammu & Kashmir, Karnataka, Punjab,Tamil Nadu, Uttar Pradesh, Uttaranchal and UT of Pondicherry (Plate III). South-west monsoon being the most prevalent contributor of rainfall in the country, about 73% of country's Annual Replenishable Ground Water Recharge takes place during the Kharif period of cultivation. Keeping 34 bcm for natural discharge, the Net Annual Ground Water Availability for the entire country is 399 bcm. The Annual Ground Water Draft is 231 bcm out of which 213 bcm is for Irrigation use and 18 bcm is for Domestic & Industrial use. An analysis of ground water draft figures indicates that in the states of Chhattisgarh, Delhi, Goa, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, North Eastern States- Manipur, Meghalaya, Mizoram, Nagaland and Tripura, Orissa, Sikkim, and UTs of Andaman & Nicobar Island, Dadra & Nagar Haveli, Daman & Diu, Lakshadweep and Pondicherry, ground water draft for domestic & industrial purposes is more than 15% which is comparatively higher than the national percentage of 8% (Plate IV). In general, the irrigation sector remains the main consumer of ground water (92% of total annual ground water draft for all uses).

Ground Water Resources Availability and Utilization in India








Recharge from Rainfall vis-a-vis Other Sources
Recharge (%)
120
100
80
60
40
20
0
Andhra
Arun
Assam
Bihar
Chattis
Delhi
Goa
Guj
Har
Hima
J & K
Jhar
Ka
Keral
M P
Maha
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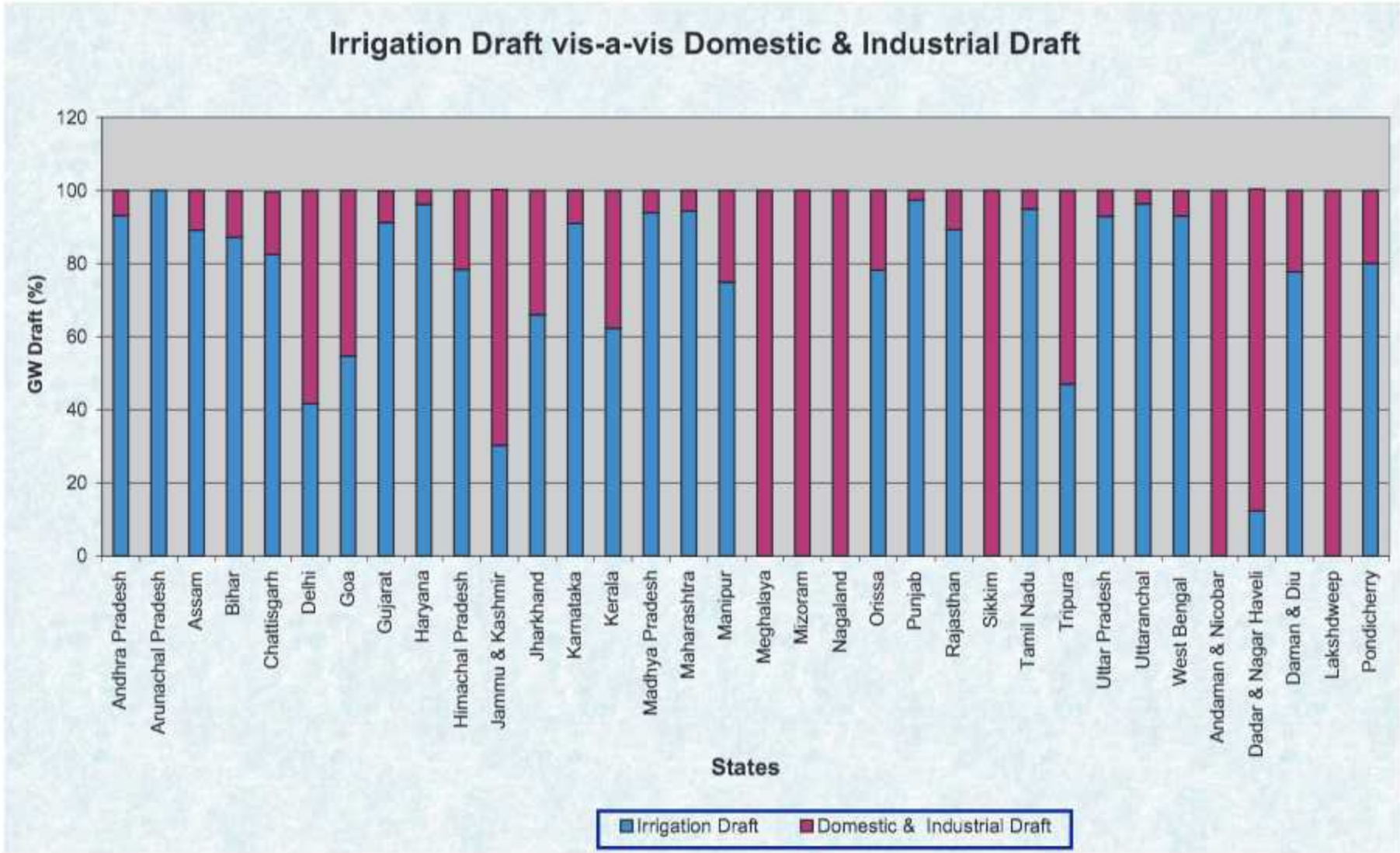
Megha
Mizo
Naga
Oris
Punj
Rajas
T N
Tri
U P
Uttaran
W B
Chandi
D & N
D & D
Pondi
States


Irrigation Draft vis-a-vis Domestic & Industrial Draft
GW Draft (%)
120
100
80
60
40
20
0
Andhra Pradesh
Arunachal Pradesh
Assam
Bihar
Chattisgarh
Delhi
Goa
Gujarat
Haryana
Himachal Pradesh
Jammu & Kashmir
Jharkhand
Karnataka
Kerala
Madhya Pradesh
Maharashtra
Manipur
Meghalaya
Mizoram
Nagaland
Orissa
Punjab
Rajasthan
Sikkim
Tamil Nadu
Tripura
Uttar Pradesh
Uttaranchal
West Bengal
Andaman & Nicobar
Dadar & Nagar Haveli
Daman & Diu
Lakshdweep
Pondicherry
States
Irrigation Draft
Domestic & Industrial Draft

4.2 STAGE OF GROUND WATER DEVELOPMENT

The stage of ground water development in the country is 58%. The status of ground water development is comparatively high in the states of Delhi, Haryana, Punjab and Rajasthan and UTs of Daman & Diu and Pondicherry, where the Stage of Ground Water Development is more than 100%, which implies that in the these states, the average annual ground water consumption is more than average annual ground water recharge. In the states of Gujarat, Karnataka, Tamil Nadu and Uttar Pradesh, the average stage of ground water development is 70% and above. In rest of the states / UTs the stage of ground water development is below 70%.

4.3 CATEGORIZATION OF ASSESSMENT UNITS

Out of 5723 numbers of assessed administrative units (Blocks/ Taluks/ Mandals/ Districts), 839 units are Over-exploited, 226 units are Critical, 550 units are Semi-critical, 4078 units are Safe and 30 units are Saline (Annexure – III). Number of Over-exploited and Critical administrative units are significantly higher (more than 15% of the total assessed units) in Andhra Pradesh (where categorization was done upto sub-unit level i.e. within Mandal – command and non-command-wise), Delhi, Gujarat, Haryana, Karnataka, Punjab, Rajasthan and Tamil Nadu and also the UTs of Daman & Diu and Pondicherry (Plate V). List of categorization of Blocks / Talukas/ Mandals/ Districts is given in Annexure – IV.

4.4 STATE-WISE GROUND WATER RESOURCE SCENARIO

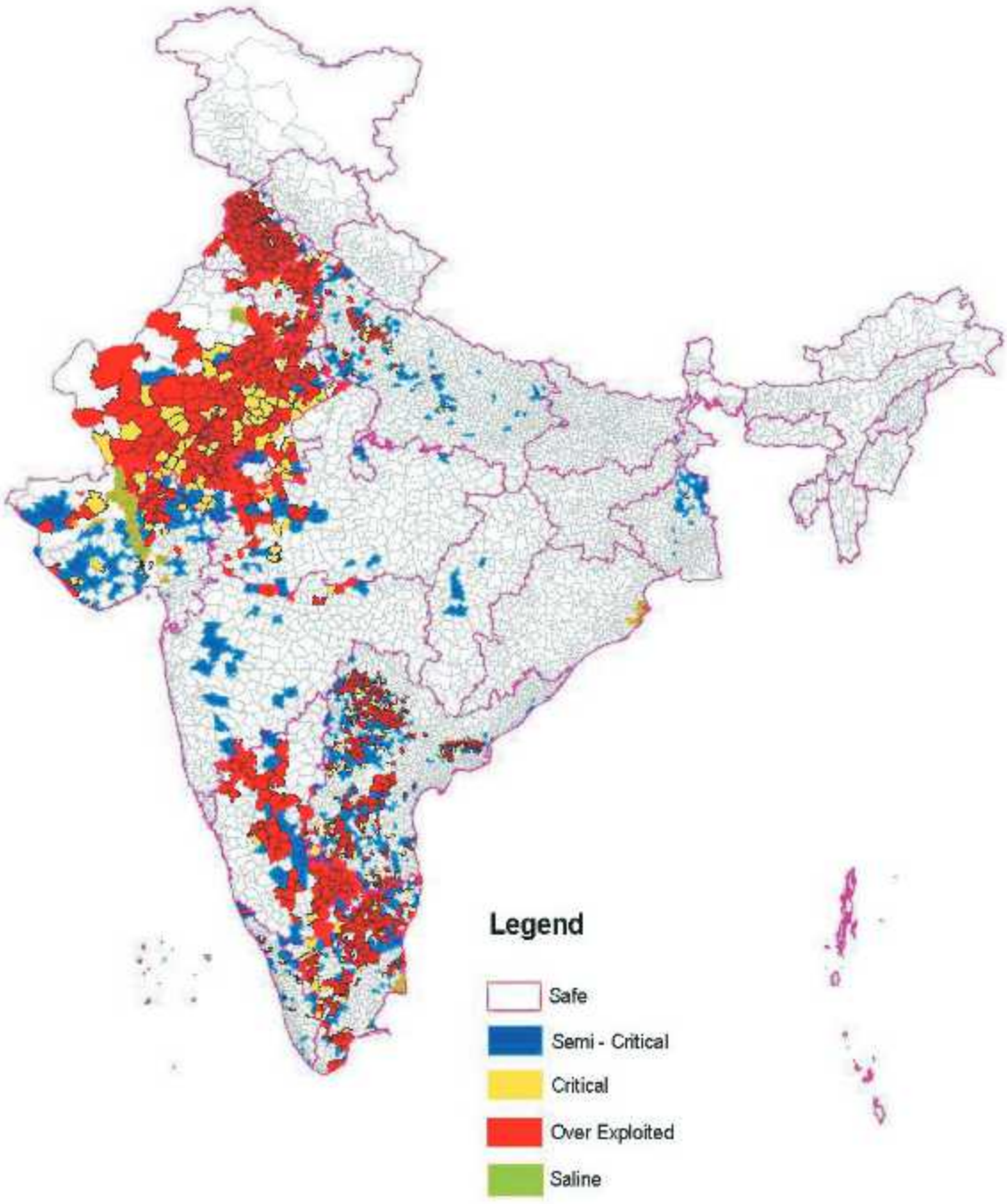
State-wise ground water resource scenario is described below.

ANDHRA PRADESH

Nearly 85% of the State is underlain by consolidated formations like Archaeans, Cuddapah, Dharwars, Kurnool, Deccan Trap etc. Rest of the area is underlain by soft rocks including Gondwanas, Rajamundhri Sandstone and alluvium. Ground Water development in the phreatic zone is generally through open wells, filter points and cavity wells. Open wells tapping the weathered zone of Dharwar Group consisting of schists, phyllites etc. yield 2-9 lps, crystalline rocks consisting of granite and gneisses yield 4-16 lps and Cuddapahs yield 2-4 lps. Open wells in Gondwanas and Tertiaries yield 1-2 lps. In alluvial formations, dug wells and filter points yield 4-15 lps. The Annual Replenishable Ground Water Resource of the state has been estimated as 36.50 bcm and Net Annual Ground Water Availability is 32.95 bcm. The Annual Ground Water Draft is 14.90 bcm and Stage of Ground Water Development is 45%. Out of 1231 Mandals, 219 assessment units (mandals) have been categorized as Over-exploited, 77 as Critical, 175 as Semi-critical and remaining 760 mandals as Safe. Besides in phreatic zone, ground water also occurs in deeper aquifers in fractures and fissures of the semi consolidated and consolidated formations down to 200-300 m. The bore wells tapping deeper aquifers in hard rock yield 1-15 lps and in soft rocks and alluvium, the yield varies from 3-60 lps.

Plate V

CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKAS AS ON MARCH, 2004



ARUNACHAL PRADESH

The entire foot hill belt running along the Himalayan front can be correlated to Bhabar belt with the exception of some area. Unconsolidated Quaternaries and Upper Tertiaries form the main hydrogeological units. Open Wells in Namsai and Minu sub-division tapping saturated sand yield upto 25 lps. The Annual Replenishable Ground Water Resource of the state is estimated as 2.56 bcm and Net Annual Ground Water Availability is 2.30 bcm. The Annual Ground Water Draft is 0.0008 bcm and Stage of Ground Water Development is 0.04%. All the districts have been categorized as Safe. The deeper aquifers have been explored in alluvial areas. The yield of tubewells tapping alluvial area ranges from 10 to 40 lps.

ASSAM

Major area of the state is underlain by unconsolidated formations in Brahmaputra valley other than consolidated and semi-consolidated formations in the hilly areas. Shallow tube wells constructed in alluvial areas yield upto 25 lps. The Annual Replenishable Ground Water Resource is 27.23 bcm and Net Annual Ground Water Availability is 24.89 bcm. The Annual Ground Water Draft is 5.44 bcm and Stage of Ground Water Development is 22%. All the districts have been categorized as Safe. Besides the dynamic ground water resource, there is scope for ground water development from the deeper aquifers in Brahmaputra valley. The deep wells tapping Bhabar area yield from 7 to 16 lps, in Terai and plain areas, the yield varies from 20 to 60 lps.

BIHAR

The major part of the state is covered with Indo-Gangetic alluvium besides consolidated formations in the southern parts. Ground water development in the phreatic zone is generally through dug wells and shallow tube wells. The yield of these wells generally ranges from 1-3 lps. The Annual Replenishable Ground Water Resource of the state has been estimated as 29.19 bcm and the Net Annual Ground Water Availability is 27.42 bcm. The Annual Ground Water Draft for all uses is 10.77 bcm and Stage of Ground Water Development of the state is 39%. All the assessment units (blocks) have been categorized as Safe. Besides the ground water of phreatic zone, there exists a huge ground water potential at deeper depth. The wells tapping deeper aquifers in alluvial areas yield between 30- 70 lps whereas in the consolidated formation, yield varies from 3-15 lps.

CHHATTISGARH

The state is underlain by diverse rock types of different geological ages from Pre-Cambrian to Recent. Large part of the state is underlain by hard rocks being tapped mostly by dug wells constructed in the weathered zone. The yield of open wells varies

from 1 to 3 lps. The Annual Replenishable Ground Water Resource of the state has been estimated as 14.93 bcm and Net Annual Ground Water Availability is 13.68 bcm. The Annual Ground Water Draft is 2.80 bcm and the Stage of Ground Water Development is 20%. Out of 146 assessment units, 8 have been categorized as Semi-critical and remaining 138 as Safe. Besides the annually replenishable ground water available in the phreatic zone, the wells tapping the deeper aquifers in the fractured hard rock ar/eas yield from 2 to 25 lps.

DELHI

Delhi region is a part of Indo-Gangatic Plain. Geologically the Delhi State is occupied by quartzite of Delhi system and alluvial deposit classified into older and newer alluvium. In the flood plains of Yamuna, in general, fresh water aquifers exist, down to 30-45 m. The phreatic aquifer is mainly exploited through shallow tube wells. The yield of the wells in alluvial areas varies from 2 to 5 lps. Annual Replenishable Ground Water Resource of the state has been estimated as 0.30 bcm and Net Annual Ground Water Availability is 0.28 bcm. The Annual Ground Water Draft is 0.48 bcm and the Stage of Ground Water Development is 170%. Out of 9 assessment districts, 7 have been categorized as Over-exploited and 2 as Safe. The deeper aquifer explored through bore wells in the quartzite areas recorded yield of 1 - 5 lps. The wells tapping deeper aquifer in the older alluvium yield from 2 -10 lps.

GOA

Major part of the Goa State is covered by consolidated formation of Dharwar Super Group. Ground water occurs under unconfined to semiconfined conditions in beach sands, laterites and weathered and fractured crystalline rocks. The development of ground water from phreatic zone is mostly through dug wells and shallow bore wells. The Annual Replenishable Ground Water Resource has been estimated as 0.28 bcm and Net Annual Ground Water Availability is 0.27 bcm. The Annual Ground Water Draft is 0.07 bcm and Stage of Ground Water Development is 27% and entire state has been categorized as Safe. In the state, ground water also exists in deeper zones and tube wells constructed down to 150m, yield between 5-15 lps.

GUJARAT

Major part of the state is underlain by hard rocks comprising of gneisses, schists, phyllites, sandstones and basalts. Remaining area in the north and central Gujarat is occupied by the soft rocks including coastal alluvium. The development of ground water from phreatic zone is mainly through dug wells and shallow tube wells. The yield from dug wells varies from 1 to 5 lps. The Annual Replenishable Ground Water Resource of the state has been estimated as 15.81 bcm and Net Annual Ground Water Availability is 15.02 bcm. The Annual Ground Water Draft is 11.49 bcm and the Stage of Ground Water Development is 76%. Out of 223 assessment units (Talukas), 31 have been categorized as Over-exploited, 12 as Critical, 69 as Semi- critical, 97 as Safe and 14

as Saline. Besides above, deeper aquifers have also been found as good water yielding. The yield of the wells tapping the consolidated formations ranges between 1-3 lps, and those tapping semi consolidated and alluvium ranges between 10-50 lps.

HARYANA

Major part of the state is occupied by alluvium. The southern part of the state is underlain by consolidated formation of Delhi System and in the northern part, Siwaliks are present. The ground water development of phreatic zone is mainly through shallow tube wells and dug wells in alluvial areas, the yield of wells at places goes upto 10 lps. Annual Replenishable Ground Water Resources of the state have been estimated as 9.31 bcm and the Net Annual Ground Water Availability is 8.63 bcm. The Annual Ground Water Draft is 9.45 bcm and the Stage of Ground Water Development is 109%. Out of 113 assessment units (blocks), 55 have been categorized as Over-exploited, 11 as Critical, 5 as Semi-critical and remaining 42 as Safe. The dynamic fresh ground water resource is being exhaustively utilized. However, the exploration carried out in the deeper aquifers indicate huge ground water potential. The tube wells tapping deeper aquifers have been found to yield between 10-40 lps.

HIMACHAL PRADESH

The state essentially is hilly terrain, comprising of fissured formations with a few inter-montane valleys occupied by Quaternary alluvium. The sub-mountainous tract is part of piedmont plain. Kandi belt and adjoining hill slopes are underlain by boulders, gravels and clay. The phreartic zone in the hard rock as well as soft rock areas are developed through dug wells and springs, the yield of open well ranges from 3-8 lps. The Annual Replenishable Ground Water Resource of the state has been assessed as 0.43 bcm and Net Annual Ground Water Availability is 0.39 bcm. The Annual Ground Water Draft of the state is only 0.12 bcm. The Stage of Ground Water Development is 30% and the entire state falls under Safe category. Apart from ground water available in phreatic zone, spring development is viable alternative. The ground water available in the deeper aquifer is being exploited through deep tube wells. The tube wells tapping deeper aquifer in valley fills yield 20-40 lps. The yield of bore wells in hard rock areas is limited but at places it goes upto 30 lps.

JAMMU & KASHMIR

The major area of the state is occupied by high hills. Occurrence of ground water is primarily confined to alluvial regions which has been classified into piedmont deposits of outer plains of Jammu, Dune belt in outer Himalaya, isolated valley fills in lesser Himalaya, Fluvio- Lacustrine deposits in Kashmir valley and moraines and fluvioglacial deposits of Laddakh. Dug wells in Kashmir valley have limited yield. Ground water occurs in perched condition and gives rise to springs in phreatic zone water table. The Annual Replenishable Ground Water Resource of the state has been assessed as 2.70 bcm and Net Annual Ground Water Availability is 2.43 bcm. The Annual Ground

Water Draft of the state is only 0.33 bcm. The Stage of Ground Water Development is 14% and the entire state falls under Safe category.

JHARKHAND

Nearly 85% of the state is covered with hard rocks consisting of granite, granite-gneisses, other formations including Vindhyans, Gondwanas, Volcanics and unconsolidated sediments. The phreatic zone is mostly developed through hand pumps, dug wells and shallow tube wells. The dug wells tapping the granite suite of rocks yield 4-7 lps, Vindhyans and Volcanics upto 1 lps and in alluvium upto 3 lps. The Annual Replenishable Ground Water Resource has been assessed as 5.58 bcm and Net Annual Ground Water Availability is 5.25 bcm. The Annual Ground Water Draft is 1.09 bcm and Stage of Ground Water Development is 21%. All the 208 assessment units (blocks) have been categorized as Safe. Wells tapping deeper aquifers in hard rock areas yield from 1-15 lps.

KARNATAKA

The State has diverse hydrogeological conditions mainly occupied by Peninsular gneisses, granites, schists, basalts along with sedimentaries. The recent alluvium is restricted to coastal area and stream courses. The Annual Replenishable Ground Water Resource of the state is 15.93 bcm and the Net Annual Ground Water Availability is 15.30 bcm. The Annual Ground Water Draft is 10.71 bcm and the Stage of Ground Water Development in the state is 70%. Out of the total 175 assessed Talukas, 65 have been categorized as Over-exploited, 3 as Critical, 14 as Semi- critical and 93 as Safe. The deeper aquifers are being explored throughout the State. The wells tapping hard rocks yield in the range of 1 to 30 lps and the tube wells tapping sedimentaries can yield from 2 to 35 lps. The yield of tubewells tapping coastal alluvium ranges from 30 to 60 lps.

KERALA

Major part of the state is underlain by the crystalline rocks. At places, sedimentary formations overlie the crystallines in the western part of the state. Coastal belt is mostly occupied by the alluvial deposits of recent origin. The shallow aquifers are generally developed through dug wells in the hard rock areas, the yield varies from 1-3 lps. In the alluvial areas, dug wells / filter point wells are common structures, the yield varies from 1-10 lps. The Annual Replenishable Ground Water Resource of the state has been estimated as 6.84 bcm and the Net Annual Ground Water Availability is 6.23 bcm. The Annual Ground Water Draft is 2.92 bcm and the Stage of Ground Water Development is 47%. Out of 151 assessment blocks, 5 have been categorized as Over-exploited, 15 as Critical, 30 as Semi-critical and 101 as Safe. Ground water exploration in the deeper aquifers of hard rock areas has indicated that yield varies from 1-30 lps whereas in the sedimentaries, the yield goes upto 50 lps.

MADHYA PRADESH

The state is underlain by formations ranging in age from Archaean to Recent, a greater part is occupied by granites, gneisses and metasedimentary rocks. Deccan traps also occupy a larger area. In the area occupied by hard rocks, dug wells and dug cum bore wells are the most common structures. The open wells tapping hard rocks yield between 1-5 lps whereas in Vindhyans and Gondwanas the yield ranges from 2-5 lps. The dug cum bore wells tapping the Deccan traps yield 15-20 lps and shallow tube wells in alluvium yield 10-18 lps.

The Annual Replenishable Ground Water Resource of the state has been assessed as 37.19 bcm and Net Annual Ground Water Availability as 35.33 bcm. The Annual Groundwater Draft in the state is 17.12 bcm and the Stage of Ground Water Development is 48%. Out of 312 assessment blocks, 24 have been categorized as Over-exploited, 5 as Critical, 19 as Semi-critical and 264 as Safe. The ground water available in deeper aquifers holds promising potential developed mainly through tube wells, in Gondwanas, the yield of well ranges from 5-20 lps and in alluvial areas, the yield of tubewells has been found to vary from 15-60 lps.

MAHARASHTRA

About 85% of the State is covered by deccan basalts and rest of the state area is occupied by Gondwanas, Vindhyans, Archaeans and Quaternary alluvium. Dug wells and dug cum bore wells are the common structures used for tapping the phreatic aquifer. The yield of dug wells in deccan trap varies from 1 to 8 lps whereas in Vindhyans, Cuddapah and Kaldagi it varies from 1-2 lps and in the Archaeans, the yield of dug wells is upto 1 lps. The dug wells tapping the semi-consolidated formations, consisting coastal sedimentaries, intra-trappeans and Gondwanas, yield between 1 to 3 lps. In unconsolidated formation, the yield varies between 1 to 5 lps.

The Annual Replenishable Ground Water Resource in the state has been assessed as 32.96 bcm and the Net Annual Ground Water Availability is 31.21 bcm. The Annual Ground Water Draft is 15.09 bcm and the Stage of Ground Water Development in the entire state is 48%. Out of 318 assessment units, 7 have been categorized as Over-exploited, 1 as Critical, 23 as Semi-critical and 287 as Safe. In addition to the available dynamic ground water resources, which are used meagerly, the deeper aquifers in select areas have good potential. Wells tapping Precambrian, metamorphics and sedimentaries yield from 14 to 28 lps whereas, Gondwanas have better yield potential ranging from 14 to 60 lps. Deccan Traps have limited yield potential varying from 20 to 30 lps.

MANIPUR

The Manipur valley is underlain by thin veneer of alluvial deposits and underlain by semi-consolidated rocks of Tertiary age. Since the upper formation is silty and clayey, open wells have poor yield prospects. The Annual Replenishable Ground Water

Resource is 0.38 bcm and Net Annual Ground Water Availability is 0.34 bcm. The Annual Ground Water Draft is 0.002 bcm and Stage of Ground Water Development is 0.65%. All the blocks have been categorized as Safe. The ground water exploration carried out in deeper zone of sandstone formations recorded yield of tube wells varying from 0.5 to 2 lps.

MEGHALAYA

The northern part of the state is covered by consolidated formations with basic and acid intrusives. The semi-consolidated sandstone and other sedimentary rocks cover the entire south-western and south eastern part of the state. The unconfined zone in river fill areas is tapped with shallow tube wells, the yield varies from 7 to 12 lps. The Annual Replenishable Ground Water Resource is 1.15 bcm and Net Annual Ground Water Availability is 1.04 bcm. The Annual Ground Water Draft is 0.002 bcm and Stage of Ground Water Development is 0.18%. The entire state has been categorized as Safe. Tube wells tapping deeper aquifer in semi-consolidated formations yield 5 to 15 lps, whereas wells tapping alluvial areas yield from 15 to 30 lps.

MIZORAM

Major part of the state is occupied by hills and semi-consolidated rocks of Tertiary age and state of Mizoram is an abode of springs. Studies indicate good scope of tapping ground water in river beds with sumps connected to infiltration galleries. The ground water of the unconfined zone mostly emanates in the form of springs which are being used as source of water supply. The Annual Replenishable Ground Water Resource is 0.04 bcm and Net Annual Ground Water Availability is almost unchanged. The Annual Ground Water Draft is negligible and Stage of Ground Water Development is 0.90%. Entire state has been categorized as Safe. The deeper aquifer explored in sandstones indicated yield varying from 2 to 5 lps.

NAGALAND

The state is mostly covered by hilly terrains having slope more than 20%. The consolidated / semi-consolidated formations are confined to south eastern part of the state along the Myanmar border and the unconsolidated alluvial plains in the northern part of the state. The open wells are not very common structure. However, in the valley area, it can yield upto 15 lps. The Annual Replenishable Ground Water Resource is 0.36 bcm and Net Annual Ground Water Availability is 0.32 bcm. The Annual Ground Water Draft is 0.009 bcm and Stage of Ground Water Development is 3%. Entire state has been categorized as Safe. Other than the dynamic ground water resources, the deeper aquifers in valley areas and foot hill zones have good ground water potential. Wells tapping deeper aquifer in valley areas yield upto 18 lps.

ORISSA

The state is underlain by diverse rock types, consolidated formations include hard, crystalline and compact sedimentaries. The semi-consolidated formations include Gondwanas. The unconsolidated formations consist of laterites and alluvium. The phreatic zone is commonly developed through dug wells and filter points which yield upto 5 lps. The Annual Replenishable Ground Water Resource of the state is 23.09 bcm and the Net Annual Ground Water Availability is 21.01 bcm. The Annual Ground Water Draft is 3.85 bcm with Stage of Ground Water Development of 18%. Excluding 6 assessment units which are saline, the entire state falls under Safe category, leaving ample scope for development of dynamic resources. In addition, the deeper aquifers explored in the state indicate good ground water prospects, wells tapping consolidated formation at places yield upto 10 lps. The yield of tube wells tapping semi-consolidated formation ranges from 5-25 lps and in alluvial formation, maximum yield is upto 50 lps.

PUNJAB

The state is mainly underlain by Quaternary alluvium of considerable thickness which abuts against the semi-consolidated formation of Siwalik System towards northeast. The development of phreatic aquifer is through shallow tube wells, filter points and dug wells. The yield of these wells go upto 10 lps. The Annual Replenishable Ground Water Resource of the state has been assessed as 23.78 bcm and the Net Annual Ground Water Availability is 21.44 bcm. The Annual Ground Water Draft is 31.16 bcm and the Stage of Ground Water Development is 145% leaving little scope for further development of dynamic resource except a few pockets. Out of 137 assessment units (blocks), 103 blocks have been categorized as Over-exploited, 5 as Critical, 4 as Semi-critical and 25 as Safe. The deeper aquifers are yet to be developed optimally, the exploration data indicates that the deeper aquifers are capable of sustaining heavy duty tube wells with yield of 15-45 lps.

RAJASTHAN

Nearly 40% of the state area is occupied by the hard rocks. Unconsolidated and semi consolidated formations occupy major part of the state. Wind blown sands form moderately potential aquifer at places in the western Rajasthan. The dug wells tapping consolidated formations yield upto 5 lps whereas in unconsolidated formation maximum yield is upto 10 lps. The Annual Replenishable Ground Water Resource in the state is 11.56 bcm and the Net Annual Ground Water Availability is 10.38 bcm. Annual Ground Water Draft is 12.99 bcm and Stage of Ground Water Development is 125% leaving little scope for further development of dynamic ground water resources except in a few pockets. Out of 237 assessment units (blocks), 140 have been categorized as Over-exploited, 50 as Critical, 14 as Semi-critical, 32 as Safe and 1 as Saline. The aeolian sediments form the potential deeper aquifers with yield of 25-40 lps. Wells tapping the semi consolidated formation, yield varies from 10-40 lps. The wells tapping the Deccan Traps and carbonate rocks yield from 5-10 lps whereas in the wells tapping igneous and metamorphic formations, the yield is limited to 5 lps.

SIKKIM

Sikkim is a small mountainous state characterized by rugged topography with series of ridges and valleys. The various rock types prevalent in the state are Pelitic and Carbonate rocks, Gondwanas and occasional alluvial terrains along streams and river courses. Ground water occurs largely in disconnected localized pockets and in deeper fracture zones. Springs are the main sources of water. The total discharge of the springs is about 0.08 bcm and its annual utilization for domestic purpose is about 0.01 bcm. The stage of ground water development is 16%.

TAMIL NADU

The Tamil Nadu state is underlain by diverse hydrogeological formations. Nearly 73% of the state is occupied by hard rocks, the semi consolidated and consolidated formations are mainly confined in the eastern part including the coastal tract. In the hard rock area, ground water is mainly developed through dug wells and dug cum bore wells tapping the weathered zone, the yield of open wells varies from 1 – 3 lps, whereas in dug wells tapping soft rocks including sedimentaries, the yield is upto 5 lps. The Annual Replenishable Ground Water Resource of the state has been estimated as 23.07 bcm and Net Annual Ground Water Availability is 20.76 bcm. The Annual Ground Water Draft is 17.65 bcm and Stage of Ground Water Development is 85% leaving limited scope for further development of the dynamic ground water resources. Out of 385 assessment units (blocks), 142 have been categorized as Over-exploited, 33 as Critical, 57 as Semi-critical, 145 as Safe and 8 as Saline. The deeper aquifers have been explored in many parts of the state indicating promising ground water potential. Autoflow conditions have been encountered in the Cauvery delta areas. The yield of wells tapping deeper aquifers in unconsolidated formation varies from 1–50 lps, whereas the wells tapping deeper fractured zones in hard rock areas yield 2-10 lps.

TRIPURA

The semi-consolidated formations consisting of friable sandstone, sandy shale etc. of Tertiary age form the main rock types of the area. The unconfined aquifer is mainly tapped through shallow wells with a discharge of 5 to 15 lps in the valley areas whereas in the sandstone, the yield varies from 2 to 4 lps. The Annual Replenishable Ground Water Resource is 2.19 bcm and Net Annual Ground Water Availability is 1.97 bcm. The Annual Ground Water Draft is 0.17 bcm and Stage of Ground Water Development is 9%. The entire state has been categorized as Safe. Ground Water development in the deeper aquifers has also been established through construction of deep tube wells, the yield of wells tapping the sandstone areas varies from 25 to 40 lps.

UTTAR PRADESH

The state of Uttar Pradesh is categorized with three distinct hydrogeological units–Bhabar, Terai and Central Ganga Plains. Bhabar is mainly the recharge zone having deeper water levels. The ground water development in phreatic aquifer is through hand pumps, dug wells, dug cum bore wells and shallow tube wells. The yield from these wells has been found upto 40 lps. The Annual Replenishable Ground Water Resource of the state has been estimated as 76.35 bcm and Net Annual Ground Water Availability is 70.18 bcm. The Annual Ground Water Draft is 48.78 bcm and Stage of Ground Water Development is 70%. Out of 803 assessment units (blocks), 37 have been categorized as Over-exploited, 13 as Critical, 88 as Semi-critical and 665 as Safe. The exploration carried out in the deeper zones indicates ample scope for ground water development. The tube wells tapping areas in Bhabar and Terai zones, the yield ranges from 30-60 lps, whereas the tube wells tapping the Central Ganga Plains, the yield ranges from 25-75 lps.

UTTARANCHAL

The predominantly hilly state of Uttaranchal has a varied hydrogeological set up consisting of Gangetic alluvial plain and Himalayan mountain belt. Ground water in hilly region is mostly tapped through springs and dug wells / hand pumps. The dug wells and hand pumps yield upto 1 lps. The Annual Replenishable Ground Water Resource of the state has been assessed as 2.27 bcm and Net Annual Ground Water Availability is 2.10 bcm. The Annual Ground Water Draft is 1.39 bcm and Stage of Ground Water Development is 66%. Out of 17 assessment units (blocks), 2 have been categorized as Over-exploited, 3 as Semi-critical and 12 as Safe. Besides dynamic resources the deeper aquifers offer good scope for ground water development. The yield of tube wells tapping Siwalik Formation ranges from 10-20 lps, in Bhabar Formation the yield goes upto 60 lps and in Terai belt upto 40 lps. In the Indo-Gangetic Plain, the deeper wells have yield ranging from 25-50 lps.

WEST BENGAL

Nearly two third area of the state is occupied by unconsolidated sediments, the western part of the state is partly occupied by the hard rocks. The phreatic aquifer is generally developed through dug well, dug cum bore well and shallow tubewell. The yield of these wells varies from 1-5 lps. The Annual Replenishable Ground Water Resource has been estimated as 30.36 bcm and Net Annual Ground Water Availability is 27.46 bcm. The Annual Ground Water Draft is 11.65 bcm and Stage of Ground Water Development is 42%. Out of 269 assessment units (blocks), 1 has been categorized as Critical, 37 as Semi-critical and 231 as Safe. The ground water exploration has indicated potential aquifers in the deeper zones. Wells tapping fracture zones in hard rock areas yield from 2-5 lps, whereas in unconsolidated sediments, the yield varies from 10-30 lps.

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ANNEXURE - I

STATE-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

(AS ON MARCH, 2004)

Annexure-I

STATE-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
INDIA

(in bcm)

Sl. No.	States / Union Territories	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	States													
1	Andhra Pradesh	16.04	8.93	4.20	7.33	36.50	3.55	32.95	13.88	1.02	14.90	2.67	17.65	45
2	Arunachal Pradesh	1.57	0.00009	0.98	0.0002	2.56	0.26	2.30	0.0008	0	0.0008	0.009	2.29	0.04
3	Assam	23.65	1.99	1.05	0.54	27.23	2.34	24.89	4.85	0.59	5.44	0.98	19.06	22
4	Bihar	19.45	3.96	3.42	2.36	29.19	1.77	27.42	9.39	1.37	10.77	2.14	15.89	39
5	Chattisgarh	12.08	0.43	1.30	1.13	14.93	1.25	13.68	2.31	0.48	2.80	0.70	10.67	20
6	Delhi	0.13	0.06	0.02	0.09	0.30	0.02	0.28	0.20	0.28	0.48	0.57	0.00	170
7	Goa	0.22	0.01	0.01	0.04	0.28	0.02	0.27	0.04	0.03	0.07	0.04	0.18	27
8	Gujarat	10.59	2.08	0.00	3.15	15.81	0.79	15.02	10.49	0.99	11.49	1.48	3.05	76
9	Haryana	3.52	2.15	0.92	2.72	9.31	0.68	8.63	9.10	0.35	9.45	0.60	-1.07	109
10	Himachal Pradesh	0.33	0.01	0.08	0.02	0.43	0.04	0.39	0.09	0.02	0.12	0.04	0.25	30
11	Jammu & Kashmir	0.61	0.77	1.00	0.32	2.70	0.27	2.43	0.10	0.24	0.33	0.42	1.92	14
12	Jharkhand	4.26	0.14	1.00	0.18	5.58	0.33	5.25	0.70	0.38	1.09	0.56	3.99	21
13	Karnataka	8.17	4.01	1.50	2.25	15.93	0.63	15.30	9.75	0.97	10.71	1.41	6.48	70
14	Kerala	3.79	0.01	1.93	1.11	6.84	0.61	6.23	1.82	1.10	2.92	1.40	3.07	47
15	Madhya Pradesh	30.59	0.96	0.05	5.59	37.19	1.86	35.33	16.08	1.04	17.12	1.74	17.51	48
16	Maharashtra	20.15	2.51	1.94	8.36	32.96	1.75	31.21	14.24	0.85	15.09	1.52	16.10	48
17	Manipur	0.20	0.005	0.16	0.01	0.38	0.04	0.34	0.002	0.0005	0.002	0.02	0.31	0.65
18	Meghalaya	0.79	0.03	0.33	0.005	1.15	0.12	1.04	0.00	0.002	0.002	0.10	0.94	0.18
19	Mizoram	0.03	0.00	0.02	0.00	0.04	0.004	0.04	0.00	0.0004	0.0004	0.0008	0.04	0.90
20	Nagaland	0.28	0.00	0.08	0.00	0.36	0.04	0.32	0.00	0.009	0.009	0.03	0.30	3
21	Orissa	12.81	3.56	3.58	3.14	23.09	2.08	21.01	3.01	0.84	3.85	1.22	16.78	18
22	Punjab	5.98	10.91	1.36	5.54	23.78	2.33	21.44	30.34	0.83	31.16	1.00	-9.89	145
23	Rajasthan	8.76	0.62	0.26	1.92	11.56	1.18	10.38	11.60	1.39	12.99	2.72	-3.94	125
24	Sikkim	-	-	-	-	0.08	0.00	0.08	0.00	0.01	0.01	0.02	0.05	16
25	Tamil Nadu	4.91	11.96	4.53	1.67	23.07	2.31	20.76	16.77	0.88	17.65	0.91	3.08	85
26	Tripura	1.10	0.00	0.92	0.17	2.19	0.22	1.97	0.08	0.09	0.17	0.20	1.69	9
27	Uttar Pradesh	38.63	11.95	5.64	20.14	76.35	6.17	70.18	45.36	3.42	48.78	5.30	19.52	70
28	Uttaranchal	1.37	0.27	0.12	0.51	2.27	0.17	2.10	1.34	0.05	1.39	0.08	0.68	66
29	West Bengal	17.87	2.19	5.44	4.86	30.36	2.90	27.46	10.84	0.81	11.65	1.24	15.32	42
	Total States	**247.88**	**69.51**	**41.83**	**73.15**	**432.42**	**33.73**	**398.70**	**212.38**	**18.04**	**230.44**	**29.12**	**161.92**	**58**
	Union Territories													
1	Andaman & Nicobar	-	-	-	-	0.330	0.005	0.320	0.000	0.010	0.010	0.008	0.303	4
2	Chandigarh	0.016	0.001	0.005	0.001	0.023	0.002	0.020	0.000	0.000	0.000	0.000	0.020	0
3	Dadara & Nagar Haveli	0.059	0.005			0.063	0.003	0.060	0.001	0.007	0.009	0.008	0.051	14
4	Daman & Diu	0.006	0.002	0.000	0.001	0.009	0.0004	0.008	0.007	0.002	0.009	0.003	-0.002	107
5	Lakshdweep	-	-	-	-	0.012	0.009	0.004	0.000	0.002	0.002	-	-	63
6	Pondicherry	0.057	0.067	0.007	0.029	0.160	0.016	0.144	0.121	0.030	0.151	0.031	-0.008	105
	Total UTs	**0.138**	**0.075**	**0.012**	**0.031**	**0.597**	**0.036**	**0.556**	**0.129**	**0.051**	**0.181**	**0.050**	**0.365**	**33**
	Grand Total	**248.01**	**69.59**	**41.85**	**73.19**	**433.02**	**33.77**	**399.25**	**212.51**	**18.09**	**230.62**	**29.17**	**162.29**	**58**

ANNEXURE - II

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

(AS ON MARCH, 2004)

Annexure-II

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
ANDHRA PRADESH

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water availability for future irrigation	Stage of ground water development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Adilabad	111535	21262	22318	21581	176696	17272	159424	48515	3937	52452	8620	102289	33
2	Anantapur	72989	33716	16471	36536	159711	15478	144233	104772	4419	109191	15238	43163	76
3	Chittoor	111804	17472	10694	20456	160427	15418	145010	95438	8387	103825	11813	42307	72
4	East Godavari	61870	49583	40385	75703	227541	22628	204913	59457	4810	64267	26680	133223	31
5	Guntur	47822	229702	34137	106983	418644	41718	376926	30195	6352	36546	15511	331984	10
6	Kadapa	37418	18545	26884	18430	103277	9988	93289	64230	5025	69255	7380	24471	74
7	Karimnagar	74907	39792	18910	52332	185942	18491	167451	85151	3774	88926	11372	77813	53
8	Khammam	118889	19030	30557	38914	207390	17967	189424	36082	3671	39752	7697	147707	21
9	Krishna	72403	62322	38934	53542	227201	22363	204838	44823	5149	49972	14907	145796	24
10	Kurnool	70321	38551	8371	20502	137746	13621	124124	47910	3640	51550	14399	67269	42
11	Mehaboobnagar	72725	26513	28481	30662	158380	15283	143098	83170	5407	88577	10888	52049	62
12	Medak	51606	10008	16297	12289	90200	8878	81322	68116	2319	70435	8973	8111	87
13	Nalgonda	93372	58499	6830	49085	207786	20779	187007	92287	5518	97805	8628	86794	52
14	Nellore	116454	78929	1673	56249	253305	25085	228220	95907	4938	100845	11684	122659	44
15	Nizamabad	69740	18341	3474	30010	121565	11308	110257	92463	2841	95304	6354	25319	86
16	Prakasham	36342	14692	45058	26825	122917	11998	110919	57654	5294	62948	9809	52581	57
17	RangaReddy	44417	10605	12430	13083	80535	7911	72623	59409	15581	74989	24640	7878	103
18	Srikakulam	75961	13016	4942	8578	102497	9879	92618	7759	1200	8958	8543	76316	10
19	Vijayanagaram	52800	32802	12480	0	98082	9724	88358	18517	3054	21571	11121	58720	24
20	Visakhapatnam	49830	7178	10325	0	67333	6547	60785	19741	1193	20934	13107	28270	34
21	Warrangal	104623	48940	0	24805	178368	17481	160887	106421	4365	110786	8610	58520	69
22	West Godavari	56201	43008	28623	36439	164271	15361	148910	70174	1070	71244	11228	72189	48
	State Total (ha m)	**1604028**	**892508**	**420273**	**733005**	**3649814**	**355178**	**3294636**	**1388190**	**101943**	**1490133**	**267201**	**1765428**	**45**
	State Total (bcm)	**16.04**	**8.93**	**4.20**	**7.33**	**36.50**	**3.55**	**32.95**	**13.88**	**1.02**	**14.90**	**2.67**	**17.65**	**45**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
ARUNACHAL PRADESH

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Changlang	12538	0	11021	0	23559	2356	21203	0	0	0	96	21107	0.00
2	Dibang valley	50796	1	17306	3	68107	6811	61296	12	0	12	47	61237	0.02
3	East Kameng	7695	0	2944	0	10639	1064	9575	0	0	0	31	9544	0.00
4	East Siang	20594	3	10880	6	31483	3148	28334	27	0	27	56	28251	0.10
5	Lohit	53054	2	47964	4	101023	10102	90921	15	0	15	110	90796	0.02
6	Lower Subansiri	836	0	602	0	1438	144	1294	0	0	0	58	1236	0.00
7	Papum Pare	3998	2	2235	4	6237	624	5614	15	0	15	169	5430	0.27
8	Tawang	-	-	-	-	-	-	-	-	-	-	23	-	-
9	Tirap	5003	0	3924	0	8927	893	8034	0	0	0	140	7895	0.00
10	Upper Siang	-	-	-	-	-	-	-	-	-	-	20	-	-
11	Upper Subansiri	-	-	-	-	-	-	-	-	-	-	25	-	-
12	West Kameng	847	1	344	3	1195	120	1075	12	0	12	59	1005	1.12
13	West Siang	2036	0	1078	0	3114	311	2802	0	0	0	59	2744	0.00
	State Total (ha m)	**157395**	**9**	**98298**	**19**	**255721**	**25572**	**230149**	**81**	**0**	**81**	**892**	**229244**	**0.04**
	State Total (bcm)	**1.57**	**0.00009**	**0.98**	**0.0002**	**2.56**	**0.26**	**2.30**	**0.0008**	**0**	**0.0008**	**0.009**	**2.29**	**0.04**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
ASSAM

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Barpeta	112846	23472	0	7035	143354	7168	136186	30867	3631	34498	5959	99360	25
2	Bongaigaon	77984	16476	0	3625	98085	4904	93181	50456	2015	52471	2884	39841	56
3	Cachar	203899	22	19990	10	223921	22392	201529	52	3213	3265	5246	196231	2
4	Darrang	88222	21977	11487	5940	127626	12763	114863	43113	3314	46427	5159	66591	40
5	Dibrugarh	105325	7626	0	1766	114717	11472	103245	21609	2627	24236	3746	77891	23
6	Dhemaji	133080	3774	0	842	137696	6885	130811	11515	1258	12773	2083	117213	10
7	Dhubri	107889	12	0	4985	112886	11289	101597	12492	3632	16124	6535	82570	16
8	Golaghat	86906	5868	11557	1295	105626	10563	95064	17956	2093	20049	3139	73969	21
9	Goalpara	123115	7262	0	1608	131985	13199	118787	22204	1819	24023	3265	93318	20
10	Hailakandi	62796	210	7007	49	70061	3503	66558	634	1202	1836	2067	63857	3
11	Jorhat	106126	4325	9408	961	120820	12082	108738	13216	2257	15473	3465	92057	14
12	Kamrup	134245	24319	0	6076	164640	16464	148176	58614	5754	64369	10516	79045	43
13	Karbi Anglong	75021	2414	8168	844	86447	8645	77802	624	1804	2428	3194	73984	3
14	Kokrajhar	166225	4622	0	686	171533	17153	154380	11577	2055	13632	3143	139660	9
15	Karimganj	64950	75	9552	31	74608	7461	67147	182	2218	2400	3853	63112	4
16	Lakhimpur	70933	3845	0	12	74791	7479	67312	9635	1965	11600	3214	54463	17
17	Morigaon	44859	7769	0	1711	54339	5434	48905	23787	1710	25497	2975	22143	52
18	Nagaon	118452	23713	0	5805	147970	14797	133173	59792	5147	64939	9056	64324	49
19	N.C. Hills	9719	61	1270	1	11051	1105	9946	151	424	575	745	9050	6
20	Nalbari	75750	12795	0	2823	91368	4568	86799	39070	2500	41570	3603	44126	48
21	Sibsagar	99314	4767	8804	1057	113941	11394	102547	14570	2332	16903	3623	84354	16
22	Sonitpur	179643	19395	17569	5603	222210	11111	211100	30308	3715	34023	5998	174794	16
23	Tinsukia	118066	4064	0	907	123037	12304	110733	12405	2580	14985	4257	94072	14
	State Total (ham)	**2365365**	**198864**	**104812**	**53672**	**2722713**	**234133**	**2488580**	**484830**	**59266**	**544096**	**97725**	**1906025**	**22**
	State Total (bcm)	**23.65**	**1.99**	**1.05**	**0.54**	**27.23**	**2.34**	**24.89**	**4.85**	**0.59**	**5.44**	**0.98**	**19.06**	**22**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
BIHAR

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation development	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Araria	66982	8178	16312	2634	94106	5766	88340	20424	3478	23903	5478	62438	27
2	Arwal	12160	6218	2014	2294	22685	1639	21047	7311	927	8238	1416	12320	39
3	Aurangabad	60988	15569	9333	5199	91088	4850	86239	25805	3512	29317	5629	54804	34
4	Banka	27206	8946	6408	1523	44084	2631	41453	10958	2600	13558	3849	26647	33
5	Begusarai	48029	4461	7302	6420	66212	3794	62418	32158	3800	35958	6439	23821	58
6	Bhabua	56521	12113	12036	5065	85735	5602	80133	20458	2043	22501	3262	56413	28
7	Bhagalpur	54451	3374	11561	2114	71501	4507	66994	15370	4234	19604	6505	45118	29
8	Bhojpur	40283	16042	7507	11013	74846	4346	70500	20921	3866	24787	5870	43709	35
9	Buxar	30988	17239	4844	8779	61850	3867	57982	15678	2409	18087	3804	38501	31
10	Darbhanga	45107	4186	6869	2730	58891	3676	55215	19725	4891	24616	8051	27439	45
11	East Champaran	96513	28078	14657	19237	158485	10741	147744	47640	6811	54451	10823	89281	37
12	Gaya	82975	13653	12018	3514	112161	6858	105303	40165	5831	45997	9225	55912	44
13	Gopalganj	38208	12785	6947	10000	67939	4578	63361	27996	3677	31673	5593	29772	50
14	Jamui	29740	6828	7969	1687	46225	3060	43165	8196	2418	10614	3897	31072	25
15	Jehanabad	20954	6182	2864	1161	31160	1803	29358	15509	1593	17103	2555	11294	58
16	Katihar	73942	7869	15988	4930	102728	5999	96729	35801	3919	39720	6206	54722	41
17	Khagaria	41846	1124	6103	3540	52614	2631	49983	16658	2146	18804	3361	29963	38
18	Kisanganj	44944	1964	14463	2428	63798	3190	60608	14076	2234	16310	3592	42940	27
19	Lakhisarai	16316	3740	2847	1224	24126	1617	22510	6053	1410	7462	2114	14343	33
20	Madhepura	40933	8800	8484	4961	63177	3696	59481	23409	2506	25915	3906	32166	44
21	Madhubani	80090	9010	15382	4837	109318	6462	102856	25667	5788	31455	8782	68407	31
22	Munger	18393	3825	3738	2052	28008	1553	26455	5707	1883	7590	2629	18119	29
23	Muzafferpur	73336	17072	11647	14486	116540	6772	109768	46360	5862	52222	9227	54182	48
24	Nalanda	49610	10362	7122	2966	70060	3996	66064	34053	4101	38154	5627	26384	58
25	Nawada	41029	5903	6878	2186	55996	2800	53196	21303	3129	24433	5163	26730	46
26	Patna	68061	25420	10352	9623	113456	8413	105043	47963	7176	55139	10605	46474	52
27	Purnea	75630	11484	18645	5134	110892	6724	104168	37434	4044	41479	7200	59534	40
28	Rohtas	76349	17508	10478	7385	111720	7397	104323	27464	4161	31625	6371	70488	30
29	Saharsa	38839	7474	8103	5057	59474	3539	55936	17149	2422	19571	3962	34825	35
30	Samstipur	82758	8522	11750	6276	109306	7073	102233	43414	5583	48997	8279	50541	48
31	Saran	54778	12080	8082	10360	85300	4842	80459	37175	5478	42653	8441	34843	53
32	Sheikhpura	11827	2623	2104	601	17155	858	16297	6868	968	7836	1643	7787	48
33	Sheohar	13170	1466	1891	666	17194	1137	16057	5924	833	6757	706	9428	42
34	Sitamarhi	53937	5892	9861	4166	73857	4517	69340	25336	4529	29864	7333	36671	43
35	Siwan	45566	19883	6831	15852	88132	5354	82778	41240	4292	45531	6379	35159	55
36	Supaul	58449	12817	11904	8323	91493	5535	85957	22830	2899	25728	4922	58205	30
37	Vaishali	50205	11097	7405	9669	78376	4368	74009	33588	4530	38118	6873	33547	52
38	West Champaran	124010	25672	13481	26099	189263	10679	178584	35578	5237	40815	8309	134697	23
	State Total (ham)	**1945124**	**395461**	**342177**	**236193**	**2918955**	**176869**	**2742086**	**939366**	**137218**	**1076585**	**214025**	**1588695**	**39**
	State Total (bcm)	**19.45**	**3.96**	**3.42**	**2.36**	**29.19**	**1.77**	**27.42**	**9.39**	**1.37**	**10.77**	**2.14**	**15.89**	**39**

DISTIRCT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

CHATTISGARH

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Bastar	163800	365	29335	3402	196902	15196	181706	8665	3007	11673	4223	168817	6
2	Bilaspur	53832	6807	0	11701	72339	5835	66505	18128	4610	22738	7661	40715	34
3	Dantewara	192481	60	0	960	193501	17999	175503	2490	1650	4139	2265	170748	2
4	Dhamtari	26233	3573	3071	8039	40916	3734	37182	13540	1641	15181	2424	21218	41
5	Durg	56313	6052	7108	16162	85636	7978	77658	44319	6473	50792	9126	24213	65
6	Janjgir Champa	29535	5700	3211	13119	51565	4639	46925	12061	3047	15108	4393	30471	32
7	Jashpur	77527	724	9605	5293	93149	5748	87401	14592	1692	16284	2230	70578	19
8	Kanker	81933	399	14746	3243	100321	9334	90987	6871	1521	8392	2317	81799	9
9	Kawardha	21787	1046	3149	3150	29132	2822	26310	7741	1333	9075	1776	16792	34
10	Korba	42923	877	5077	1909	50785	4231	46554	3992	2363	6355	3588	38974	14
11	Koriya	27606	930	3524	2231	34291	3071	31220	3909	1350	5259	1898	25412	17
12	Mahasamund	67685	1580	7585	7129	83979	5905	78074	16415	1933	18348	2344	59314	24
13	Raigarh	56953	953	6113	5582	69601	5682	63919	13165	2927	16093	4225	46529	25
14	Raipur	118680	9472	13158	10463	151774	12825	138949	22329	6989	29318	10175	106445	21
15	Rajnandgaon	54160	2189	7578	7370	71297	6159	65138	16851	2961	19811	4213	44074	30
16	Surguja	136124	2288	16466	13403	168280	13825	154455	26326	4639	30965	7302	120827	20
	State Total (ha m)	**1207569**	**43016**	**129726**	**113157**	**1493468**	**124984**	**1368484**	**231396**	**48136**	**279532**	**70161**	**1066927**	**20**
	State Total (bcm)	**12.08**	**0.43**	**1.30**	**1.13**	**14.93**	**1.25**	**13.68**	**2.31**	**0.48**	**2.80**	**0.70**	**10.67**	**20**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

NCT DELHI

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft				Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic uses	Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Central	159	8	39	2	208	21	188	0	165	0	165	1722	0	88
2	East	397	61	63	116	636	32	605	142	466	179	788	3860	0	130
3	North	489	73	123	132	817	82	736	0	255	0	255	2194	0	35
4	New Delhi	186	82	44	20	331	33	298	0	509	0	509	916	0	171
5	North East	662	49	134	96	940	47	893	150	811	193	1153	4490	0	129
6	North West	4419	1491	621	2912	9443	472	8971	9799	822	1607	12228	7822	0	136
7	South	2188	752	258	416	3614	181	3433	109	7428	806	8343	17250	0	243
8	South West	3787	2216	537	3658	10198	510	9688	8567	11767	439	20773	12929	0	214
9	West	837	858	101	1724	3521	176	3345	1235	1421	1075	3732	5730	0	112
	State Total (ha m)	**13123**	**5590**	**1919**	**9078**	**29710**	**1553**	**28156**	**20002**	**23644**	**4300**	**47945**	**56912**	**0**	**170**
	State Total (bcm)	**0.13**	**0.06**	**0.02**	**0.09**	**0.30**	**0.02**	**0.28**	**0.20**	**0.24**	**0.04**	**0.48**	**0.57**	**0**	**170**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
GOA

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	North Goa	15975	510	0	2020	18505	1150	17355	2917	1839	4756	2414	12023	27
2	South Goa	6144	780	684	2358	9967	609	9358	1026	1428	2454	1875	6457	26
	State Total (ha m)	**22119**	**1291**	**684**	**4378**	**28472**	**1759**	**26713**	**3944**	**3267**	**7211**	**4288**	**18480**	**27**
	State Total (in bcm)	**0.22**	**0.01**	**0.01**	**0.04**	**0.28**	**0.02**	**0.27**	**0.04**	**0.03**	**0.07**	**0.04**	**0.18**	**27**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
GUJARAT

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Ahmedabad	34550	6404	0	6602	47556	2378	45178	42374	6454	48828	9597	-6793	108
2	Amreli	58975	2578	0	9037	70590	3529	67060	43603	2376	45980	3532	19925	69
3	Anand	22416	22681	0	18461	63558	3178	60380	28670	4622	33293	6875	24835	55
4	Banaskantha	71839	8456	0	10177	90473	4524	85949	96663	5150	101813	7638	-18352	118
5	Bharuch	20380	1994	0	5504	27878	1394	26484	13349	1835	15184	2729	10406	57
6	Bhavnagar	63595	2467	0	10502	76564	3828	72735	41732	5084	46816	7561	23442	64
7	Dohad	20584	2700	0	3659	26943	1347	25596	11720	3998	15718	5894	7982	61
8	Gandhinagar	27096	4767	0	4329	36192	1810	34383	60388	2861	63249	4257	-30262	184
9	Jamnagar	68632	9607	0	11396	89635	4482	85153	46688	4057	50745	6033	32431	60
10	Junagadh	93251	8838	0	17253	119342	5967	113375	75384	6197	81581	9203	28788	72
11	Kachchh	44934	13161	0	14215	72311	3616	68695	58314	3821	62135	5684	4697	90
12	Kheda	35382	15985	0	16960	68327	3416	64911	38044	5287	43331	7862	19005	67
13	Mahesana	67263	8732	0	6571	82586	4129	78457	113587	5013	118600	7455	-42585	151
14	Narmada	15228	2341	0	3883	21452	1073	20380	5100	1403	6503	2085	13195	32
15	Navsari	17883	10928	0	22129	50940	2547	48393	20731	2096	22827	3117	24545	47
16	Panchmahals	25565	10047	0	14947	50559	2528	48031	23514	5050	28564	7505	17012	59
17	Patan	19786	1800	0	1761	23347	1167	22180	28352	1678	30030	2495	-8667	135
18	Porbandar	12248	909	0	1440	14597	730	13867	11354	1035	12389	1540	973	89
19	Rajkot	77417	17058	0	23575	118051	5903	112148	73741	7016	80757	10434	27973	72
20	Sabarkantha	69430	8009	0	16659	94098	4705	89393	69737	5072	74809	7544	12112	84
21	Surat	43234	29022	0	63604	135860	6793	129067	40645	6855	47500	10193	78229	37
22	Surendranagar	42538	4533	0	6975	54046	2702	51344	31081	2423	33504	3605	16658	65
23	The Dangs	4481	702	0	61	5244	262	4982	516	510	1026	758	3707	21
24	Vadodara	83030	8508	0	13764	105302	5265	100037	61521	7106	68627	10566	27950	69
25	Valsad	19224	5283	0	11137	35644	1782	33862	12358	2406	14763	3578	17926	44
	State Total (ha m)	**1058980**	**207511**	**0**	**314602**	**1581093**	**79055**	**1502039**	**1049167**	**99405**	**1148572**	**147740**	**305132**	**76**
	State Total (bcm)	**10.59**	**2.08**	**0.00**	**3.15**	**15.81**	**0.79**	**15.02**	**10.49**	**0.99**	**11.49**	**1.48**	**3.05**	**76**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

HARYANA

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial use	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Ambala	30521	8483	9196	6328	54528	4481	50047	33975	3840	37815	5914	10157	76
2	Bhiwani	33551	10159	5876	12428	62015	4191	57823	59307	755	60062	1108	-2592	104
3	Faridabad	19817	12563	4567	21025	57972	2899	55074	26811	1002	27813	2023	26239	51
4	Fatehabad	13247	11791	3172	13010	41220	2414	38806	52898	243	53140	369	-14461	137
5	Gurgaon	25786	6514	6466	8879	47645	4528	43117	51157	11315	62472	22856	-30896	145
6	Hissar	16811	16199	3720	24143	60873	5004	55869	37456	262	37719	413	17999	68
7	Jhajjar	10432	9435	3030	15486	38383	2738	35646	30873	156	31029	235	4537	87
8	Jind	18214	20852	7088	29254	75408	5454	69954	46820	1950	48770	2827	20307	70
9	Kaithal	19121	22616	4872	15960	62570	6257	56313	98154	2497	100652	3597	-45439	179
10	Karnal	35242	26543	5316	26371	93471	5621	87850	119235	1245	120479	1854	-33238	137
11	Kurukshetra	16818	12111	4588	9717	43233	2795	40439	64196	2778	66974	4167	-27924	166
12	Mahendragarh	9968	1788	3057	5425	20238	2024	18214	19141	388	19528	543	-1469	107
13	Panchkula	8026	2691	2569	2371	15657	783	14874	7731	1365	9096	2825	4318	61
14	Panipat	14810	8454	2609	10260	36132	3189	32942	50939	496	51435	897	-18894	156
15	Rewari	9931	3457	3104	11683	28176	2111	26065	31090	301	31391	460	-5486	120
16	Rohtak	10430	5011	3776	8330	27547	2234	25313	16790	0	16790	0	8523	66
17	Sirsa	13535	15562	4763	27981	61841	3092	58749	66646	514	67160	762	-8659	114
18	Sonepat	15126	11589	5507	15101	47324	2366	44958	48179	2931	51110	4309	-7531	114
19	Yamunanagar	30404	9086	9165	8151	56806	5681	51125	48333	3315	51648	4841	-2048	101
	State Total (ha m)	**351791**	**214904**	**92441**	**271902**	**931038**	**67862**	**863177**	**909732**	**35353**	**945085**	**60000**	**-106555**	**109**
	State Total (bcm)	**3.52**	**2.15**	**0.92**	**2.72**	**9.31**	**0.68**	**8.63**	**9.10**	**0.35**	**9.45**	**0.60**	**-1.07**	**109**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

HIMACHAL PRADESH

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Kangra	7663	149	2127	300	10239	1024	9215	1800	635	2435	888	6527	26
2	Mandi	2991	29	792	58	3870	387	3483	347	434	781	679	2458	22
3	Sirmaur	6391	79	1076	148	7693	769	6924	943	277	1220	490	5491	18
4	Solan	6060	60	1467	120	7707	771	6936	718	307	1025	684	5534	15
5	Una	9615	443	2332	886	13276	1328	11948	5314	837	6151	1390	5244	51
	State Total (ha m)	**32721**	**760**	**7794**	**1511**	**42785**	**4279**	**38507**	**9122**	**2490**	**11612**	**4131**	**25255**	**30**
	State Total (bcm)	**0.33**	**0.01**	**0.08**	**0.02**	**0.43**	**0.04**	**0.39**	**0.09**	**0.02**	**0.12**	**0.04**	**0.25**	**30**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

JAMMU & KASHMIR

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and industrial uses	Total			
		Recharge from Rainfall	Recharge from other sources	Recharge from Rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Anantnag	3038	12237	13851	3465	32591	3259	29332	40	1377	1417	2534	26758	5
2	Badgan	1969	8229	6805	1050	18053	1805	16248	36	2285	2321	4017	12195	14
3	Baramula	4689	9885	29245	1260	45079	4508	40571	236	3488	3724	6257	34078	9
4	Jammu	31424	21921	15700	16032	85077	8508	76569	6636	6854	13490	11721	58212	18
5	Kathua	13748	8747	6869	6223	35587	3559	32028	2193	1786	3979	2676	27159	12
6	Kupwara	1921	4074	7002	105	13102	1310	11792	14	1981	1995	3948	7830	17
7	Pulwama	3544	7877	16160	3045	30626	3063	27563	53	2256	2309	3691	23819	8
8	Srinagar	1158	4175	4028	840	10201	1020	9181	295	3903	4198	6694	2192	46
	State Total (ham)	**61491**	**77145**	**99660**	**32020**	**270316**	**27032**	**243284**	**9503**	**23930**	**33433**	**41538**	**192243**	**14**
	State Total (bcm)	**0.61**	**0.77**	**1.00**	**0.32**	**2.70**	**0.27**	**2.43**	**0.10**	**0.24**	**0.33**	**0.42**	**1.92**	**14**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
JHARKHAND

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Bokaro	17479	156	4008	438	22082	1169	20913	1710	2146	3856	3081	16122	18
2	Chatra	20363	524	3909	768	25565	1364	24201	3008	1222	4230	1908	19285	17
3	Deoghar	11995	53	3596	460	16103	900	15203	1790	1756	3546	2596	10817	23
4	Dhanbad	11123	207	2826	155	14311	830	13481	566	2874	3440	4163	8752	26
5	Dumka	20692	2316	5910	1235	30154	1856	28298	4856	1677	6533	2256	21185	23
6	East Singhbhum	21239	153	5348	542	27282	1534	25748	2054	2248	4302	3249	20444	17
7	Garwa	21011	1560	3385	1456	27411	1684	25728	5656	1608	7264	2510	17562	28
8	Giridih	29103	81	7560	1344	38087	2157	35930	5288	2907	8195	4436	26206	23
9	Godda	9342	1151	2733	966	14192	902	13290	3818	1600	5418	2281	7190	41
10	Gumla	31074	906	7298	1115	40393	2186	38207	4351	1244	5596	1658	32198	15
11	Hazaribag	31078	746	5941	1736	39502	2088	37413	6806	3227	10033	4745	25862	27
12	Jamtara	11137	19	2941	303	14401	720	13681	1181	960	2140	1292	11208	16
13	Koderma	5963	3	1325	285	7575	379	7196	1136	718	1854	1086	4975	26
14	Latehar	17906	222	3171	769	22068	1327	20741	3022	861	3883	1310	16410	19
15	Lohardaga	9398	355	1849	847	12448	707	11741	3350	538	3888	812	7579	33
16	Pakur	10303	279	3478	175	14236	1067	13169	659	1071	1731	1582	10928	13
17	Palamu	26470	1538	4605	1490	34103	2103	32001	5852	2380	8231	3619	22530	26
18	Ranchi	41264	1741	9640	2156	54801	3103	51698	8487	4078	12564	6122	37089	24
19	Sahibganj	12212	206	3290	937	16645	890	15755	3675	1383	5058	2081	9998	32
20	Saraikela	15203	617	4005	104	19929	1336	18593	376	1240	1616	1646	16570	9
21	Simdega	22730	276	5346	574	28925	1717	27209	2243	762	3005	1015	23951	11
22	West Singhbhum	29059	890	7362	130	37441	2503	34938	406	1742	2149	2313	32219	6
	State Total (ham)	**426144**	**13999**	**99527**	**17984**	**557654**	**32521**	**525134**	**70292**	**38242**	**108534**	**55761**	**399081**	**21**
	State Total (bcm)	**4.26**	**0.14**	**1.00**	**0.18**	**5.58**	**0.33**	**5.25**	**0.70**	**0.38**	**1.09**	**0.56**	**3.99**	**21**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
KARNATAKA

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Bagalkote	18558	14634	4362	6774	44329	1526	42802	35962	3416	39378	4916	12991	92
2	Bangalore(R)	16317	15129	6538	8397	46381	2143	44239	72223	3336	75559	4683	2066	171
3	Bangalore(U)	4568	7638	2384	3071	17661	892	16769	31470	1557	33027	2186	0	197
4	Belgaum	60987	57595	6752	23891	149225	5450	143775	121666	8818	130485	12922	36966	91
5	Bellary	27547	17745	7618	12700	65610	2135	63476	23740	4182	27921	6577	34494	44
6	Bidar	35293	4550	989	2221	43054	2128	40926	19826	3279	23105	5019	19343	56
7	Bijapur	43164	4471	6474	3158	57267	2606	54661	31028	4617	35646	6418	18013	65
8	Chamrajanagar	19072	12716	6911	4070	42768	1612	41156	34597	2162	36760	3044	12062	89
9	Chikmagalur	23355	13051	8481	5882	50768	2212	48556	20087	3243	23330	4485	23964	48
10	Chitradurga	32492	11824	8296	8403	61016	2921	58094	55844	3633	59477	5210	7545	102
11	D. Kannada	43990	2165	4021	4567	54743	2689	52054	27623	3792	31415	5370	18997	60
12	Davangere	26535	17401	1959	15578	61472	1861	59610	42656	3176	45832	4955	20075	77
13	Dharwar	24129	1720	3607	1437	30894	1499	29395	9580	1526	11106	2173	17718	38
14	Gadag	13265	3514	4074	3753	24605	1074	23532	19966	2136	22102	3033	5013	94
15	Gulbarga	70528	10917	7498	3671	92615	4131	88484	19447	5618	25065	7813	62091	28
16	Hassan	20488	19395	7925	6612	54421	2238	52183	31152	5709	36861	7917	15906	71
17	Haveri	21302	12936	4747	3529	42515	1845	40670	26247	2870	29117	4282	13182	72
18	Kodagu	21029	2065	5607	1117	29818	1099	28720	6699	1547	8246	2162	19889	29
19	Kolar	29168	12803	8346	11232	61550	2487	59063	110918	4405	115323	6316	1001	195
20	Koppal	20252	25028	3676	23070	72025	1876	70149	31400	2379	33779	4022	41138	48
21	Mandya	11733	36375	5766	11805	65679	1275	64404	19649	4065	23714	5863	41456	37
22	Mysore	19850	11380	8810	2902	42942	1799	41143	19923	3915	23838	6133	17762	58
23	Raichur	21247	20754	3941	21940	67883	1525	66358	10102	3141	13243	5361	51373	20
24	Shimoga	44268	28926	3386	12003	88584	3729	84855	23943	3198	27141	4488	56528	32
25	Tumkur	33990	33189	12688	17125	96993	3976	93017	96635	5965	102600	8462	15579	110
26	U. Kannada	67640	1727	1819	3239	74425	3660	70765	15212	2241	17452	3127	52509	25
27	Udupi	46284	1363	2839	2945	53431	2629	50803	17138	2654	19792	3756	29918	39
	State Total (ha m)	**817051**	**401012**	**149515**	**225095**	**1592673**	**63013**	**1529660**	**974731**	**96581**	**1071312**	**140693**	**647580**	**70**
	State Total (bcm)	**8.17**	**4.01**	**1.50**	**2.25**	**15.93**	**0.63**	**15.30**	**9.75**	**0.97**	**10.71**	**1.41**	**6.48**	**70**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

KERALA

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Alleppey	22100	0	13639	10869	46608	4662	41946	6324	6541	12865	7712	27910	31
2	Calicut	27038	0	9603	0	36641	2160	34481	12663	8675	21338	11145	12053	62
3	Ernakulam	30812	0	17116	13914	61842	5059	56783	20186	9196	29382	11994	24902	52
4	Idukki	17227	0	7279	2398	26904	2272	24632	5200	4032	9232	4932	14560	37
5	Kannur	40863	0	11620	6706	59189	5127	54062	18460	7659	26119	9558	27221	48
6	Kasaragod	27718	0	7852	2048	37618	3264	34354	22940	4255	27195	5834	7455	79
7	Kottayam	28172	0	17138	6796	52106	5023	47083	6632	6730	13362	8217	32234	28
8	Malappuram	32010	0	15606	8114	55730	4966	50764	18092	12663	30755	18331	14828	61
9	Palghat	35809	0	15756	30823	82388	7355	75033	16401	16374	32775	18951	39681	44
10	Pathanamthitta	15141	1486	14589	3483	34699	3044	31655	5937	4114	10051	4749	20970	32
11	Quilon	23584	0	21822	4155	49561	4736	44825	12531	7976	20507	9852	22478	46
12	Trichur	41846	0	19122	16525	77493	7218	70275	23474	9174	32648	11692	35380	46
13	Trivandrum	12818	0	15011	3022	30851	3048	27803	9206	9373	18579	11652	8068	67
14	Wayanad	23749	0	6655	2099	32503	3244	29259	4081	3112	7193	5496	19682	25
	State Total (ham)	**378887**	**1486**	**192808**	**110952**	**684133**	**61178**	**622955**	**182127**	**109874**	**292001**	**140115**	**307422**	**47**
	State Total (bcm)	**3.79**	**0.01**	**1.93**	**1.11**	**6.84**	**0.61**	**6.23**	**1.82**	**1.10**	**2.92**	**1.40**	**3.07**	**47**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
MADHYA PRADESH

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Annupur	40393	154	5491	497	46534	2327	44207	2400	1216	3616	2204	39603	8
2	Ashoknagar	36493	660	0	9610	46763	2488	44275	13887	1343	15230	1725	28663	34
3	Balaghat	109462	4061	0	3483	117006	5657	111349	11344	3307	14651	4448	95557	13
4	Barwani	36711	709	0	5511	42930	2146	40784	25093	1886	26979	3411	12280	66
5	Betul	79482	1389	0	9095	89966	4498	85467	39089	2318	41407	3380	42998	48
6	Bhind	62523	390	0	15797	78710	3935	74774	16354	2366	18720	3974	54447	25
7	Bhopal	28514	702	0	5055	34271	1714	32557	22515	706	23221	1239	8804	71
8	Burhanpur	24347	285	0	2419	27051	1352	25698	16777	1400	18178	1901	7020	71
9	Chhatarpur	83039	2094	0	14707	99840	4999	94841	51100	2510	53610	3043	40698	57
10	Chhindwara	102567	1838	0	11553	115958	5808	110150	52932	2965	55896	5913	51306	51
11	Damoh	36595	927	0	6696	44218	2211	42007	20036	1962	21997	2808	19163	52
12	Datia	36308	519	0	7202	44029	2201	41828	17479	1046	18525	1892	22458	44
13	Dewas	77079	1479	0	14144	92703	4635	88068	56172	2296	58468	3086	28809	66
14	Dhar	88264	2144	0	19819	110227	5524	104703	101296	3032	104327	5562	-2154	100
15	Dindori	43219	51	0	93	43362	2168	41194	1766	1455	3220	3399	36030	8
16	Guna	52880	2260	0	9242	64382	3219	61163	31545	1721	33266	2305	27314	54
17	Gwalior	45932	7504	0	15765	69201	3460	65741	17077	2237	19314	2618	46046	29
18	Harda	26502	5225	0	19652	51379	2569	48810	13005	717	13722	1383	34422	28
19	Hoshangabad	137141	16523	0	68325	221989	11099	210889	27218	1528	28746	2009	181662	14
20	Indore	43459	1610	0	14828	59897	2995	56902	56943	2484	59426	5965	-6005	104
21	Jabalpur	40498	4865	0	8465	53829	2706	51123	19177	2298	21475	4571	27375	42
22	Jhabua	50952	419	0	2282	53653	2683	50970	11113	2931	14044	8275	31582	28
23	Katni	51430	2344	0	5594	59368	2968	56400	18874	1754	20629	2190	35335	37
24	Khandwa	64001	927	0	8293	73222	3662	69560	38485	2391	40876	4175	26901	59
25	Khargone	60973	1380	0	11249	73602	3680	69922	50815	2500	53315	4154	14953	76
26	Mandla	53096	1119	0	5934	60149	3006	57143	1314	1892	3205	3214	52615	6
27	Mandsaur	56275	1953	0	16370	74598	3730	70868	75966	1608	77573	3463	-8561	109
28	Morena	58428	564	0	34134	93126	4656	88470	21474	2429	23903	3858	63138	27
29	Narsinghpur	105623	1434	0	14260	121317	6066	115251	69800	2233	72032	3073	42378	63
30	Neemuch	23926	5431	0	8988	38345	1917	36428	32111	1297	33407	1699	2618	92
31	Panna	47959	467	0	2832	51258	2563	48695	10111	1796	11907	2042	36541	24
32	Raisen	117522	3263	0	18050	138835	6942	131893	43485	1998	45483	5481	82927	34
33	Rajgarh	79871	1469	0	12307	93646	4684	88962	66585	2556	69141	4737	17640	78
34	Ratlam	48266	1758	0	13575	63599	3180	60419	67780	3102	70882	3628	-10989	117
35	Rewa	47082	724	0	5552	53358	2669	50689	18076	3122	21198	6868	25745	42
36	Sagar	108498	1416	0	11783	121697	6085	115612	51040	2885	53925	4133	60439	47

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
MADHYA PRADESH

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
37	Satna	56301	1377	0	7035	64713	3236	61477	38611	3630	42240	7510	15357	69
38	Sehore	66721	1574	0	10920	79215	3961	75255	44844	2136	46980	2983	27428	62
39	Seoni	92010	1999	0	6960	100969	5049	95920	18677	2296	20973	3739	73504	22
40	Shahdol	90118	234	0	797	91149	4557	86592	4038	1714	5752	3218	79336	7
41	Shajapur	39519	1540	0	14180	55239	2919	52320	56908	2532	59439	3578	-8165	114
42	Sheopur	85157	204	0	22470	107832	5392	102440	18104	1528	19633	1910	82426	19
43	Shivpuri	91368	1856	0	11702	104926	5246	99680	65549	2450	67998	3833	30298	68
44	Sidhi	82666	670	0	4052	87387	4370	83016	17082	3793	20875	6387	59547	25
45	Tikamgarh	57818	3123	0	19705	80647	4032	76614	37351	2022	39373	3766	35497	51
46	Ujjain	62235	2279	0	18940	83454	4173	79281	83932	2503	86435	3059	-7710	109
47	Umaria	69089	248	0	1299	70635	3532	67103	5381	892	6273	1557	60166	9
48	Vidisha	60429	990	0	7848	69266	3463	65803	27727	3195	30922	4271	33805	47
	State Total (ha m)	**3058741**	**96151**	**5491**	**559065**	**3719449**	**186133**	**3533315**	**1608433**	**103974**	**1712407**	**173637**	**1751245**	**48**
	State Total (bcm)	**30.59**	**0.96**	**0.05**	**5.59**	**37.19**	**1.86**	**35.33**	**16.08**	**1.04**	**17.12**	**1.74**	**17.51**	**48**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

MAHARASHTRA

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Ahmednagar	101678	14595	28989	52214	197476	9899	187577	134143	4278	138420	6160	58569	74
2	Akola	62905	1832	3493	8767	76997	3863	73135	25330	2566	27896	5099	42705	38
3	Amravati	63239	2632	8487	25063	99421	4971	94450	70759	2510	73270	3928	28425	78
4	Aurangabad	68632	8433	3180	40581	120825	6206	114619	60585	2687	63272	5285	49086	55
5	Beed	72524	10553	17170	27256	127502	6596	120907	48817	4632	53448	9193	62897	44
6	Bhandara	70089	11622	7178	23426	112314	6339	105975	19751	5052	24803	9911	77300	23
7	Buldhana	61530	3396	4684	3648	73257	3663	69595	38758	2886	41644	4985	28494	60
8	Chandrapur	84440	4831	0	3311	92582	4629	87953	9762	4568	14331	9137	69053	16
9	Dhule	83422	51804	0	73694	208920	13775	195145	83623	2627	86249	4286	111756	44
10	Gadchiroli	81488	19530	0	30495	131513	8971	122542	9302	1372	10674	2733	110507	9
11	Jalgaon	81219	3816	4672	41369	131076	6554	124522	80618	5596	86213	8718	43801	69
12	Jalna	62455	2600	809	30719	96584	4855	91728	38533	694	39227	1389	51807	43
13	Kolhapur	56132	3636	6941	21112	87821	4391	83430	53241	1256	54498	2490	27699	65
14	Latur	42872	24529	6469	46492	120363	6729	113634	81373	1633	83006	2621	33343	73
15	Nagpur	70427	11557	11334	16909	110228	6039	104189	39431	5865	45295	10229	56762	43
16	Nanded	96245	4949	17088	26675	144957	7467	137490	37038	1460	38498	2919	97533	28
17	Nashik	134842	14735	285	42656	192518	10435	182083	88012	2960	90973	4851	94363	50
18	Osmanabad	75130	8321	8751	21961	114163	5764	108398	68345	1776	70121	3389	36701	65
19	Parbhani	115155	1098	6897	93444	216595	10830	205765	42619	1891	44510	3781	159364	22
20	Pune	95562	9420	562	46435	151979	7691	144288	98797	2738	101535	4334	49797	70
21	Raigad	12213	609	0	3162	15984	816	15168	5388	1614	7001	3151	6629	46
22	Ratnagiri	23208	129	0	1515	24852	1247	23605	4702	1128	5830	2247	16685	25
23	Sangli	61293	7409	2724	22602	94028	4701	89327	64949	2456	67405	4009	22080	75
24	Satara	73360	10800	12393	26459	123012	6264	116748	66566	5103	71668	9022	43371	61
25	Sindhudurg	8215	150	85	2119	10569	539	10030	5293	1781	7074	2989	1749	71
26	Solapur	87957	13725	14169	32692	148543	7534	141009	91463	4941	96404	8289	45224	68
27	Thane	19399	500	0	17890	37790	1914	35875	6133	1232	7365	2464	27278	21
28	Wardha	54232	547	8676	36225	99680	5295	94385	24767	1681	26448	3344	66339	28
29	Yeotmal	94687	3400	19403	17072	134562	6728	127834	25863	5572	31435	11143	90827	25
	State Total (ham)	**2014550**	**251158**	**194439**	**835962**	**3296110**	**174706**	**3121404**	**1423960**	**84553**	**1508513**	**152097**	**1610144**	**48**
	State Total (bcm)	**20.15**	**2.51**	**1.94**	**8.36**	**32.96**	**1.75**	**31.21**	**14.24**	**0.85**	**15.09**	**1.52**	**16.10**	**48**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

MANIPUR

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Bishnupur	4503	0	3557	0	8060	806	7254	0	3	3	602	6652	0.04
2	Imphal West	4543	200	3583	400	8726	873	7853	105	30	135	713	7034	1.72
3	Imphal East	5072	149	4001	298	9520	952	8568	33	9	42	543	7992	0.49
4	Thoubal	6094	152	4807	303	11356	1136	10221	33	11	44	573	9615	0.43
	State Total (ha m)	**20212**	**500**	**15948**	**1001**	**37662**	**3766**	**33896**	**172**	**53**	**224**	**2431**	**31294**	**0.65**
	State Total (bcm)	**0.20**	**0.005**	**0.16**	**0.01**	**0.38**	**0.04**	**0.34**	**0.002**	**0.0005**	**0.002**	**0.02**	**0.31**	**0.65**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

MEGHALAYA

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	East Garo Hills	8680	780	3529	52	13041	1304	11737	0	7	7	1042	10695	0.06
2	East Khasi Hills	11159	100	5691	23	16973	1697	15276	0	30	30	2382	12894	0.20
3	Jaintia Hills	30568	352	12413	136	43469	4347	39122	0	62	62	1319	37803	0.16
4	Ri-Bhoi	1317	401	1483	0	3201	320	2881	0	31	31	1147	1734	1.07
5	South Garo Hills	1437	69	584	10	2100	210	1890	0	26	26	399	1491	1.36
6	West Garo Hills	21633	630	8066	222	30551	3055	27496	0	19	19	2055	25441	0.07
7	West Khasi Hills	4026	212	1659	48	5945	595	5350	0	15	15	1293	4057	0.29
	State Total (ha m)	**78820**	**2544**	**33425**	**491**	**115280**	**11528**	**103752**	**0**	**191**	**191**	**9637**	**94115**	**0.18**
	State Total (bcm)	**0.79**	**0.03**	**0.33**	**0.005**	**1.15**	**0.12**	**1.04**	**0.00**	**0.002**	**0.002**	**0.10**	**0.94**	**0.18**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

MIZORAM

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Aizawl	249	0	137	0	386	39	348	0	11	11	27	321	3.20
2	Champhai	509	0	301	0	810	81	729	0	5	5	9	720	0.66
3	Kolasib	413	0	259	0	673	67	605	0	4	4	9	597	0.66
4	Lawngtalai	536	0	276	0	813	81	731	0	4	4	14	717	0.49
5	Lunglei	381	0	172	0	553	55	497	0	6	6	10	487	1.22
6	Mamit	271	0	221	0	492	49	443	0	1	1	1	442	0.13
7	Saiha	205	0	119	0	324	32	291	0	3	3	5	286	0.88
8	Serchipp	202	0	137	0	339	34	305	0	3	3	4	301	0.88
	State Total (ha m)	**2766**	**0**	**1623**	**0**	**4388**	**439**	**3950**	**0**	**35**	**35**	**79**	**3871**	**0.90**
	State Total (bcm)	**0.03**	**0.00**	**0.02**	**0.00**	**0.04**	**0.004**	**0.04**	**0.00**	**0.0004**	**0.0004**	**0.0008**	**0.04**	**0.90**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

NAGALAND

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Kohima	14684	0	4486	0	19170	1917	17253	0	529	529	737	16516	3
2	Mokokchang	1642	0	749	0	2392	239	2153	0	71	71	201	1952	3
3	Mon	4915	0	928	0	5843	584	5259	0	78	78	361	4897	1
4	Phek	1178	0	369	0	1546	155	1392	0	45	45	135	1257	3
5	Tuensang	3584	0	1274	0	4858	486	4372	0	125	125	615	3757	3
6	Wokha	196	0	52	0	248	25	223	0	26	26	297	0	12
7	Zunebhoto	1403	0	426	0	1829	183	1646	0	49	49	180	1466	3
	State Total (ham)	**27601**	**0**	**8285**	**0**	**35886**	**3589**	**32297**	**0**	**923**	**923**	**2525**	**29846**	**3**
	State Total (bcm)	**0.28**	**0.00**	**0.08**	**0.00**	**0.36**	**0.04**	**0.32**	**0.00**	**0.009**	**0.009**	**0.03**	**0.30**	**3**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

ORISSA

Sl. No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Develeopment %
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domentic and Industrial uses	Total			
		Recharge from Rainfall	Recharge from other Sources	Recharge from Rainfall	Recharge from other Sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Angul	62341	8733	16204	7592	94870	8197	86673	11881	3279	15160	4475	70317	17
2	Balasore	64089	15049	12807	18359	110304	10422	99882	43018	4386	47404	6666	50198	47
3	Bargarh	34527	7231	10981	8488	61227	5151	56076	5105	2924	8029	3912	47059	14
4	Bhadrak	32877	5476	6851	11090	56294	5084	51210	20294	2878	23172	3829	27087	45
5	Bolangir	61503	2790	11698	2665	78656	7308	71348	9049	2913	11962	4255	58044	17
6	Boudh	18255	11637	3549	7282	40723	3749	36974	5350	820	6170	1359	30265	17
7	Cuttack	38885	35413	16336	25939	116573	11207	105366	14635	5006	19641	6747	83984	19
8	Deogarh	17194	2677	0	3309	23180	1956	21224	1859	566	2425	786	18579	11
9	Dhenkanal	42503	7516	15459	6721	72199	7007	65192	8040	2354	10394	3479	53673	16
10	Gajapati	17633	1815	10246	668	30362	2606	27756	4033	1029	5062	1247	22476	18
11	Ganjam	55862	34895	28714	4389	123860	10060	113800	22548	6433	28981	9394	81858	25
12	Jagatsinghpur	53038	32448	8198	59258	152942	13245	139697	18378	1971	20349	2984	118335	15
13	Jajpur	41289	3630	13835	6799	65553	6554	58999	17267	3874	21141	6128	35604	36
14	Jharsuguda	15681	1438	0	1554	18673	1407	17266	2733	1143	3876	1849	12684	22
15	Kalahandi	54142	20279	8619	16220	99260	9740	89520	9530	3230	12760	7043	72947	14
16	Kandhamal	44293	5057	16469	3511	69330	6933	62397	5159	1478	6637	2170	55068	11
17	Kendrapara	7678	12635	2717	12660	35690	3543	32147	8852	1395	10247	1844	21451	32
18	Keonjhar	84503	11389	24368	22928	143188	10904	132284	13977	3600	17577	4954	113353	13
19	Khurda	50670	13972	24658	10690	99990	9806	90184	7728	4736	12464	8542	73914	14
20	Koraput	65942	8954	10136	4749	89781	7646	82135	2116	3349	5465	4934	75085	7
21	Malkhangiri	17834	10616	2563	5276	36289	3409	32880	914	1065	1979	1281	30685	6
22	Mayurbhanj	84613	40694	25521	16120	166948	14882	152066	27553	5466	33019	7179	117334	22
23	Nawapara	23141	6105	6927	4637	40810	4080	36730	4702	1135	5837	1528	30500	16
24	Nayagarh	25244	6490	16211	9041	56986	5556	51430	6082	1898	7980	2418	42930	16
25	Nawarangpur	38345	1646	11006	977	51974	3873	48101	3145	2226	5371	3926	41030	11
26	Puri	43413	18487	21557	14433	97890	9539	88351	5946	3341	9287	4299	78106	11
27	Rayagada	41201	6990	17804	3429	69424	6541	62883	4699	3311	8010	4320	53864	13
28	Sambalpur	57572	6887	0	8253	72712	6375	66337	4432	2425	6857	2955	58950	10
29	Subarnapur	24064	2844	3184	2774	32866	2923	29943	2196	1167	3363	1827	25920	11
30	Sundargarh	62619	11827	11540	14075	100061	7984	92077	9680	4468	14148	5796	76601	15
	State Total (ham)	**1280951**	**355620**	**358158**	**313886**	**2308615**	**207687**	**2100928**	**300901**	**83866**	**384767**	**122126**	**1677901**	**18**
	State Total (bcm)	**12.81**	**3.56**	**3.58**	**3.14**	**23.09**	**2.08**	**21.01**	**3.01**	**0.84**	**3.85**	**1.22**	**16.78**	**18**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

PUNJAB

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Amritsar	62037	135195	16397	59838	273467	27347	246120	366699	6275	372974	9121	-129701	152
2	Bathinda	24719	34146	4405	29777	93047	7698	85349	78412	680	79093	712	6225	93
3	Faridkot	12967	26352	2158	15311	56787	5679	51109	54056	220	54277	266	-3214	106
4	Fatehgarh Sahib	17032	25685	4033	11657	58407	5841	52566	83552	1021	84573	1483	-32468	161
5	Ferozepur	42151	133096	8591	59921	243758	24376	219383	228769	2367	231136	3570	-12956	105
6	Gurdaspur	57068	89916	15423	43434	205840	20584	185256	193600	4097	197697	6072	-14416	107
7	Hoshiarpur	47318	23447	12687	16540	99992	8175	91817	74603	3536	78139	4575	12640	85
8	Jalandhar	36957	51176	8643	29006	125781	12578	113203	257084	30033	287117	31336	-175217	254
9	Kapurthala	21629	32582	6195	8656	69062	6906	62156	124929	1972	126901	2580	-65354	204
10	Ludhiana	54534	127006	10405	68185	260130	26013	234117	323274	14816	338089	17201	-106357	144
11	Mansa	18195	40822	3646	26693	89357	8936	80421	140412	30	140442	30	-60021	175
12	Moga	22407	74516	4287	34389	135599	13560	122039	214540	2128	216668	2636	-95137	178
13	Muktsar	21081	37882	3868	29827	92658	8330	84328	51990	160	52150	160	32178	62
14	Nawan Shahr	21968	26287	5164	20448	73866	7387	66480	114933	1208	116140	1517	-49971	175
15	Patiala	53986	84668	11600	30955	181208	18121	163087	264951	3602	268553	5236	-107099	165
16	Ropar	28561	15757	6670	14174	65161	6516	58645	47717	6743	54460	7881	3047	93
17	Sangrur	54990	132168	11351	55065	253573	25357	228216	414055	3688	417744	5266	-191106	183
	State Total (ham)	**597599**	**1090699**	**135520**	**553876**	**2377694**	**233402**	**2144292**	**3033577**	**82575**	**3116152**	**99641**	**-988927**	**145**
	State Total (bcm)	**5.98**	**10.91**	**1.36**	**5.54**	**23.78**	**2.33**	**21.44**	**30.34**	**0.83**	**31.16**	**1.00**	**-9.89**	**145**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

RAJASTHAN

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge uring non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Ajmer	29149	1348	0	4730	35227	3270	31957	34634	4605	39239	10260	-12937	123
2	Alwar	58560	4309	7553	16219	86641	7605	79036	107981	6410	114391	12082	-41027	145
3	Banswara	11220	2128	0	12997	26345	8876	17469	11339	1408	12747	2471	3659	73
4	Baran	40865	1549	0	6911	49325	3970	45355	33156	1985	35141	4215	7984	77
5	Barmer	26068	482	0	1945	28495	2850	25645	21597	5103	26700	8121	-4073	104
6	Bharatpur	36626	2753	1663	8507	49549	4186	45363	41218	4097	45315	7838	-3693	100
7	Bhilwara	33191	1953	0	8224	43368	4332	39036	42918	2369	45287	7590	-11472	116
8	Bikaner	23855	235	0	1025	25115	2407	22708	15644	5848	21492	8774	-1710	95
9	Bundi	21352	2333	0	10064	33749	7722	26027	25988	2222	28210	5606	-5567	108
10	Chittorgarh	32154	2285	0	9291	43730	4291	39439	54741	1436	56177	6563	-21865	142
11	Churu	14257	0	0	0	14257	1359	12898	7452	2207	9659	5779	-333	75
12	Dausa	23149	1466	332	3756	28703	2589	26114	30427	2618	33046	6026	-10339	127
13	Dholpur	19205	1189	0	4367	24761	2237	22524	22318	1684	24002	3578	-3372	107
14	Dungarpur	7866	1602	0	5433	14901	2108	12793	9907	704	10611	3575	-689	83
15	Ganganagar	2707	11279	649	20090	34725	3473	31252	13890	281	14171	702	16660	45
16	Hanumangarh	3591	5897	301	11541	21330	2133	19197	15699	502	16201	1107	2391	84
17	Jaipur	53818	2641	3309	7238	67006	6081	60925	91996	21689	113685	41029	-72100	187
18	Jaisalmer	6637	10	0	30	6677	668	6009	4105	1842	5947	2388	-484	99
19	Jalore	39213	1900	0	6494	47607	4374	43233	74938	3274	78212	7434	-39139	181
20	Jhalawar	38043	1680	0	6051	45774	2692	43082	43304	1998	45302	4621	-4843	105
21	Jhunjhunu	20686	568	2937	1726	25917	2404	23513	39933	7103	47036	13014	-29434	200
22	Jodhpur	36387	920	1605	2762	41674	4110	37564	62162	11981	74143	18246	-42844	197
23	Karauli	31059	1397	0	4088	36544	3442	33102	36391	4672	41063	7930	-11219	124
24	Kota	32069	3139	0	9888	45096	4450	40646	43338	3737	47075	7219	-9911	116
25	Nagaur	52322	1127	3964	3377	60790	5952	54838	77430	14697	92127	22889	-45481	168
26	Pali	27513	872	0	2867	31252	3036	28216	29578	2700	32278	5443	-6805	114
27	Rajsamand	8429	450	0	1577	10456	1041	9415	10546	884	11430	3641	-4772	121
28	Sawai Madhopur	35103	1444	0	3901	40448	3804	36644	34043	7352	41395	12158	-9557	113
29	Sikar	28655	512	3930	1536	34633	3431	31202	37211	4521	41732	8347	-14356	134
30	Sirohi	26343	989	0	2969	30301	3027	27274	26583	684	27267	1768	-1077	100
31	Tonk	33909	2611	0	5911	42431	3268	39163	31168	6582	37750	13173	-5178	96
32	Udaipur	22113	1427	0	6030	29570	2957	26613	28264	2020	30284	8385	-10036	114
	State Total (ham)	**876114**	**62495**	**26243**	**191545**	**1156397**	**118145**	**1038252**	**1159899**	**139215**	**1299115**	**271972**	**-393619**	**125**
	(bcm)	**8.76**	**0.62**	**0.26**	**1.92**	**11.56**	**1.18**	**10.38**	**11.60**	**1.39**	**12.99**	**2.72**	**-3.94**	**125**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

SIKKIM

Sl. No.	State	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Sikkim	-	-	-	-	7622	-	7622	-	1237	1237	2384	5238	16
	StateTotal (ham)	**-**	**-**	**-**	**-**	**7622**	**-**	**7622**	**-**	**1237**	**1237**	**2384**	**5238**	**16**
	StateTotal (bcm)	-	-	-	-	**0.08**	-	**0.08**	-	**0.01**	**0.01**	**0.02**	**0.05**	**16**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

TAMILNADU

Sl. No.	Districts	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Coimbatore	19062	28088	18826	22121	88097	8810	79287	78049	4061	82110	4220	-2982	104
2	Cuddalore	41047	100503	28540	3752	173843	17384	156458	107125	3717	110842	3872	45462	71
3	Dharmapuri	8671	29229	12483	4798	55180	5518	49662	71864	1905	73770	2000	-24202	149
4	Dindigul	17192	25273	16623	11381	70470	7047	63423	69746	2940	72686	3043	-9366	115
5	Erode	19201	57324	19295	14698	110519	11052	99467	65260	3891	69151	4025	30182	70
6	Kancheepuram	27513	84430	21875	4472	138291	13829	124461	84378	5493	89871	5812	34271	72
7	Kanyakumari	3734	16225	7286	1673	28918	2892	26026	1966	2251	4217	2330	21731	16
8	Karur	8841	15049	9289	2538	35717	3572	32145	20250	1765	22015	1833	10061	68
9	Krishnagiri	8103	15389	15263	3955	42710	4271	38439	33589	2310	35899	2425	2425	93
10	Madurai	10524	51399	11561	2599	76083	7608	68475	39499	3085	42583	3213	25763	62
11	Nagapattinam	6489	10571	888	2242	20191	2019	18172	21181	2027	23208	2094	-5103	128
12	Namakkal	8239	26952	12186	7458	54835	5483	49351	49070	2361	51431	2447	-2166	104
13	Nilgiri	2824	223	9837	48	12932	1293	11639	117	341	458	353	11169	4
14	Perambalur	23496	29256	20735	2627	76114	7611	68503	52448	2299	54747	2389	13666	80
15	Pudukkottai	24388	44304	26330	1221	96242	9624	86618	18532	2378	20909	2471	65615	24
16	Ramanathapuram	13966	13485	8680	1138	37268	3727	33541	11433	932	12365	964	21144	37
17	Salem	14785	38847	23309	18073	95014	9501	85513	122959	3866	126826	4007	-41454	148
18	Sivaganga	23988	40169	24448	1797	90403	9040	81363	10653	2152	12805	2220	68489	16
19	Thanjavur	28211	42057	4661	6855	81784	8178	73606	48608	4180	52788	4318	20679	72
20	Theni	5876	32424	5886	4725	48911	4891	44020	44496	1481	45977	1543	-2019	104
21	Tiruchchirapalli	15034	43135	14210	6476	78855	7885	70969	46254	3629	49882	3770	20946	70
22	Tirunelveli	24977	51204	18364	5176	99721	9972	89749	42668	3901	46569	4038	43043	52
23	Tiruvallur	32660	59754	25890	5525	123829	12383	111446	98169	7676	105846	7931	5346	95
24	Tiruvannamalai	25489	96120	30464	7890	159963	15996	143967	150547	3554	154101	3692	-10272	107
25	Tiruvarur	10576	18563	1728	5174	36041	3604	32437	24962	1840	26803	1901	5574	83
26	Tuticorin	5363	14576	2657	2430	25025	2503	22523	17886	1645	19530	1685	2952	87
27	Vellore	15526	67621	20725	5556	109427	10943	98485	133659	4115	137774	4280	-39454	140
28	Villupuram	31081	122018	28866	6496	188461	18846	169615	183403	5523	188926	5753	-19542	111
29	Virudhunagar	14335	22090	12152	3621	52197	5220	46978	28671	2580	31251	2690	15617	67
	State Total (ha m)	**491192**	**1196278**	**453056**	**166517**	**2307043**	**230704**	**2076338**	**1677441**	**87898**	**1765340**	**91319**	**307578**	**85**
	State Total (bcm)	**4.91**	**11.96**	**4.53**	**1.67**	**23.07**	**2.31**	**20.76**	**16.77**	**0.88**	**17.65**	**0.91**	**3.08**	**85**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
TRIPURA

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Dhalai	18834	0	17002	622	36457	3646	32812	762	1070	1832	1689	30361	6
2	North Tripura	18911	0	17872	547	37330	3732	33598	867	2135	3002	4639	28091	9
3	South Tripura	34053	0	24499	6730	65281	6528	58753	1578	2277	3855	3868	53308	7
4	West Tripura	37923	0	33006	9088	80016	8002	72014	5004	3366	8370	9965	57046	12
	State Total (ham)	**109720**	**0**	**92379**	**16986**	**219084**	**21908**	**197177**	**8211**	**8848**	**17059**	**20160**	**168805**	**9**
	State Total (bcm)	**1.10**	**0.00**	**0.92**	**0.17**	**2.19**	**0.22**	**1.97**	**0.08**	**0.09**	**0.17**	**0.20**	**1.69**	**9**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
UTTAR PRADESH

Sl. No.	District	Annual Replenishable Groundwater Resource					Natural Discharge during non-monsoon Season	Net Annual Ground water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Groundwater Availability for future irrigation	Stage of Groundwater Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic & Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Agra	55262	11431	8602	31897	107191	10719	96472	79901	5659	85560	8488	8083	89
2	Aligarh	50536	13569	9068	31604	104777	8499	96279	72859	4981	77840	7471	15948	81
3	Allahabad	66949	24997	0	27774	119721	10217	109503	67000	8689	75688	14230	28273	69
4	Ambedkar Nagar	48602	18886	10864	26967	105320	9986	95334	60805	4666	65470	7894	26635	69
5	Auraiya	30736	18806	2440	27453	79435	6396	73039	39645	2311	41955	3026	30368	57
6	Azamgah	87504	26438	16663	36419	167024	16276	150749	100065	8931	108995	15151	35533	72
7	Baghpat	17202	12023	3384	21684	54293	4664	49629	46336	2412	48749	3619	-326	98
8	Bahraich	88491	9055	23172	15707	136425	8896	127529	76306	5569	81875	8354	42870	64
9	Ballia	58149	16313	9492	22154	106109	9926	96183	61375	6246	67621	9887	24921	70
10	Balrampur	66053	7464	14235	15287	103039	8303	94737	50245	3355	53600	5033	39459	57
11	Banda	55593	21669	0	10834	88095	7592	80503	28145	1407	29552	2111	50247	37
12	Barabanki	70755	31466	15445	65979	183645	16285	167361	93615	7489	101104	11234	62511	60
13	Bareilly	59314	21686	778	30911	112688	9355	103333	84342	5837	90179	8755	10236	87
14	Basti	57951	8222	12512	16244	94929	7382	87547	65358	4612	69970	7484	14706	80
15	Bijnor	85689	13881	13225	27346	140141	10643	129498	96932	7132	104064	10698	21868	80
16	Budaun	88235	12308	0	22848	123391	7023	116368	113249	4107	117356	7394	-4275	101
17	Bulandshahar	54292	31777	7611	69436	163117	15106	148011	91898	5133	97031	7700	48413	66
18	Chandauli	31788	26905	0	17801	76494	6598	69896	25869	3325	29194	5547	38480	42
19	Chitrakut	26658	1726	0	2850	31233	2331	28903	10131	511	10642	766	18006	37
20	Deoria	49700	14609	10507	18534	93351	6995	86356	65268	6155	71423	10070	11018	83
21	Etah	63774	14639	11101	35911	125424	12542	112881	81879	6550	88430	9826	21177	78
22	Etawah	30473	17072	2517	27186	77248	6413	70835	27382	2307	29689	2965	40489	42
23	Faizabad	52013	24189	11745	32093	120040	9968	110072	68602	4699	73302	7795	33675	67
24	Farrukhabad	35019	11389	3249	18509	68166	3835	64331	45661	2299	47961	3104	15565	75
25	Fatehpur	69339	20555	6142	42878	138914	9538	129376	86372	4869	91241	6778	36226	71
26	Firozabad	34663	10397	6519	26131	77709	7173	70537	52724	4049	56773	6073	11739	80
27	Gautam Buddha Nagar	19107	11738	3031	29190	63066	3153	59913	29211	1582	30792	2110	28592	51
28	Ghaziabad	41529	17168	6080	42898	107674	9511	98164	66685	3808	70494	5129	26350	72
29	Ghazipur	63167	23962	12186	30791	130127	8531	121596	72585	6865	79451	11400	37610	65
30	Gonda	88409	13129	21685	27133	150357	8230	142127	105239	7472	112711	11208	25680	79
31	Gorakhpur	86817	9986	24316	22684	143803	11392	132411	84915	7179	92094	11652	35844	70
32	Hamirpur	51831	5654	7844	13077	78406	5527	72879	39789	1989	41779	2984	30106	57
33	Hardoi	96762	33448	4148	38240	172598	15073	157526	108792	4447	113239	8337	40397	72
34	Hathras	28738	11170	4472	27652	72031	7203	64828	59039	4113	63152	6170	-380	97
35	Jalaun	57440	12494	7059	19505	96497	7923	88574	27413	1371	28784	2056	59105	32
36	Jaunpur	78573	23354	14348	40444	156719	12993	143726	103021	8167	111189	13865	26840	77

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
UTTAR PRADESH

Sl. No.	District	Annual Replenishable Groundwater Resource					Natural Discharge during non-monsoon Season	Net Annual Ground water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Groundwater Availability for future irrigation	Stage of Groundwater Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic & Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
37	Jhansi	38078	6197	6221	20418	70914	4091	66824	26681	1936	28617	3230	36913	43
38	Jyotiba Phule Nagar	44178	12127	5531	23997	85833	5184	80649	67361	5043	72405	7565	5723	90
39	Kannauj	35074	10387	3346	29425	78232	7171	71061	43343	2676	46019	3718	24000	65
40	Kanpur Dehat	51749	13725	4026	26667	96167	7059	89108	40663	3340	44003	4141	44305	49
41	Kanpur Nagar	48148	17906	3454	31221	100728	8067	92662	58727	3666	62393	5306	28629	67
42	Kaushambi	28808	7696	1295	7358	45158	3313	41845	22502	2598	25100	4256	15087	60
43	Kushi Nagar	56822	34825	14206	27987	133840	9472	124368	48727	6571	55299	11530	64110	44
44	Lakhimpur Kheri	126011	38323	39362	90334	294031	21174	272856	152808	12225	165032	18337	101712	60
45	Lalitpur	40256	6410	4633	16515	67814	5539	62274	30747	1449	32196	2702	28825	52
46	Lucknow	36973	15701	1055	21544	75274	6741	68533	51182	4477	55659	6715	10636	81
47	Maharajganj	54583	27181	18204	25636	125605	10997	114607	48020	4546	52566	7537	59050	46
48	Mahoba	33327	3197	0	10523	47047	4705	42342	19980	999	20979	1498	20864	50
49	Mainpuri	39343	15596	7361	30377	92678	7566	85112	64689	4953	69643	7430	12993	82
50	Mathura	41125	18250	6951	41924	108249	10825	97424	74134	5931	80065	8896	14394	82
51	Maunath Bhanjan	29845	7346	5785	10571	53547	3790	49757	35983	4077	40060	6866	6908	81
52	Meerut	47818	25406	8281	48470	129977	9310	120668	74405	3950	78355	5925	40338	65
53	Mirzapur	38324	8387	0	7242	53952	4420	49532	19920	4212	24132	7361	22251	49
54	Moradabad	72989	16784	6800	28411	124985	9451	115534	101983	7270	109254	10905	2645	95
55	Muzaffar Nagar	70137	37053	14229	67062	188480	16254	172226	131715	9792	141506	14687	25824	82
56	Pilibhit	60464	21903	1566	27310	111243	9758	101485	77117	2392	79509	3854	20515	78
57	Pratapgarh	69802	19335	11672	28802	129612	9898	119714	63028	9466	72494	14129	42556	61
58	Raibareli	55603	27486	10976	35492	129557	11984	117573	81787	8572	90358	12782	23005	77
59	Rampur	65967	8834	570	23350	98721	9872	88849	63790	4620	68410	6930	18129	77
60	Saharanpur	65387	29460	14511	51731	161088	11822	149266	128435	8297	136732	12446	8385	92
61	Sant Kabir Nagar	35586	4074	8950	8456	57066	3177	53889	34982	3367	38349	5882	13024	71
62	Sant Ravidas Nagar	22259	7337	0	8530	38126	3073	35053	23715	2864	26580	4297	7041	76
63	Shahjahanpur	96074	23001	4010	30557	153641	11508	142134	109108	7894	117002	11973	21052	82
64	Shrawasti	30292	3319	6590	6167	46368	3831	42536	27192	1945	29136	2917	12428	68
65	Siddharth Nagar	74115	8220	18227	13614	114176	9684	104492	53740	4397	58137	6595	44157	56
66	Sitapur	102470	38387	8686	81426	230970	19195	211774	122415	9793	132208	14690	74670	62
67	Sonbhadra	24387	3668	0	1983	30038	2152	27886	9313	2644	11957	4748	13825	43
68	Sultanpur	74406	32958	15873	48071	171309	13360	157949	108312	6623	114934	10852	38785	73
69	Unnao	68555	32343	6832	56487	164217	14552	149665	97549	5063	102612	6828	45289	69
70	Varanasi	36581	8662	0	12133	57375	5738	51638	33487	4300	37786	6450	11701	73
	State Total (ham)	**3862644**	**1195084**	**563646**	**2013843**	**7635216**	**616926**	**7018290**	**4536196**	**342241**	**4878436**	**530337**	**1951757**	**70**
	State Total (bcm)	**38.63**	**11.95**	**5.64**	**20.14**	**76.35**	**6.17**	**70.18**	**45.36**	**3.42**	**48.78**	**5.30**	**19.52**	**70**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

UTTARANCHAL

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Dehradun	45862	1587	4523	2095	54068	2703	51364	2891	145	3036	1444	47029	6
2	Hardwar	35222	18574	7273	36397	97466	9747	87720	80513	4051	84564	3294	3912	96
3	Nainital	8648	300	0	540	9488	668	8820	2398	36	2435	241	6180	28
4	Udham Singh Nagar	47577	6429	0	11686	65692	3686	62006	48484	723	49207	2747	10775	79
	State Total (ha m)	**137310**	**26890**	**11796**	**50718**	**226714**	**16804**	**209910**	**134287**	**4955**	**139242**	**7726**	**67897**	**66**
	State Total (bcm)	**1.37**	**0.27**	**0.12**	**0.51**	**2.27**	**0.17**	**2.10**	**1.34**	**0.05**	**1.39**	**0.08**	**0.68**	**66**

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

WEST BENGAL

Sl. No.	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Bankura	104088	28873	29170	47022	209153	19227	189926	52097	4740	56837	6376	131453	30
2	Birbhum	71505	26062	19271	49876	166715	14103	152612	34887	4472	39359	6473	111252	26
3	Burdwan	178041	34645	49654	71528	333868	30573	303295	123679	8221	131900	12187	161807	43
4	Coochbehar	157742	3686	61238	9000	231666	23167	208500	31081	3702	34783	5006	172412	17
5	Dakshin-Dinajpur	55956	5321	18962	14964	95203	8083	87120	39045	2186	41231	3519	44555	47
6	Darjeeling	39332	565	10813	1465	52175	5218	46957	1700	807	2507	1719	43539	5
7	Howrah	19382	2883	5576	9193	37034	3703	33330	5096	1774	6870	2421	25813	21
8	Hugli	86202	18763	24882	39754	169601	16960	152640	53047	6046	59093	8419	91175	39
9	Jalpaiguri	198706	1518	59567	3830	263621	26362	237259	6635	3700	10335	5957	224667	4
10	Malda	86128	6587	25363	22260	140338	13210	127128	67237	5142	72379	8278	51613	57
11	Medinipur(E)	54616	2453	15258	10273	82601	8260	74341	26034	2847	28882	3965	44342	39
12	Medinipur(W)	231555	23133	69527	57592	381808	37362	344447	116340	7507	123847	10453	217653	36
13	Murshidabad	138378	21043	41382	51461	252264	25226	227038	191893	8944	200837	18303	16842	88
14	N-24 Paraganas	95287	8980	26958	26416	157640	15764	141876	94066	6939	101005	10859	36951	71
15	Nadia	111789	16817	42127	46501	217234	21723	195511	166677	6266	172943	9320	19513	88
16	Puruliya	47629	10640	12742	5734	76745	6598	70147	6000	3666	9666	4940	59207	14
17	Uttar Dinajpur	110836	6669	31624	19062	168191	14505	153686	68657	3608	72265	5808	79221	47
	State Total (ha m)	**1787173**	**218639**	**544113**	**485932**	**3035857**	**290044**	**2745813**	**1084172**	**80566**	**1164738**	**124005**	**1532015**	**42**
	State Total (bcm)	**17.87**	**2.19**	**5.44**	**4.86**	**30.36**	**2.90**	**27.46**	**10.84**	**0.81**	**11.65**	**1.24**	**15.32**	**42**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT
ANDAMAN & NICOBAR ISLANDS

Sl. No.	Island	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Andaman & Nicobar Islands	-	-	-	-	32627	548	32080	0	1198	1198	791	30277	4
	Total UT (in ha m)	-	-	-	-	**32627**	**548**	**32080**	**0**	**1198**	**1198**	**791**	**30277**	**4**
	Total UT (in bcm)	-	-	-	-	**0.33**	**0.005**	**0.32**	**0.00**	**0.01**	**0.01**	**0.008**	**0.303**	**4**

GROUND WATER RESOURCE AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

CHANDIGARH

Sl. No.	Union Territory	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Chandigarh	1580	66	474	135	2255	225	2030	0	0	0	0	2030	0
	Total UT (ha m)	**1580**	**66**	**474**	**135**	**2255**	**225**	**2030**	**0**	**0**	**0**	**0**	**2030**	**0**
	Total UT (bcm)	**0.016**	**0.001**	**0.005**	**0.001**	**0.023**	**0.002**	**0.020**	**0.000**	**0.000**	**0.000**	**0.000**	**0.020**	**0**

GROUND WATER RESOURCE AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

DADRA & NAGAR HAVELI

Sl. No.	Union Territory	Annual Replenishable Ground Water Ressource			Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Recharge from rainfall	Recharge from other sources	Total			Irrigation	Domestic and industrial uses	Total			
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Dadra & Nagar Haveli	5869	472	6341	317	6024	111	749	861	783	5130	14
	Total UT (ha m)	**5869**	**472**	**6341**	**317**	**6024**	**111**	**749**	**861**	**783**	**5130**	**14**
	Total UT (bcm)	**0.059**	**0.005**	**0.063**	**0.003**	**0.060**	**0.001**	**0.007**	**0.009**	**0.008**	**0.051**	**14**

GROUND WATER RESOURCE AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

DAMAN & DIU

Sl. No.	Union Territory	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Diu	240	14	0	43	297	15	282	326	104	430	164	-208	152
2	Daman	332	142	0	86	560	28	532	338	107	445	166	28	84
	Total UT (ha m)	**572**	**156**	**0**	**129**	**857**	**43**	**814**	**664**	**211**	**875**	**330**	**-180**	**107**
	Total UT (bcm)	**0.006**	**0.002**	**0.000**	**0.001**	**0.009**	**0.0004**	**0.008**	**0.007**	**0.002**	**0.009**	**0.003**	**-0.002**	**107**

GROUND WATER RESOURCE AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

LAKSHADWEEP

Sl. No.	Island	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season *	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Agatti	Water Resource computed using Climatic Water Balance Study				121	87	34	-	25	25	-	-	74
2	Amini					122	85	37	-	27	27	-	-	73
3	Androth					235	165	70	-	40	40	-	-	57
4	Chetlat					47	33	14	-	8	8	-	-	57
5	Kadmat					146	103	43	-	19	19	-	-	44
6	Kalpeni					108	77	31	-	16	16	-	-	52
7	Kiltan					75	53	22	-	13	13	-	-	59
8	Kavaratti					157	114	43	-	37	37	-	-	86
9	Minicoy					197	141	56	-	35	35	-	-	63
	Total UT (ham)					**1208**	**858**	**350**	**0**	**220**	**220**	**-**	**-**	**63**
	Total UT (bcm)					**0.012**	**0.009**	**0.004**	**0.000**	**0.002**	**0.002**	**-**	**-**	**63**

★ *Includes ET loss from Trees for 8 non-monsoon months, Water loss due to outflow to sea, Buffer zone for reserve during delayed or lesser monsoon period*

GROUND WATER RESOURCE AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

PONDICHERRY

Sl. No.	Region	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon Season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Karaikal	1537	4334	172	1114	7157	716	6441	830	372	1202	334	5277	19
2	Mahe	229	0	31	0	260	12	248	0	138	138	168	80	56
3	Pondicherry	3890	2336	537	1792	8555	855	7699	11300	2469	13769	2563	-6164	179
4	Yanam	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total UT (ha m)	**5656**	**6669**	**740**	**2907**	**15972**	**1583**	**14388**	**12130**	**2979**	**15109**	**3065**	**-807**	**105**
	State UT (bcm)	**0.057**	**0.067**	**0.007**	**0.029**	**0.160**	**0.016**	**0.144**	**0.121**	**0.030**	**0.151**	**0.031**	**-0.008**	**105**

Note - Ground Water in Yanam is saline.

ANNEXURE - III

CATEGORIZATION OF BLOCKS/ MANDALS/TALUKAS IN INDIA

(AS ON MARCH, 2004)

Annexure-III

CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKAS IN INDIA

Sl. No.	States / Union Territories	Total No. of Assessed Units	Safe		Semi-critical		Critical		Over-exploited		Remarks
			Nos.	%	Nos.	%	Nos.	%	Nos.	%	
	States										
1	Andhra Pradesh	1231	760	62	175	14	77	6	219	18	-
2	Arunachal Pradesh	13	13	100	0	0	0	0	0	0	-
3	Assam	23	23	100	0	0	0	0	0	0	-
4	Bihar	515	515	100	0	0	0	0	0	0	-
5	Chattisgarh	146	138	95	8	5	0	0	0	0	-
6	Delhi	9	2	22	0	0	0	0	7	78	-
7	Goa	11	11	100	0	0	0	0	0	0	-
8	Gujarat	223	97	43	69	31	12	5	31	14	Rest 14 talukas- Saline
9	Haryana	113	42	37	5	4	11	10	55	49	-
10	Himachal Pradesh	5	5	100	0	0	0	0	0	0	-
11	Jammu & Kashmir	8	8	100	0	0	0	0	0	0	-
12	Jharkhand	208	208	100	0	0	0	0	0	0	-
13	Karnataka	175	93	53	14	8	3	2	65	37	-
14	Kerala	151	101	67	30	20	15	10	5	3	-
15	Madhya Pradesh	312	264	85	19	6	5	2	24	8	-
16	Maharashtra	318	287	90	23	7	1	0	7	2	-
17	Manipur	7	7	100	0	0	0	0	0	0	-
18	Meghalaya	7	7	100	0	0	0	0	0	0	-
19	Mizoram	22	22	100	0	0	0	0	0	0	-
20	Nagaland	7	7	100	0	0	0	0	0	0	-
21	Orissa	314	308	98	0	0	0	0	0	0	Rest 6 blocks- Saline
22	Punjab	137	25	18	4	3	5	4	103	75	-
23	Rajasthan	237	32	14	14	6	50	21	140	59	Rest 1 block- Saline
24	Sikkim	1	1	100	0	0	0	0	0	0	-
25	Tamil Nadu	385	145	38	57	15	33	9	142	37	Rest 8 blocks- Saline
26	Tripura	38	38	100	0	0	0	0	0	0	-
27	Uttar Pradesh	803	665	83	88	11	13	2	37	5	-
28	Uttaranchal	17	12	71	3	18	0	0	2	12	-
29	West Bengal	269	231	86	37	14	1	0	0	0	-
	Total States	**5705**	**4067**	**71**	**546**	**10**	**226**	**4**	**837**	**15**	**-**
	Union Territories										
1	Andaman & Nicobar	1	1	100	0	0	0	0	0	0	-
2	Chandigarh	1	1	100	0	0	0	0	0	0	-
3	Dadra & Nagar Haveli	1	1	100	0	0	0	0	0	0	-
4	Daman & Diu	2	0	0	1	50	0	0	1	50	-
5	Lakshdweep	9	6	67	3	33	0	0	0	0	-
6	Pondicherry	4	2	50	0	0	0	0	1	25	Rest 1 Region- Saline
	Total Uts	**18**	**11**	**61**	**4**	**22**	**0**	**0**	**2**	**11**	**-**
	Grand Total	**5723**	**4078**	**71**	**550**	**10**	**226**	**4**	**839**	**15**	**-**

Note

Blocks- Bihar, Chhattisgarh, Haryana, Jharkhand, Kerala, Madhya Pradesh, Manipur, Mizoram, Orissa, Punjab, Rajasthan, Tamilnadu, Tripura, Uttar Pradesh, Uttaranchal , West Bengal

Mandals (command/ non-command) - Andhra Pradesh

Talukas - Goa, Gujarat, Karnataka, Maharashtra

Districts - Arunachal Pradesh, Assam, Delhi, Meghalaya, Nagaland

Districts (Valley) - Himachal Pradesh, Jammu & Kashmir

State - Sikkim

Islands - Lakshdweep

UT - Andaman & Nicobar, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Pondicherry

ANNEXURE - IV

STATE-WISE CATEGORIZATION OF BLOCKS/MANDALS/ TALUKAS

(AS ON MARCH, 2004)

CATEGORISATION OF MANDALS IN ANDHRA PRADESH

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
1	**Adilabad**	1 Boath (NC) 2 Lokeshwaram (NC)	- -	1 Nirmal (NC)
2	**Anantapur**	1 Dharmavaram 2 Guntakal(NC) 3 Kanaganipalli 4 Kundurpi 5 Lepakshi 6 Madakasira 7 Peddavaduguru(NC) 8 Ramagiri 9 Roddam	1 B.K.Samudram(NC) 2 Bathalapalli 3 Kothacheruvu 4 N.P.Kunta 5 Nallamada 6 O.D. Cheruvu 7 Pamidi(NC) 8 Raptadu 9 Singanamala(NC) 10 Somandepalli 11 Tadimarri 12 Uravakonda(NC)	1 Agali 2 Ammarapuram 3 Anantapur(NC) 4 Beluguppa 5 Bukkapatnam 6 Chilmathur 7 D. Hirehal(NC) 8 Gandlapenta 9 Garladinne(NC) 10 Gorantla 11 Gudibanda 12 Gummagatta(NC) 13 Hindupur 14 Kadiri 15 Mudigubba 16 Nallacheruvu 17 Narpala(NC) 18 Parigi 19 Peddapappuru 20 Putlur(NC) 21 Puttaparthy 22 Rayadurg(NC) 23 Rolla 24 Settur 25 Tadipatri 26 Talapula 27 Yadiki 28 Yellanur
3	**Chittoor**	1 Gudipala 2 Gurramkonda 3 Madanapalle 4 Palamaner 5 Peddapanjani 6 Pichatur 7 Piler 8 Punganur 9 Santhipuram 10 Srikalahasti 11 Yerpedu	1 Chowdepalle 2 G.D.Nellore 3 Irala 4 Narayanavanam 5 Pulicherla 6 Puttur 7 Ramakuppam 8 V.Kota 9 Yadamarri	1 Baireddy Palli 2 Chittoor 3 Gangavaram 4 Karvetinagar 5 Nagari 6 Nindra 7 Pakala 8 Palasamudram 9 Penumur 10 Puthalpattu 11 Ramasamudram 12 R.C.Puram 13 S.R.Puram. 14 Sodam 15 Thavanampalle 16 Tirupati - R 17 Vedurukuppam 18 Vijayapuram
4	**Kadapa**	1 Atloor 2 B.Mattam 3 Chakrayapeta 4 Chintakommadinne 5 Galiveedu 6 Kalasapadu	1 Badvel 2 Duvvur (NC) 3 Kamalapuram (NC) 4 Mydukur (NC)	1 B.Koduru 2 Chennuru 3 Chinnamandem 4 Chitvel 5 Kamalapuram (C) 6 Koduru

CATEGORISATION OF MANDALS IN ANDHRA PRADESH

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
		7 Kasinayana		7 Lingala
		8 Kondapuram		8 Mydukur (C)
		9 Muddanur		9 Obulavaripalli
		10 Nandaluru		10 Pendlimarri
		11 Penagaluru		11 Porumamilla
		12 Rajampeta		12 Proddatur (NC)
		13 Sidhout		13 Pulivendula
		14 T.Sundupalli		14 Pullampeta
		15 Vallur (NC)		15 Simhadripuram
		16 Vempalli		16 Veeraballi
		17 VNPalli		17 Vemula
		18 Vontimitta		
5	**East Godavari**	1 Prathipadu(C)	- -	1 Thondangi(NC)
		2 Peddapuram(C)		2 Seethanagaram(NC)
		3 Pithapuram(NC)		3 Korukonda(NC)
		4 Samalkot(NC)		4 Peddapuram(NC)
		5 Rajahmundry(R)(C)		5 Rangampeta
		6 Mandapeta(NC)		6 Gandepalli
				7 Rajanagaram
				8 Rajahmundry(R)(NC)
				9 Kadiyam(NC)
				10 Anaparthi(NC)
				11 Biccavole(NC)
6	**Guntur**	- -	- -	1 Bollapalli (NC)
				2 Rentachintala (NC)
7	**Karimnagar**	1 Chigurumamidi	1 Bheemadevarpally	1 Bejjanki
		2 Dharmaram(NC)	2 Chendurthy	2 Boinapally
		3 Jagityal(NC)	3 Gambhiraopet	3 Choppadandi(NC)
		4 Keshavapatanam(NC)	4 Gollapally(NC)	4 Dharmapuri(NC)
		5 Sricilla	5 Husnabad(NC)	5 Eligedu(NC)
		6 Thimmapur	6 Illanthakunta	6 Elkatherthy(NC)
		7 Veenavanka(NC)	7 Kamalapur(NC)	7 Gangadhara
			8 Koheda	8 Huzurabad(NC)
			9 Mallial(NC)	9 Ibrahimpatanam(NC)
			10 Manakondur(NC)	10 Karimnagar(NC)
			11 Odela(NC)	11 Kathalapur
			12 Velgatoor(NC)	12 Komidiyal
			13 Yellareddypally	13 Konaraopet
				14 Korutla(NC)
				15 Mallapur(NC)
				16 Medipally(NC)
				17 Metpally(NC)
				18 Mustabad
				19 Ramadugu
				20 Saidapur
				21 Sulthanabad(NC)
				22 Vemulawada
8	**Khammam**	1 Kusumanchi(NC)	- -	1 Khammam Rural(NC)
				2 Tirumalayapalem
				3 Enkur(NC)

CATEGORISATION OF MANDALS IN ANDHRA PRADESH

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
9	**Krishna**	1 Ibrahimpatnam(NC) 2 Vijayawada (Rural)(NC) 3 Chatrai(NC) 4 Bapulapadu(NC)	1 Nuzvid 2 Musunuru	- -
10	**Kurnool**	1 Kolimigundla 2 Kosigi (NC) 3 Miduthuru 4 Rudravaram	1 Kodumuru (NC)	1 Allagadda (NC) 2 B.Atmakuru (NC) 3 Banaganapalli 4 Bethamcherla 5 Chagalamarri (NC) 6 Gadivemula (NC) 7 Jupadu Bunglow (NC) 8 Kowthalam (NC) 9 Mahanandi 10 Nandyala (NC) 11 Orvakal 12 Sirivella (NC)
11	**Medak**	1 Andole 2 Jharasangam 3 Kulcharam 4 Nyalkal 5 Papannapet 6 Patancheru 7 Pulkal 8 Sadasivpet 9 Sangareddy 10 Shankarampet-R 11 Shivampet 12 Tekmal 13 Zaheerabad	1 Chinnakodur 2 Jagadevpur 3 Jinnaram 4 Kondapur 5 Kowdipally 6 Medak 7 Narsapur 8 Wargal 9 Yeldurthy	1 Chegunta 2 Doulthabad 3 Dubbak 4 Gajwel 5 Hathnura 6 Kondapak 7 Mirdoddi 8 Mulugu 9 Nanganur 10 Ramayampet 11 Siddipet 12 Toopran
12	**Mehaboobnagar**	1 Addakal 2 Atmakur(NC) 3 Bijinepally 4 Devarkadra 5 Dhanwada 6 Doulathabad 7 Hanwada 8 Jadcherla 9 Kodair 10 Koilkonda 11 Maddur 12 Madgul 13 Mahboobnagar 14 Makthal (NC) 15 Nagarkurnool 16 Narayanpet 17 Narva (NC) 18 Pangal (NC) 19 Pebbair(NC) 20 Tadoor 21 Thimmajipet 22 Vangoor 23 Wanaparthy	1 C.C.Kunta 2 Dharoor (NC) 3 Ghanpur 4 Gopalpet 5 Kondurg 6 Kothakota (NC) 7 Uppununthala	1 Amangal 2 Balanagar 3 Boothpur 4 Kalwakurthy 5 Keshampet 6 Kosgi 7 Kothur 8 Makthal (C) 9 Midjil 10 Narva (C) 11 Shadnagar 12 Talkondapally 13 Veldanda

CATEGORISATION OF MANDALS IN ANDHRA PRADESH

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
13	**Nalgonda**	1 Alair 2 Atmakur (M) 3 B. Ramaram 4 Bhongir 5 Bibinagar 6 Chandampet 7 Chinthapally 8 Chivemla 9 Choutuppal 10 Devarakonda 11 Gundala 12 Gundlapally 13 Kethepalli 14 Mothey 15 Munagala (NC) 16 Munugode 17 Nakerakal 18 Nalgonda 19 Nampally 20 Narketpally 21 Nidmanoor (NC) 22 Nuthankal 23 P A Pally 24 S.Narayanpur 25 Thipparthy 26 Thungathurthy 27 Thurkapally	1 B.Pochampally 2 Chandur 3 Kanagal 4 Mothkur 5 Ramannapet	1 Chityal 2 Garidepally (NC) 3 Rajapet 4 Yadagirigutta
14	**Nellore**	1 Buchireddipalem 2 Dakkili 3 Naidupeta 4 Nellore rural (NC) 5 Podalakur (NC) 6 T.P.Gudur 7 Venkatagiri 8 Vinjamur	1 Anantasagaram (NC) 2 Gudur	1 Indukurupeta -Nellore 2 Kovur 3 Venkatachalam (NC)
15	**Nizamabad**	1 Balkonda (C) 2 Birkur (C) 3 Bodhan (C) 4 Lingampet 5 Madnoor 6 Morthad (C) 7 Navipet (NC) 8 Nizamsagar (NC) 9 Pitlam 10 Renjal (NC) 11 Sadashivnagar 12 Yedpally (NC)	1 Kammarpally 2 Nagireddypet 3 Nandipet (C) 4 Sirikonda	1 Armoor (C) 2 Balkonda (NC) 3 Banswada (NC) 4 Bheemgal 5 Bhiknoor 6 Bichkunda 7 Dharpally 8 Dichpally (NC) 9 Domakonda 10 Jakranpally 11 Kamareddy 12 Kotagiri (NC) 13 Makloor (NC) 14 Morthad (NC) 15 Nizamabad (NC) 16 Vailpoor (NC) 17 Varni (C) 18 Yedpally (C)

CATEGORISATION OF MANDALS IN ANDHRA PRADESH

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
16	**Prakasam**	1 Arthaveedu 2 Cheemakurthy 3 J.Panguluru (NC) 4 Kanigiri 5 Komarolu 6 Tarlupadu 7 Veligandla 8 Yaddanapudi (C)	1 Cumbum	1 Bestavaripeta 2 Dornala 3 Giddaluru 4 Markapuram 5 Martur 6 Peddaraveedu 7 Pullacheruvu (NC) 8 Racherla 9 Talluru 10 Tripurantakam 11 Yerragondapalem
17	**Ranga Reddy**	1 Mominpet 2 Nawabpet 3 Hayathnagar 4 Saroornagar 5 Dharur 6 Peddamul 7 Kulakcherla 8 Yacharam	1 Gandeed 2 Pargi	1 Shankarpally 2 Medchal 3 Shamirpet 4 Keesara 5 Moinabad 6 Doma 7 Shabad 8 Shamshabad 9 Maheshwaram 10 Kandukur 11 Ibrahimpatnam 12 Manchal
18	**Vijayanagaram**	1 Cheepurupalli 2 Pusapatirega 3 Bhogapuram(NC)	- -	- -
19	**Vishakhapatnam**	1 Munagapaka	- -	- -
20	**Warangal**	1 Geesugonda (C) 2 Mahabubabad(NC) 3 Mogullapally 4 Nekkonda 5 Sangem (NC) 6 Wardhannapet (C)	1 Geesugonda (NC) 2 Narsampet(NC)	1 Bachanapet 2 Cherial 3 Devaruppla 4 Dharmasagarl 5 Duggondi(NC) 6 Jangoan 7 Kodakandla 8 Lingala ghanpur 9 Maddur 10 Maripeda(NC) 11 Narmetta 12 Narsimhulapet(NC) 13 Nellikudur(NC) 14 Palakurthy 15 Parvathagiri(NC) 16 Raghunathpally 17 Rayaparthy 18 Regonda(NC) 19 St Ghanpur 20 Thorrur 21 Wardhannapet (NC) 22 Zaffergadh

CATEGORISATION OF MANDALS IN ANDHRA PRADESH

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
21	**West Godavari**	1 Chagallu 2 KamavarapuKota 3 Tadepalligudem (NC) 4 Tallapudi	1 Chintalapudi 2 Devarapalli 3 Dwarakatirumala 4 Nallajarla	1 Denduluru (NC) 2 Eluru (NC) 3 Gopalapuram 4 Jangareddigudem 5 Kovvuru 6 Koyyalagudem 7 Lingapalem 8 Nidadavolu 9 Pedavegi 10 T.Narsapuram

ABSTRACT

Total no. of Assessed Units (Mandal - command/non-command)		Semi-critical		Critical		Over-exploited	
Full	983	Full	129	Full	56	Full	151
Part	248	Part	46	Part	21	Part	68
	1231		**175**		**77**		**219**

Note In cases where categorization of command and non-command areas within the same Mandal differ, separate categorization [for command (C)] and for non-command (NC)] have been indicated.

CATEGORIZATION OF BLOCKS IN CHHATTISGARH

Sl. No.	Districts	Semi-critical				
1	Bilaspur	1 Belha	-	-	-	-
2	Dhamtari	1 Dhamtari	-	-	-	-
3	Durg	1 Balod 2 Dhamdha 3 Durg 4 Gurur 5 Patan 6 Saja	-	-	-	-

ABSTRACT

No. of Assessed Blocks	Semi-critical	Critical	Over-exploited
146	8	-	-

CATEGORIZATION OF DISTRICTS IN NCT DELHI

Sl. No.	District	Semi-critical		Critical		Over-exploited
1	East	-	-	-	-	1 East
2	New Delhi	-	-	-	-	1 New Delhi
3	North East	-	-	-	-	1 North East
4	North West	-	-	-	-	1 North West
5	South	-	-	-	-	1 South
6	South West	-	-	-	-	1 South West
7	West	-	-	-	-	1 West

ABSTRACT			
No. of Assessed Districts	**Semi-critical**	**Critical**	**Over-exploited**
9	**-**	**-**	**7**

CATEGORISATION OF TALUKAS IN GUJARAT

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
1	Ahmedabad	1	Barvala	1	Detroj-Rampura	1	City-Dascroi
		2	Bavla	2	Sanand	2	Dholka
		3	Mandal				
		4	Viramgam				
2	Amreli	1	Amreli	-	-	-	-
		2	Babra				
		3	Bagasara				
		4	Khambha				
		5	Lathi				
		6	Savarkundla				
3	Anand	1	Khambhat	-	-	-	-
4	Banaskantha	1	Danta	1	Amirgadh	1	Deodar
				2	Deesa	2	Dhanera
						3	Kankrej
						4	Palanpur
						5	Tharad
						6	Vadgam
5	Bharuch	1	Amod	-	-	-	-
		2	Jhaghadiya				
6	Bhavnagar	1	Botad	1	Bhavnagar	-	-
		2	Ghogha				
		3	Sihor				
		4	Talaja				
7	Dohad	1	Devgadh Baria	-	-	-	-
		2	Dhanpur				
8	Gandhinagar	-	-	-	-	1	Dehgam
						2	Gandhinagar
						3	Kalol
						4	Mansa
9	Jamnagar	1	Jamjhodhpur	-	-	-	-
		2	Jodiya				
		3	Kalawad				
		4	Okhamandal				
10	Junagadh	1	Bhesan	1	Manavadar	1	Mangrol
		2	Junagadh	2	Vanthali		
		3	Keshod				
		4	Kodinar				
		5	Mendarda				
		6	Sutrapada				

CATEGORISATION OF TALUKAS IN GUJARAT

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
		7	Veraval				
		8	Visavadar				
11	Kachchh	1	Abdasa	1	Rapar	1	Anjar
		2	Bhuj			2	Bhachau
		3	Mundra			3	Mandvi
		4	Nakhatrana				
12	Kheda	1	Balasinor	1	Mehmdabad	-	-
		2	Kapadwanj				
		3	Kathlal				
13	Mahesana	-	-	1	Vadnagar	1	Becharaji
						2	Kadi
						3	Kheralu
						4	Mahesana
						5	Satlasana
						6	Unjha
						7	Vijapur
						8	Visnagar
14	Panchmahals	1	Ghoghamba	-	-	-	-
		2	Kalol				
		3	Khanpur				
		4	Lunawada				
		5	Morava Hadaf				
		6	Santrampur				
15	Patan	-	-	-	-	1	Chanasma
						2	Patan
						3	Sidhpur
16	Porbandar	1	Kutiyana	-	-	1	Porbandar
		2	Ranavav				
17	Rajkot	1	Dhoraji	1	Gondal	-	-
		2	Jam Kandorana				
		3	Jasdan				
		4	Lodhika				
		5	Morbi				
		6	Paddhari				
		7	Rajkot				
		8	Upleta				
18	Sabarkantha	1	Bayad	1	Modasa	1	Idar
		2	Bhiloda			2	Vadali
		3	Dhansura				
		4	Himatnagar				
		5	Meghraj				

CATEGORISATION OF TALUKAS IN GUJARAT

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
		6	Prantij				
		7	Talod				
		8	Vijaynagar				
19	Surat	1	Choriyasi	-	-	-	-
20	Surendranagar	1	Chuda	-	-	-	-
		2	Dhrangadhra				
		3	Wadhwan				
21	Vadodara	1	Karjan	-	-	1	Vadodara
		2	Sinor				

ABSTRACT			
No. of Assessed Talukas	**Semi-critical**	**Critical**	**Over-exploited**
223	**69**	**12**	**31**

CATEGORIZATION OF BLOCKS IN HARYANA

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
1	Ambala	-	-	1	Barara	-	-
2	Bhiwani	-	-	-	-	1	Badra
						2	Dadri-I
						3	Dadri-II
						4	Kairu
						5	Loharu
3	Fatehabad	-	-	-	-	1	Fatehabad
						2	Ratia
						3	Tohana
4	Faridabad	-	-	1	Faridabad	-	-
				2	Hassanpur		
5	Gurgaon	1	Ferozepur Zhirka	1	Nagina	1	Farukhnagar
						2	Gurgaon
						3	Pataudi
						4	Sohna
						5	Tauru
6	Hissar	-	-	-	-	1	Narnaund
7	Jhajjar	-	-	1	Bahadurgarh	1	Jhajjar
						2	Salhawas
8	Jind	-	-	1	Alewa	1	Safidon
				2	Narwana		
9	Kaithal	-	-	-	-	1	Gulha
						2	Kaithal
						3	Kalyat
						4	Pundri
						5	Rajaund

CATEGORIZATION OF BLOCKS IN HARYANA

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
10	Karnal	-	-	-	-	1	Assandh
						2	Gharaunda
						3	Indri
						4	Karnal
						5	Nilokheri
						6	Nissang
11	Kurukshetra	-	-	-	-	1	Babain
						2	Ladwa
						3	Pehowa
						4	Shahbad
						5	Thaneswar
12	Mahendragarh	-	-	1	Ateli	1	Kanina
				2	Mahendragarh	2	Nangal Chaudary
				3	Narnaul		
13	Panipat	-	-	-	-	1	Bapoli
						2	Israna
						3	Madlauda
						4	Panipat
						5	Samalkha
14	Panchkula	1	Raipur Rani	-	-	-	-
15	Rewari	1	Nahar	-	-	1	Bawal
						2	Jatusana
						3	Khol
						4	Rewari
16	Rohtak	-	-	-	-	1	Sampla

CATEGORIZATION OF BLOCKS IN HARYANA

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
17	Sirsa	-	-	1	Baraguda	1 2 3	Ellenabad Rania Sirsa
18	Sonepat	-	-	-	-	1 2 3 4	Ganaur Gohana Rai Sonepat
19	Yamunanagar	1 2	Chachrauli Sadhuara	-	-	1 2 3	Jagadhri Mustafabad Radour

ABSTRACT

No. of Assessed Blocks	Semi-critical	Critical	Over-exploited
113	**5**	**11**	**55**

CATEGORIZATION OF TALUKAS IN KARNATAKA

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
1	**Bagalkote**	-	-	-	-	1	Badami
						2	Bagalkote(P)
						3	Hungund(P)
						4	Jamkhandi(P)
						5	Mudhol(P)
2	**Bangalore(R)**	-	-	-	-	1	Channapatna(P)
						2	Devanhalli
						3	Dod Ballapur
						4	Hoskote
						5	Kanakapura(P)
						6	Magadi(P)
						7	Nelamangala(P)
						8	Ramanagaram
3	**Bangalore(U)**	-	-	-	-	1	Anekal
						2	Bangalore (N)
						3	Bangalore(S)
4	**Belgaum**	-	-	-	-	1	Athni(P)
						2	Bailahongal(P)
						3	Chikodi(P)
						4	Gokak(P)
						5	Ramdurg
						6	Raybag(P)
						7	Saundatti(P)
5	**Bellary**	1	H.B.Halli(P-I)	-	-	1	Bellary(P)
		2	Kudligi(P)			2	Hadagalli
6	**Bijapur**	1	B.Bagevadi(P)	-	-	1	Muddebihal(P)
		2	Indi(P-I)			2	Sindgi(P)
7	**Chamrajanagar**	1	Gundlupet(P)	-	-	1	Kollegal(P)
8	**Chikmagalur**	1	Kadur(P)	-	-	-	-
9	**Chitradurga**	1	Challakere(P)	-	-	1	Chitradurga(P)

CATEGORIZATION OF TALUKAS IN KARNATAKA

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
		2	Hiriyur(P)			2	Holalkere(P)
10	**Davangere**	1	Honnali(P)	-	-	1	Channagiri(P)
						2	Davangere
						3	H.P Halli(P)
						4	Harihar(P)
						5	Jagalur(P)
11	**Gadag**	1	Mundargi(P)	-	-	1	Gadag(P)
						2	Nargund(P)
						3	Ron
12	**Hassan**	1	Arsikere(P)	-	-	1	C.R. Patna(P)
						2	Hassan(P)
						3	Holenarsipur(P)
13	**Haveri**	-	-	1	Hirekerur(P)	1	Byadgi(P)
						2	Haveri(P)
						3	Ranibennur(P)
14	**Kolar**	-	-	-	-	1	Bagepalli(P-I)
						2	Bangarapet
						3	Chik Ballapur
						4	Chintamani
						5	Gauribidanur
						6	Gudibanda
						7	Kolar
						8	Malur
						9	Mulbagal
						10	Sidlaghhatta
						11	Srinivasapura
15	**Koppal**	-	-	-	-	1	Gangawati(P)
						2	Koppal(P)
						3	Yelbarga(P)
16	**Mandya**	-	-	1	Malavalli(P)	1	K.R.Pet(P)
17	**Mysore**	1	Nanjangud(P)	-	-	1	Mysore(P)
18	**Tumkur**	1	Gubbi(P-I)	1	Pavagada(P)	1	C.N.Halli(P)
		2	Sira(P)			2	Koratagere(P)

CATEGORIZATION OF TALUKAS IN KARNATAKA

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
				3 Madhugiri(P) 4 Tiptur(P) 5 Turuvekere(P)

ABSTRACT			
No. of Assessed Talukas	**Semi-critical**	**Critical**	**Over-exploited**
175	**14**	**3**	**65**

Criteria for categorization of talukas - (I) Full - Entire taluka falling under a particular category, (II) Partial (P) - >50% of the area of the taluka falling under a particular category, (III) Partial (P-I) - Where none of the category is having >50% area, categorization done based on stage of ground water development

CATEGORIZATION OF BLOCKS IN KERALA

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
1	Trivendrum	1	Kilimanoor	1	Chirayinkil	1	Athiyannoor
		2	Nemom	2	Parassala		
2	Quilon	1	Anchalamood	-	-	-	-
		2	Mukhathala				
		3	Pathanapuram				
		4	Vettikavala				
3	Idukki	1	Devikulam	1	Kattappana	-	-
		2	Nedumkandam				
4	Ernakulam	1	Alangadu	1	Angamaly	-	-
		2	Koovapady	2	Pampakuda		
		3	Mulanthuruthy	3	Parakadavu		
		4	Paravoor	4	Vyttila		
5	Trichur	1	Mala	-	-	1	Kodungalloor
		2	Mathilakam				
		3	Ollurkara				
		4	Thalikulam				
6	Malappuram	1	Andathodu	1	Wandur	-	-
		2	Kondotti				
		3	Kuttipuram				
		4	Manjeri				
		5	Nilambur				
		6	Tanur				
		7	Tirurangadi				
		8	Vengara				
7	Palghat	1	Attapadi	1	Kollengode	1	Chittur
		2	Sreekrishnapuram	2	Palghat		
				3	Thrithala		
8	Calicut	1	Chevayoor	1	Balusseri	1	Kozhikode
				2	Tooneri		
9	Wayanad	1	Sulthan Bathery	-	-	-	-
10	Kannur	-	-	1	Kuthaparamba	-	-
				2	Tellissery		
11	Kasaragod	1	Kanhangad	-	-	1	Kasaragod
		2	Manjeshwar				

ABSTRACT

No. of Assessed Blocks	Semi-critical	Critical	Over-exploited
151	**30**	**15**	**5**

CATEGORIZATION OF BLOCKS IN MADHYA PRADESH

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
1	Barwani	1	Rajpur	-	-	1	Parasmal
2	Bhopal	1	Phanda	-	-	-	-
3	Betul	1	Amla	-	-	-	-
4	Burhanpur	1	Burhanpur	-	-	-	-
5	Chhatarpur	1	Chhatarpur	-	-	-	-
6	Chhindwara	1	Chhindwara	-	-	-	-
7	Dewas	-	-	1 2	Dewas Sonkutch	-	-
8	Dhar	1	Dharampuri	-	-	1 2 3 4 5	Badnawar Dhar Manawar Nalcha Tirla
9	Indore	-	-	1	Depalpur	1 2	Indore Sanwer
10	Khargone	1 2	Khargone Mahashwar	1	Barwaha	-	-
11	Khandwa	1	Chopan	-	-	-	-
12	Mandsaur	-	-	-	-	1 2 3	Mandsaur Malahargarh Sitamau
13	Neemuch	1	Jawad	-	-	1	Neemuch
14	Ratlam	1	Sailana	-	-	1 2	Alote Jaora

CATEGORIZATION OF BLOCKS IN MADHYA PRADESH

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
						3	Piploda
						4	Ratlam
15	Satna	1	Rampur Baghalan	-	-	-	-
16	Sehore	1	Ashta	-	-	-	-
		2	Sehore				
17	Shajapur	1	Agar	1	Barod	1	Kalapipal
		2	Shajapur			2	Mohan Berodia
						3	Nalkhera
						4	Shujalpur
						5	Susner
18	Ujjain	1	Tarana	-	-	1	Badnagar
		2	Kachrod			2	Ghatia
						3	Ujjain

ABSTRACT			
No. of Assessed Blocks	**Semi-critical**	**Critical**	**Over-exploited**
312	**19**	**5**	**24**

CATEGORIZATION OF TALUKAS IN MAHARASHTRA

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
1	**Ahmednagar**	1	Kopargaon	-	-	-	-
		2	Nagar				
		3	Newasa				
		4	Sangamner				
		5	Shrirampur				
2	**Amravati**	-	-	1	Chandur Bazar	1	Daryapur
						2	Morshi
						3	Warud
3	**Buldhana**	1	Buldhana	-	-	1	Jalgaon
4	**Jalgaon**	1	Chopda	-	-	1	Raver
		2	Pachora			2	Yawal
5	**Latur**	1	Latur	-	-	-	-
		2	Renapur				
6	**Nagpur**	1	Katol	-	-	-	-
		2	Narkhed				
7	**Nashik**	1	Chandwad	-	-	-	-
		2	Niphad				
		3	Sinnar				
8	**Osmanabad**	1	Osmanabad	-	-	-	-
9	**Pune**	1	Ambegaon	-	-	-	-
		2	Baramati				
		3	Junnar				
		4	Purandhar				
10	**Sangli**	1	Miraj	-	-	1	Kavathe Mahankal
		2	Tasgaon				
11	**Satara**	1	Khatav	-	-	-	-

ABSTRACT

No. of Assessed Talukas	Semi-critical	Critical	Over-exploited
318	**23**	**1**	**7**

CATEGORIZATION OF BLOCKS IN PUNJAB

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
1	Amritsar	-	-	-	-	1	Ajnala
						2	Bhikhiwind
						3	Chagawan
						4	Chola Sahib
						5	Gandiwind
						6	Harsha China
						7	Jandiala
						8	Khadur Sahib
						9	Majitha
						10	Naushera Panuan
						11	Patti
						12	Rayya
						13	Tarn Taran
						14	Tarsika
						15	Valtoha
						16	Verka
2	Bathinda	-	-	-	-	1	Mour
						2	Nathana
						3	Phul
						4	Rampura
3	Faridkot	-	-	-	-	1	Faridkot
						2	Kotkapura
4	Fatehgarh Sahib	-	-	-	-	1	Amloh
						2	Bassi Pathana
						3	Khamano
						4	Khera
						5	Sirhind
5	Ferozepur	-	-	1	Mamdot	1	Fazilka
						2	Ferozepur
						3	Ghall Khurd
						4	Guru Har Sahai
						5	Jalalabad
						6	Makhu
						7	Zira
6	Gurdaspur	1	N.J.Singh	1	Dhariwal	1	Batala
				2	Kalanaur	2	Dera Baba Nanak
						3	Fatehgarh Churrian
						4	Gurdaspur
						5	Kahnuwan
						6	Qadian

CATEGORIZATION OF BLOCKS IN PUNJAB

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
						7	Sh. H.G.Pur
7	Hoshiarpur	1	Garh Shankar	-	-	1	Hoshiarpur-I
		2	Hazipur			2	Tanda
8	Jalandhar	-	-	-	-	1	Adampur
						2	Bhogpur
						3	Goraya
						4	Jaleast
						5	Jalwest
						6	Lohian
						7	Nakodar
						8	Nurmahal
						9	Phillaur
						10	Shahkot
9	Kapurthala	-	-	-	-	1	Bholath
						2	Dhilwan
						3	Kapurthala
						4	Phagwara
						5	Sultanpur
10	Ludhiana	-	-	1	Doraha	1	Dehlon
						2	Jagraon
						3	Khanna
						4	Ludhiana
						5	Machiwara
						6	Mangat
						7	Pakhowal
						8	Samrala
						9	Sidhwanbet
						10	Sudhar
11	Mansa	-	-	-	-	1	Bhikhi
						2	Budhlada
						3	Jhunir
						4	Mansa
						5	Sardulgarh
12	Moga	-	-	-	-	1	Bagha Purana
						2	Dharmkot
						3	Moga-I
						4	Moga-II
						5	Nihalsinghwala

CATEGORIZATION OF BLOCKS IN PUNJAB

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
13	Nawan Shahr	-	-	-	-	1	Aur
						2	Banga
						3	Nawan Shahr
14	Patiala	1	Dera Bassi	-	-	1	Bhuner Heri
						2	Ghanaur
						3	Nabha
						4	Patiala
						5	Pattran
						6	Rajpura
						7	Samana
						8	Sanaur
15	Ropar	-	-	1	Sialba Majri	1	Chamkaur Sahib
						2	Morinda
16	Sangrur	-	-	-	-	1	Ahmadgarh
						2	Andana
						3	Barnala
						4	Bhawanigarh
						5	Dhuri
						6	Lehragaga
						7	Mahal Kalan
						8	Malerkotla
						9	Sangrur
						10	Shena
						11	Sherpur
						12	Sunam

ABSTRACT

No. of Assessed Blocks	Semi-critical	Critical	Over-exploited
137	**4**	**5**	**103**

CATEGORIZATION OF BLOCKS IN RAJASTHAN

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
1	Ajmer	- -	1 Kekri 2 Masuda	1 Arain 2 Bhinai 3 Jawaja 4 Pisangan 5 Silora 6 Srinagar
2	Alwar	- -	1 Thanagazi	1 Behror 2 Bansur 3 Kathumar 4 Kishangarh 5 Kotkasim 6 Laxmangarh 7 Mandawar 8 Neemrana 9 Rajgarh 10 Ramgarh 11 Reni 12 Tijara 13 Umrain
3	Banswara	1 Anandpuri 2 Bagidora 3 Ghatol 4 Kushalgarh 5 Sajjangarh 6 Talwara	1 Garhi	- -
4	Baran	1 Chhipa Barod	1 Anta	1 Atru 2 Baran
5	Barmer	- -	1 Chohtan 2 Sindhari	1 Baetu 2 Balotra 3 Dhorimanna 4 Siwana 5 Sheo
6	Bharatpur	1 Bayana	- -	1 Nadbai 2 Sewer 3 Weir
7	Bhilwara	- -	1 Kotri 2 Sahada 3 Shahpura	1 Asind 2 Banera 3 Hurda 4 Jahazpur 5 Mandal 6 Mandalgarh 7 Raipur 8 Suwana
8	Bikaner	- -	1 Dungargarh	1 Bikaner 2 Nokha

CATEGORIZATION OF BLOCKS IN RAJASTHAN

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
9	Bundi	- -	1 Talera 2 K. Patan	1 Hindoli 2 Nainwa
10	Chittorgarh	1 Bhainsrorgarh	- -	1 Arnod 2 Bari Sadri 3 Begun 4 Bhadesar 5 Bhoopalsagar 6 Chhoti Sadri 7 Chhitorgarh 8 Dungla 9 Gangrar 10 Kapasan 11 Nimbahera 12 Pratap Garh 13 Rashmi
11	Churu	- -	1 Sujangarh	1 Rajgarh
12	Dausa	- -	- -	1 Bandikui 2 Dausa 3 Lalsot 4 Mahua 5 Sikrai
13	Dholpur	- -	1 Baseri	1 Dholpur 2 Rajakhera
14	Dungarpur	1 Bichhiwara 2 Dugarpur	1 Sagwara 2 Simalwara	- -
15	Jaipur	- -	1 Dudu 2 Phagi	1 Amer 2 Bairath 3 Bassi 4 Chaksu 5 Govindgarh 6 Jamwaramgarh 7 Jhotwara 8 Kotputli 9 Sambher 10 Sanganer 11 Shahpura
16	Jaisalmer	- -	- -	1 Jaisalmer 2 Sankra
17	Jalore	- -	- -	1 Ahore 2 Bhinmal 3 Jalore 4 Jaswantpura 5 Raniwara

CATEGORIZATION OF BLOCKS IN RAJASTHAN

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
				6 Sanchore
				7 Sayala
18	Jhalawar	- -	1 Bakani	1 Manoharthana
			2 Dag	2 Pirawa
			3 Jhalrapatan	
			4 Khanpur	
19	Jhunjhunu	- -	- -	1 Buhana
				2 Chirawa
				3 Jhunujhunu
				4 Khetri
				5 Nawalgarh
				6 Surajgarh
				7 Udaipurwati
20	Jodhpur	1 Phalodi	1 Luni	1 Balesar
			2 Shergarh	2 Bhopalgarh
				3 Bilara
				4 Mandore
				5 Osian
21	Karauli	1 Nadauti	1 Sapotra	1 Hindaun
				2 Karauli
				3 Todabhim
22	Kota	- -	1 Sultanpur	1 Itawa
				2 Khairabad
				3 Ladpura
				4 Sangod
23	Nagaur	1 Ladnu	1 Jayal	1 Degana
			2 Makrana	2 Didwana
				3 Kuchaman
				4 Merta
				5 Mundwa
				6 Parbatsar
				7 Riyan
24	Pali	- -	1 Bali	1 Jaitaran
			2 Desuri	2 Kharchi
			3 Pali	3 Rani
			4 Raipur	4 Sojat
			5 Rohit	5 Sumerpur
25	Rajsamand	- -	1 Railmagra	1 Amet
			2 Rajsamand	2 Bhim
				3 Deogarh
				4 Khamnor
				5 Kumbhalgarh
26	Sawaimadhopur	- -	1 Bamanwas	1 Gangapur

CATEGORIZATION OF BLOCKS IN RAJASTHAN

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
				2	Bonli	2	Sawai Madhopur
				3	Khandar		
27	Sikar	-	-	-	-	1	Dantaramgarh
						2	Dhod
						3	Khandella
						4	Laxmangarh
						5	Neem ka thana
						6	Piprali
						7	Srimadhopur
28	Sirohi	-	-	1	Abu Road	1	Reodar
				2	Pindwara	2	Sheoganj
				3	Sirohi		
29	Tonk	-	-	1	Deoli	1	Uniara
				2	Malpura		
				3	Newai		
				4	Todaraisingh		
				5	Tonk		
30	Udaipur	-	-	1	Kherwara	1	Badgaon
				2	Kotra	2	Bhinder
				3	Sarada	3	Dhariyawad
						4	Girwa
						5	Gogunda
						6	Jhadol
						7	Mavli
						8	Salumber

ABSTRACT

No. of Assessed Blocks	Semi-critical	Critical	Over-exploited
237	**14**	**50**	**140**

CATEGORIZATION OF BLOCKS IN TAMILNADU

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
1	Coimbatore	1	Pongalur	1	Gudimangalam	1	Annur
				2	Karamadai	2	Avinashi
				3	Palladam	3	Kinathukadavu
				4	Udumalpet	4	Madukarai
						5	P_N_Palayam
						6	Pollachi_N
						7	Pollachi_S
						8	Sarkarsammakulam
						9	Sultanpet
						10	Sulur
						11	Thondamuthur
2	Cuddalore	1	Annagramam	-	-	-	-
		2	Cuddalore				
		3	Kammapuram				
		4	Kurinjipadi				
		5	Mangalore				
		6	Panruti				
		7	Vridhachalam				
		8	Nallur				
3	Dharmapuri	-	-	1	Pennagaram	1	Dharmapuri
						2	Harur
						3	Karimangalam
						4	Morappur
						5	Nallampalli
						6	Palacode
						7	Pappireddipatti
4	Dindigul	-	-	1	Nilakkottai	1	Attur-D
				2	Palani	2	Batlagundu
						3	Dindigul
						4	Guzliamparai
						5	Oddanchattram
						6	Reddiarchattiram
						7	Sanarpatti
						8	Thoppampatti
						9	Vadamadurai
						10	Vedasandur
5	Erode	1	Perundurai	1	Bhavanisagar	1	Ammapet-E
		2	T.N.Palayam	2	Satyamangalam	2	Andhiyur
				3	Thalavadi	3	Nambiyur
6	Kancheepuram	1	St.Thomas Mount	1	Sittamur	1	Lattur
		2	Thiruporur	2	Thirukalunkundram	2	Uthiramerur
		3	Acharapakkam				
7	Karur	1	Aravakurichi	-	-	1	Kadavur
		2	Krishnarayapuram			2	Thanthoni
8	Krishnagiri	1	Hosur	-	-	1	Burgur
		2	Kaveripattinam			2	Mathur
		3	Shoolagiri			3	Uthangarai

CATEGORIZATION OF BLOCKS IN TAMILNADU

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
				4 Veppanapalli
9	Madurai	1 T.Kallupatti 2 Thirumangalam 3 Thiruparunkundram	1 Alanganallur	1 Chellampatti 2 Sedapatti 3 Usilampatti
10	Nagapattinam	1 Myladuthurai	- -	1 Kollidam 2 Kuttalam 3 Sembanarkoil 4 Sirkazhi
11	Namakkal	1 Kabilarmalai 2 Mohanur 3 Tiruchengodu	1 Mallasamudram 2 Paramathi	1 Erumaipatti 2 Namagiripettai 3 Namakkal 4 Pallipalayam 5 Puduchatram 6 Rasipuram 7 Sendamangalam 8 Vennandur
12	Perambalur	- -	- -	1 Alathur 2 Perambalur 3 Veppanthattai 4 Veppur
13	Pudukkottai	1 Thiruvarankulam	- -	- -
14	Ramanathapuram	1 Mandapam 2 Ramanathapuram	1 Thirupullani	- -
15	Salem	1 Kolathur-S 2 Sankari 3 Tharamangalam	1 Kadayampatti	1 Attur-S 2 Ayotiapattinam 3 Gangavalli 4 Konganapuram 5 Magudanchavadi 6 Mecheri 7 Nangavalli 8 Omalur 9 P.N.Palayam 10 Panamaruthupatti 11 Salem 12 Talaivasal 13 Valapadi 14 Veerapandi
16	Sivaganga	1 S.Pudur	- -	- -
17	Thanjavur	1 Madukkur 2 Thiruvaiyaru 3 Thiruvonam	1 Ammapet	1 Kumbakonam 2 Thiruppanandal 3 Thiruvidaimaruthur
18	Theni	- -	1 Bodinaikkanur 2 Cumbum 3 Theni	1 Andipatti 2 Chinnamanur 3 Myladumparai

CATEGORIZATION OF BLOCKS IN TAMILNADU

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
				4 Periyakulam
				5 Uthamapalayam
19	Tiruchchirapalli	- -	1 Musiri	1 Manaparai
				2 Tattayangarpettai
				3 Thuraiyur
				4 Uppiliyapuram
20	Tirunelveli	1 Alankulam	- -	1 Melneelithanallur
				2 Radhapuram
				3 Sankarankoil
				4 Valliyur
21	Tiruvallur	1 Sholavaram	1 Kadambathur	1 Ellapuram
		2 Tiruvallur	2 Poonamalee	2 Minjur
				3 Pallipattu
				4 R.K.Pet
				5 Thiruvalankadu
				6 Tiruttani
22	Tiruvannamalai	1 Anakavur	1 Arni (West)	1 Chengam
		2 Arni (East)	2 Javadi Hills	2 Kalasapakkam
		3 Chetpet		3 Kilpennathur
		4 Cheyyar		4 Polur
		5 Vembakkam		5 Pudupalayam
				6 Thandarampattu
				7 Thiruvannamalai
				8 Thurinjapuram
				9 Vandavasi
23	Tiruvarur	1 Nannilam	1 Kodavasal	1 Valangaiman
		2 Needamangalam		
24	Tuticorin	1 Karunkulam	1 Pudur	1 Kayathar
		2 Tiruchendur		2 Kovilpatti
				3 Ottapidaram
				4 Satankulam
				5 Tuticorin
				6 Udangudi
				7 Vilathikulam
25	Vellore	1 Arakonam	1 Nemili	1 Alangayam
		2 Kaveripakkam		2 Anaicut
		3 Wallajah		3 Arcot
				4 Gudiyatham
				5 Jolarpet
				6 K.V.Kuppam
				7 Kandili
				8 Kanniyambadi
				9 Katpadi
				10 Madanur
				11 Nattrampalli
				12 Pernampet
				13 Sholinghur

CATEGORIZATION OF BLOCKS IN TAMILNADU

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
				14 Timiri
				15 Tiruppathur
				16 Vellore
26	Villupuram	1 Chinnasalem	1 Kallakurichi	1 Gingee
		2 Kanai	2 Thirunavalur	2 Kandamangalam
		3 Thiyagadurgam	3 Vanur	3 Kolianur
		4 Tirukovilur		4 Mailam
				5 Marakanam
				6 Melmalaiyanur
				7 Mugaiyur
				8 Olakkur
				9 Rishivandhiyam
				10 Sankarapuram
				11 Tiruvennainallur
				12 Ulundurpet
				13 Vallam
				14 Vikravandi
27	Virudhunagar	1 Sivakasi	1 Watrap	1 Rajapalayam
		2 Srivilliputhur		

ABSTRACT

No. of Assessed Blocks	Semi-critical	Critical	Over-exploited
385	57	33	142

CATEGORIZATION OF BLOCKS IN UTTAR PRADESH

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
1	Agra	1	Akola	-	-	1	Shamshabad
		2	Bah			2	Barauli Ahir
		3	Bichpuri				
		4	Etmadpur				
		5	Fatehabad				
		6	Khandauli				
2	Aligarh	1	Atrauli	-	-	-	-
		2	Khair				
3	Ambedkar Nagar	1	Katehari	-	-	-	-
4	Auraiya	1	Bidhuna	-	-	-	-
5	Azamgah	1	Palhani	-	-	-	-
		2	Rani Ki Sarai				
6	Baghpat	1	Baghpat	1	Chhaprauli	1	Binauli
				2	Khekra	2	Pilana
7	Ballia	1	Bairia	-	-	-	-
8	Bareilly	1	Bhadpura	1	Meerganj	1	Alampur Zafarabad
		2	Bhutah				
		3	Fatehganj(W)				
		4	Kiyara				
		5	Nawabganj				
		6	Ramnagar				
		7	Shergarh				
9	Bijnor	1	Kiratpur	-	-	1	Jalilpur
10	Budaun	1	Dataganj	1	Dahigawan	1	Ambiapur
		2	Usawan	2	Islam Nagar	2	Asafpur
				3	Miaon	3	Bisauli
						4	Jagat
						5	Junawai
						6	Rajpura
						7	Sahaswan
						8	Salarpur(Binawar)
						9	Wazirganj
11	Buland Sahar	1	Gulaothi	-	-	-	-
12	Deoria	1	Bankata	-	-	1	Bhatpar Rani
		2	Deoria Sadar				
		3	Gauri Bazar				
		4	Rudrapur				
13	Etah	1	Jalesar	-	-	1	Kasganj
		2	Nidholikalan			2	Marehra
						3	Sakeet
14	Faizabad	-	-	1	Haringteenganj	-	-
15	Farrukhabad	1	Mohamadabad	1	Kamalganj	1	Barhpur

CATEGORIZATION OF BLOCKS IN UTTAR PRADESH

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
16	Fatehpur	1	Airawan	-	-	-	-
		2	Deomai				
17	Firozabad	1	Madnapur	1	Firozabad	-	-
		2	Shikohabad				
		3	Tundla				
18	Ghaziabad	1	Hapur	-	-	-	-
		2	Loni				
19	Gonda	1	Padri Kripal	-	-	-	-
20	Hardoi	1	Harpalpur	-	-	-	-
		2	Madhoganj				
		3	Mallawan				
21	Hathras	1	Hassain	1	Hathras	1	Sadabad
						2	Sahpau
						3	Sasni
22	Jaunpur	1	Jalalpur	-	-	-	-
		2	Kerakat				
23	Jyotiba Phule Nagar	1	Joya	-	-	1	Gajraula
						2	Gangeshwari
						3	Hasanpur
24	Kannauj	1	Jalalabad	-	-	-	-
		2	Kannauj				
		3	Talgram				
25	Kanpur Nagar	1	Shivrajpur	-	-	-	-
26	Kaushambi	1	Chail	-	-	-	-
27	Kushi Nagar	1	Kasaya	-	-	-	-
		2	Sukrauli				
28	Lalitpur	1	Bar	-	-	-	-
		2	Talbehat				
29	Lucknow	1	Bakshi Ka Talab	-	-	1	Mal
		2	Kakori				
		3	Malihabad				
		4	Sarojini Nagar				
30	Mainpuri	1	Barnahal	-	-	-	-
31	Mathura	1	Baldeo	-	-	1	Nohjhil
		2	Chhata				
		3	Mat				
		4	Mathura				
		5	Raya				
32	Maunath Bhanjan	1	Mohammadabad	-	-	-	-

CATEGORIZATION OF BLOCKS IN UTTAR PRADESH

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
33	Moradabad	1	Asmoli	-	-	1	Bahjoi
		2	Bilari			2	Dingerpur
		3	Dilari			3	Sambhal
		4	Pawansa				
34	Muzaffar Nagar	1	Kairana	-	-	1	Shahpur
		2	Kandhala			2	Un
		3	Khatauli				
		4	Shamli				
		5	Thanabhawan				
35	Raibareli	1	Bachharawan	1	Lalganj	-	-
		2	Kheron	2	Satawan		
		3	Maharajganj				
		4	Rahi				
		5	Saraini				
36	Rampur	-	-	-	-	1	Chamraua
37	Saharanpur	1	Deoband	-	-	1	Gangoh
		2	Nagal			2	Nakur
		3	Punwarka			3	Nanauta
38	Shahjahanpur	-	-	1	Kalan	-	-
39	Sitapur	1	Aliya	-	-	-	-
		2	Gondalamau				
40	Unnao	1	Bangarmau	-	-	-	-
		2	Hilauli				

ABSTRACT

No. of Assessed Blocks	Semi-critical	Critical	Over-exploited
803	**88**	**13**	**37**

CATEGORIZATION OF BLOCKS IN UTTARANCHAL

Sl. No.	Districts	Semi-critical	Critical	Over-exploited
1	Hardwar	1 Bahadrabad 2 Gurukul Narsen 3 Roorkee	-	-	1 Bhagwanpur 2 Laksar

ABSTRACT			
No. of Assessed Blocks	**Semi-critical**	**Critical**	**Over-exploited**
17	**3**	**-**	**2**

CATEGORIZATION OF BLOCKS IN WEST BENGAL

Sl. No.	Districts	Semi-critical		Critical		Over-exploited	
1	Burdwan	1 Bhatar 2 Ketugram-I 3 Mangalkote 4 Memari-II 5 Monteswar 6 Purbasthali-II	-	-	-	-	
2	Birbhum	1 Murarai-II 2 Nalhati-II 3 Nanoor 4 Rampurhat-II	-	-	-	-	
3	Hugli	1 Goghat - I 2 Pandua	-	-	-	-	
4	Malda	1 Harishchandrapur-II 2 Kaliachak-I	-	-	-	-	
5	Medinipur(E)	1 Moyna	-	-	-	-	
6	Medinipur(W)	1 Daspur-II	-	-	-	-	
7	Murshidabad	1 Barwan 2 Berhampur 3 Bhagabangola-I 4 Bhagabangola-II 5 Bharatpur-I 6 Domkal 7 Hariharpara 8 Jalangi 9 Lalgola 10 Mur-Jiaganj 11 Nabagram 12 Nowda 13 Raninagar-I 14 Sagardighi 15 Suti-II	1	Bharatpur-II	-	-	
8	Nadia	1 Chapra 2 Hanskhali 3 Karimpur-I 4 Karimpur-II 5 Tehatta-I 6 Tehatta-II	-	-	-	-	

ABSTRACT

No. of Assessed Blocks	Semi-critical	Critical	Over-exploited
269	37	1	-

CATEGORIZATION OF UNITS IN DAMAN AND DIU

Sl. No.	Union Territory	Semi-critical		Critical		Over-exploited	
1	Diu	-	-	-	-	1	Diu
2	Daman	1	Daman	-	-	-	-

ABSTRACT

No. of Assessed Units	Semi-critical	Critical	Over-exploited
2	1	-	1

CATEGORIZATION OF ISLANDS IN LAKSHADWEEP ISLANDS

Sl. No.	Islands	Semi-critical		Critical		Over-exploited	
1	Agatti	1	Agatti	-	-	-	-
2	Amini	1	Amini	-	-	-	-
3	Kavaratti	1	Kavaratti	-	-	-	-

ABSTRACT			
Total number of Assessed Islands	**Semi-critical**	**Critical**	**Over-exploited**
9	**3**	**-**	**-**

CATEGORIZATION OF REGIONS IN PONDICHERRY

Sl. No.	Regions	Semi-critical		Critical		Over-exploited	
1	Pondicherry	-	-	-	-	1	Pondicherry

ABSTRACT			
No. of Assessed Regions	**Semi-critical**	**Critical**	**Over-exploited**
4	**-**	**-**	**1**