National Compilation on

Dynamic Ground Water Resources of India, 2017

Government of India
Ministry of Jal Shakti
Department of Water Resources, RD & GR
Central Ground Water Board

Faridabad
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सत्यमेव जयते

भारत सरकार
केन्द्रीय भूमि जल बोर्ड
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास
और गंगा संरक्षण विभाग

Government of India
Central Ground Water Board
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Department of Water Resources,
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FOREWORD

Water is crucial to life on Earth, however, its availability in space and time is not uniform. The near utilization of surface water resources has made the public and Government to look towards groundwater resources to supplement the water supply. The ever-increasing demand has resulted in the greater dependence on groundwater and consequently resulting in depletion of groundwater resources in many parts of the country. In the era of climate change, groundwater may act as a buffering resource in the time of drought and it needs to be managed more intensively to enhance its sustainability. The change in groundwater extraction and rainfall pattern necessitate periodic revision of groundwater resources assessment.

The report 'National Compilation on Dynamic Groundwater Resources of India, 2017' is a compilation of State-wise assessment carried out jointly by CGWB and State Groundwater Departments at periodical intervals under the supervision of State level Committee of the respective States/UTs and under overall guidance of Central Level Expert Group. The groundwater resources of India are assessed following Groundwater Estimation Methodology, 2015, which takes care of all the relevant parameters contributing to the net annual ground water recharge and extractions for various uses. The database thus generated plays a significant role in ground water management and planning.

I genuinely appreciate the work done by the officers of Central Ground Water Board and State Groundwater Departments in assessing the dynamic groundwater resources to provide inputs for the planners. I am hopeful that this report will motivate all groundwater professionals to join hands for optimal development of the groundwater resources, so as to conserve water for future generations to come.

(K C Naik)

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PREFACE

Water is an indispensable natural resource for life on this planet. Groundwater has emerged as the main source for agriculture, domestic and the industry. In general, groundwater is a reliable source of water for the agriculture and can be used in a flexible manner. However, it is important to realize that groundwater is not a resource that could be utilized indiscriminately. Issues such as water logging, salinity, agricultural toxins, and industrial effluents need to be looked upon. As for the environment, groundwater plays a very important role in keeping the water level and flow into rivers, lakes and wetlands.

Ground water has slowly become the mainstay of India's agriculture and drinking water security as it is considered a dependable source. India being a home to more than 1.3 billion people, the increasing population, urbanization and non-uniform extraction have accelerated depletion of ground water resources. This is reflected in falling ground water levels trends and contamination of aquifers. In addition, there has not been adequate thoughtfulness to water conservation, efficiency in water use, water re-use & recycle, groundwater recharge, and ecosystem sustainability. This calls for dedicated plans and schemes to manage this scarce resource.

The Dynamic Ground Water resource assessment as in March, 2017 carried out jointly by CGWB and state ground water departments provides a basic database for ground water management in the country. The exercise categorizes assessment units into 'Safe', 'Semi-Critical', 'Critical' and 'Over-exploited' blocks depending on Stage of Ground water Extraction. Over-exploited assessment units gives a red flag, demanding immediate change in extraction pattern and surface water interventions. Groundwater resources, though is replenishable, the over exploitation has resulted in mining of groundwater resources more than the annual replenishment. The efforts have always been on the supply side interventions but the continued and ever increasing water stress indicates that simultaneous demand side interventions also required to manage the groundwater resources.

I appreciate the efforts of the officers of CGWB, CHQ, who were involved in the work of national compilation and the officers of CGWB and State Groundwater Agencies, who had carried out the assessment for the respective States and UTs. I strongly believe that the national compilation will be beneficial in planning and management of ground water for various upcoming projects in the country. I hope this report will spread awareness and result in conscientious usage of water for overall development of the country.

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DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017

AT A GLANCE

1.	Total Annual Ground Water Recharge	431.86 bcm
2.	Annual Extractable Ground Water Resources	392.70 bcm
3.	Annual Ground Water Extraction	248.69 bcm
4.	Stage of Ground Water Extraction	63.33 %

Categorization of Assessment Units
(Blocks/ Mandals/ Firkas/Taluks)

	Total No. of Assessed Units	6881
1.	Safe	4310
2.	Semi Critical	972
3.	Critical	313
4.	Over-Exploited	1186
5.	Saline	100

EXCUTIVE SUMMARY

Ground Water Resources Assessment is carried out at periodical intervals jointly by State Ground Water Departments and Central Ground Water Board under the guidance of the respective State Level Committee on Ground Water Assessment at State Levels and under the overall supervision of the Central Level Expert Group. Previous such joint exercises were carried out in 1980, 1995, 2004, 2009, 2011 and 2013.

The assessment involves estimation of dynamic ground water resources or Annual Extractable Ground Water Resource, Total Current Annual Ground Water Extraction (utilization) and the percentage of utilization with respect to recharge (stage of Ground Water Extraction). The assessment units (blocks/watersheds/mandals/talukas/firkas) are categorized based on Stage of Ground Water Extraction, which are then validated with long-term water level trends. The previous assessment was carried out using GEC 97 Methodology, whereas the present assessment is done based on norms and guidelines of the latest GEC 2015 Methodology.

The main source of replenishable ground water resources is recharge through rainfall, which contributes to nearly 67% of the total annual ground water recharge. India receives about 119cm of rain in a year but it has great spatial variations. Most part of India receives rainfall mainly during SW Monsoon season. However, main rainfall season in Tamil Nadu is October–December. Jammu and Kashmir, Himachal Pradesh and Uttarakhand receive significant rainfall in all four seasons.

Major part of country including Northern, Central and Eastern India receives annual normal rainfall between 75 and 150cm. Highest rainfall of more than 250cm are recorded in the North Eastern States and along West Coast in the Konkan region whereas western part of Rajasthan receives about 30cm of rainfall in an year. The areas on the Western Ghats and the Sub-Himalayan areas in North East and Meghalaya Hills receive heavy rainfall of over 250cm annually, whereas the Areas of Northern parts of Kashmir and Western Rajasthan receive rainfall less than 40cm. The two significant features of India's rainfall are that, in the north India, rainfall decreases westwards and in the Peninsular India, it decreases eastwards and then increases in the coastal region.

In 2016, the country received annual rainfall of 91% of its normal rainfall i.e. 118.7cm. During SW monsoon season, it received 97% of normal rainfall i.e. 89cm. The country experienced deficiency in rainfall as compared to its normal rainfall during the months of June (10%), August (8%) and September (3%). However, in July, it was 7% more than its normal rainfall.

The rock formations and their properties have a significant influence in ground water recharge. Porous formations like alluvial formations in the Indo-Ganga-Brahmaputra basin having high specific yield values are the most important repository of ground water resources. Ground water occurrences in the fissured formations, on the other hand, are limited to weathered, jointed and fractured portions of the rocks, which occupy almost two-third part of the country including peninsular India.

In the present assessment, the total annual ground water recharge has been estimated as 432bcm. Keeping an allocation for natural discharge, the annual extractable ground water resource is 393bcm. The total current annual ground water extraction (as in March, 2017) is 249bcm. The average stage of ground water extraction for the country as a whole works out to be about 63 %. The extraction of ground water for various uses in different parts of the country is not uniform. Out of the total 6881 assessment units (Blocks/ Mandals/ Talukas/Firkas) in the country, 1186 units in various States (17%) have been categorized as 'Over-Exploited' indicating ground water extraction exceeding the annually replenishable ground water recharge. In these areas the percentage of ground water extraction is more than 100 percent. In addition, 313 units (5%) are 'Critical', where the stage of ground water extraction is between 90-100 %. There are 972 semi-critical units (14%), where the stage of ground water extraction is between 70% and 90% and 4310 assessment units (63%) have been categorized as 'Safe' where the stage of Ground water extraction is less than 70 %. Apart from this, there are 100 assessment units (1%), which have been categorized, as 'Saline' as major part of the ground water in phreatic aquifers is brackish or saline. In respect of West Bengal, the results of GWRA-2017 indicated a huge variation with respect of previous assessment of resources and the reasons for the changes in West Bengal was not found reasonable and adequate and further, SLC has also not approved the GWRA- 2017 assessment. Hence, CLEG recommended that the results of 2013 assessment in respect of West Bengal may be used in place of GWRA-2017 assessment for national compilation of GWRA-2017 with a rider that after approval of GWRA-2017 by SLC of West Bengal, a corrigendum may be issued separately, incorporating the results of GWRA-2017. Accordingly, the results of 2013 assessment have been considered for West Bengal.

In comparison to 2013 assessment, the total assessment units in the country have increased from 6584 to 6881 with major contribution from the State of Telangana, Rajasthan and Tamil Nadu. The total annual groundwater recharge has decreased from 447 to 432bcm, where major decrease is noticed in the States of Uttar Pradesh, Assam & Punjab. The changes is attributed mainly to changes in methodology, where in the principle of threshold value has been introduced to consider rainfall recharge and in some States change in area as per local revenue records, change in parameters due to field studies etc. Accordingly, the annual extractable resource of GWRA, 2017 (as per GEC 2015 methodology) on comparison with Net Ground water Availability of GWRA,2013 (as per GEC 97 methodology) also shows a decrease from 411 to 393bcm. The groundwater extraction has marginally decreased from 253 to 249bcm, mainly due to revision of well census data. The overall stage of groundwater extraction has marginally increased from 62 % to 63 %.

The over-exploited areas are mostly concentrated in:(i) the north western part of the country including parts of Punjab, Haryana, Delhi and Western Uttar Pradesh where even though the replenishable resources are abundant, there have been indiscriminate withdrawals of ground water leading to over-exploitation; (ii) the western part of the country, particularly in parts of Rajasthan and Gujarat, where due to arid climate, ground water recharge itself is limited, leading to stress on the resource and (iii) the southern part of peninsular India including parts of Karnataka, Andhra Pradesh, Telangana and Tamil Nadu where due to inherent aquifer properties of crystalline aquifers, the ground water availability is low. In some areas of the country, good continuous rainfall and management practices like ground water augmentation and conservation measures through government and private initiatives have resulted in improvement in ground water situation. Ground water resources assessment, like other fields of science, requires continuous refinements.

DYNAMIC GROUND WATER RESOURCES OF INDIA – 2017

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CHAPTER 1

1.0 INTRODUCTION

Water is a fundamental resource for life. Sustainable development and efficient management of this scarce resource has become a challenge in India. Increasing population, growing urbanization and rapid industrialization combined with the need for raising agricultural production generates competing demands for water. Ground water has steadily emerged as the backbone of India's agriculture and drinking water security. Contribution of ground water is nearly 62% in irrigation, 85% in rural water supply and 45% in urban water supply (MoWR, RD & GR).Ground water is an annually replenishable resource but its availability is non-uniform in space and time. It is the quantity of ground water available in the zone of water level fluctuation, which is replenished annually with rainfall being the dominant contributor. Hence, the sustainable utilization of ground water resources demands a realistic quantitative assessment based on reasonably valid scientific principles. National Water Policy, 2012 has laid emphasis on periodic assessment of ground water resources on scientific basis. The trends in water availability due to various factors including climate change must also be assessed and accounted for during water resources planning. To meet the increasing demands of water, it advocates direct use of rainfall, desalination and avoidance of inadvertent evapotranspiration for augmenting utilizable water resources. According to the National Water Policy, 2012 the safe water for drinking and sanitation should be considered as pre-emptive needs followed by high priority allocation for other domestic needs (including needs of animals), achieving food security, supporting sustenance agriculture and minimum eco-system needs. Available water, after meeting the above needs should be allocated in a manner to promote its conservation and efficient use.

1.1 PREVIOUS ASSESSMENTS

Assessment of water resources of the country dates back to 1901 when the First Irrigation Commission assessed the Surface Water Resources as 144 million hectare meters (M.ham) (NABARD, 2006). In 1949 Dr. A. N. Khosla, based on empirical formula estimated the total average annual runoff of all the river systems of India including both surface and ground water resources as 167 M.ham (CGWB, 1995). Since then attempts have been made from time to time by various Working Groups/ Committees/Task Forces constituted by Govt. of India to estimate the ground water resources of the country based on available data and in response to developmental needs. In 1976, the National Commission of Agriculture assessed the total ground water resources of the country as 67M.ham and the utilizable ground water was worked out to be 35M.ham, out of which 26M.ham was considered available for irrigation (CGWB, 1995).

The first systematic methodology to estimate the ground water resources of the country was evolved 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, the country's Gross Ground Water Recharge has been assessed as 47M.ham and the Net Recharge as 32M.ham (CGWB, 1995).

In 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 a methodology for assessment of dynamic ground water resources, which is commonly referred to as GEC'84. As per the recommendations of the GEC'84, the State Governments constituted Working Groups for assessment of ground water potentials. The Working Groups were headed by Secretaries, in-charge of Ground Water Developments and included Heads of Ground Water Departments, State Agriculture Departments, representatives from Agriculture Universities and NABARD. Director, CGWB was the convener of the group. The base year for the computation of the resource mostly varied between 1991 and 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 in India was estimated to be about 432 billion cubic meter (bcm). The ground water resource available for irrigation purpose was about 361bcm. The Net Ground Water Draft from Irrigation uses was around 115bcm and the level of development was 32%. Utilizable Irrigation Potential from ground water of the country was worked out to be 64 million hectare (CGWB, 1995).

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 assessment and to suggest revisions, if necessary. The Committee submitted its report in 1997 wherein a revised and elaborate methodology for resource assessment was suggested, more commonly referred 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. Based on GEC'97, the dynamic ground water resources of India have been estimated for the entire country considering 2004, 2009, 2011 and 2013 as base years.

The GEC 97 Methodology was revised and the 2017 assessment has been carried out using the revised GEC 2015 Methodology. In the present assessment, the total annual ground water recharge has been assessed as 431.86bcm. Keeping an allocation for natural discharge, the annual extractable ground water recharge has been assessed as 392.70bcm. The annual ground water extraction (as in March, 2017) is 248.69bcm. The average stage of ground water extraction for the country as a whole works out to be about 63%. Out of the total 6881 assessment units (Blocks/ Mandals/ Talukas/Firkas) in the country, 1186 units in various States (17%) have been categorized as 'Over-Exploited' indicating ground water extraction exceeding the annually replenishable ground water recharge. In these areas the percentage of ground water extraction is more than 100 percent and a declining trend in long term water level trend in both pre-monsoon and post-monsoon periods is observed. In addition, 313 units (5%) are 'Critical', where the stage of ground water extraction is between 90-100%. There are 972 semi-critical units (14%), where the stage of ground water extraction is between 70% and 90% and 4310 assessment units (63%) have been categorised as 'Safe' where the stage of Ground water extraction is less than 70 %. Apart from this, there are 100 assessment units (1%), which have been categorised as 'Saline' as major part of the ground water in phreatic aquifers is brackish or saline. In respect of West Bengal, the results of GWRA-2017 indicated a huge variation with respect of previous assessment of resources and the reasons for the changes in West Bengal was not found reasonable and adequate and further, SLC has also not approved the GWRA- 2017 assessment. Hence, CLEG recommended that the results of 2013 assessment in respect of West Bengal may be used in place of GWRA-2017 assessment for national compilation of GWRA-2017 with a rider that after approval of GWRA-2017 by SLC of West Bengal, a corrigendum may be issued separately, incorporating the results of GWRA-2017. Accordingly, the results of 2013 assessment have been considered for West Bengal. Ground Water Resources and categorization of previous years are shown in Table 1.1 and Table 1.2.

Table 1.1 Ground water Resources assessment 2004 to 2017

S. No.	Ground Water Resources Assessment	2004	2009	2011	2013	2017
1	Annual Replenishable Ground Water Resources	433 bcm	431 bcm	433 bcm	447 bcm	432 bcm
2	Net Annual Ground Water Availability	399 bcm	396 bcm	398 bcm	411 bcm	393 bcm

3	Annual Ground Water Draft for Irrigation, Domestic & Industrial uses	231 bcm	243 bcm	245 bcm	253 bcm	249 bcm
4	Stage of Ground Water Development	58%	61%	62%	62 %	63%

Table 1.2 Categorization of assessment units from 2004 to 2017

S. No.	**Categorization of Blocks/ Mandals/ Talukas**	**2004**	**2009**	**2011**	**2013**	**2017**
1	Total Assessed units	5723	5842	6607	6584	6881
2	Safe	4078	4277	4503	4519	4310
3	Semi-critical	550	523	697	681	972
4	Critical	226	169	217	253	313
5	Over-Exploited	839	802	1071	1034	1186
6	Saline	30	71	92	96	100

1.2 GROUND WATER ASSESSMENT AND MANAGEMENT INITIATIVES

The findings of the ground water resources assessment is utilized as an input to the planners and stakeholders for taking appropriate management measures for optimal utilization and sustainable development of the ground water resources. Several measures, primarily based on the findings of the resource assessment, have been taken up by the Government of India to replenish/augment ground water resources.

Some of the undergoing projects includes construction of 11 million Artificial Recharge structures of different types in urban and rural areas of the Country through a conceptual document entitled “Master Plan for Artificial Recharge to Ground water in India” prepared by CGWB. It envisages Pilot/ demonstrative projects for Rain Water Harvesting and Artificial Recharge to ground water including roof top rain water harvesting in various states in the country have been implemented (MoWR, RD & GR).Besides these, MoWR, RD & GR has circulated a Model Bill to all the States/UTs to enable them to enact suitable ground water legislation for its regulation and development, which includes provision of rainwater harvesting. For regulation of groundwater extraction, certain groundwater stressed areas have also been ‘notified’ by the Central Ground Water Authority (CGWA) as per the guidelines. CGWB has initiated National Aquifer Mapping & Management Programme (NAQUIM), which envisages formulation of Aquifer Management Plans to ensure sustainability of the resources. Several State Governments are implementing watershed development programmes, in which, ground water conservation forms an integral part. Water conservation measures are also taken up as a part of the MGNREGA. MoWR, RD & GR has launched ‘Jal Kranti Abhiyan’ in order to consolidate water conservation and management in the Country through a holistic and integrated approach involving all stakeholders, ‘Jal Gram Yojana’, a component of ‘Jal Kranti Abhiyan’, envisages selection of two villages in every district, preferably ‘over-exploited’ or facing acute water scarcity, as ‘Jal Grams’ to ensure optimum and sustainable utilization of water. In addition, schemes like Pradhan Mantri Krishi Sinchai Yojana (PMKSY) Har Khet Ko Pani (HKKP) - Ground Water Irrigation, for creation of irrigation potential through ground water in assessment units where there is scope for further future groundwater development.

In addition to above, many efforts involving the direct stakeholders have yielded promising results. Some of such success stories are: (i) Community management of ground water resources has been quite effective in certain areas in the country. Success stories on effective community participation on water conservation measures such as community management and Water conservation measures in Aravalli hills of Rajasthan, Ralegaon Sidhi, Hiware Bazar and World Bank sponsored Projects in rural Maharashtra, Andhra Pradesh Farmer-Managed Groundwater Systems Project (APFAMGS). Some of the best practices on Ground Water harvesting/recharge/conservation have been successful in Chittoor District of Andhra

Pradesh, Ground Water Recharge in Sanaud Nala, Gurur block, of Durg district, Chhattisgarh etc. (Ministry of Water Resources, RD & GR). There are several such examples from across the country.

1.3 RE-ASSESSMENT OF GROUND WATER RESOURCES, 2017

The assessment of Ground water resources is carried out to determine the prevailing ground water scenario of the country. It would also indicate the impact of the on-going ground water management practices on the ground water resources. In 2017, MoWR, RD & GR constituted a Central Level Expert Group (CLEG) for over-all supervision of the re-assessment of ground water resources in the entire country. The terms of reference of the committee include supervision of assessment of annual replenishable ground water resources and the status of utilization for reference year 2017. The copy of the Government Resolution is given as Appendix A.

The ground water resources assessment for reference year 2017 at the State Level have been carried out jointly by State Ground Water Departments and Central Ground Water Board under the supervision of State Level Committees, with technical guidance from Central Level Expert Group. Out of 36 States & UTs in the country, the assessments are yet to be approved in 6 States/UTs (Jammu & Kashmir, Rajasthan, West Bengal, Sikkim, Andaman & Nicobar, Daman & Diu) (Appendix B). Based on the assessments provided by the respective State Level Committees and joint assessment made in the aforesaid 6 States/UTs, the National Level Report titled “Dynamic Ground Water Resources of India-2017” has been compiled. The report provides summary and analysis of groundwater resources in different States. The report was reviewed and deliberated upon during the meeting of CLEG held on 23.04.2017, and was approved as given in Appendix C.

CHAPTER 2

2.0 GROUNDWATER ESTIMATION METHODOLOGY

Ground water resource of the year 2017 has been estimated following the guidelines of the GEC 2015 methodology. The previous resource assessments in the years 2004, 2009, 2011 and 2013 were completed following GEC-97 methodology. In the present report, GEC-2015 methodology has been used and based on the data availability, the assessment has been made using appropriate assumptions. The principal attributes of GEC 2015 methodology is given below:

This methodology recommends aquifer wise ground water resource assessment of both the Ground water resources components, i.e., Replenishable ground water resources or Dynamic Ground Water Resources and In-storage Resources or Static Resources. Wherever the aquifer geometry has not been firmly established for the unconfined aquifer, the in-storage ground water resources have to be assessed in the alluvial areas up to the depth of bed rock or 300m whichever is less. In case of hard rock aquifers, the depth of assessment would be limited to 100m.In case of confined aquifers, if it is known that ground water extraction is being taken place from this aquifer, the dynamic as well as in-storage resources are to be estimated. If it is firmly established that there is no ground water extraction from this confined aquifer, then only in-storage resources of that aquifer has to be estimated. This methodology recommends aquifer wise ground water resource assessment. Until Aquifer Geometry is established on appropriate scale, the existing practice of using watershed in hard rock areas and blocks/mandals/ firkas in soft rock areas may be continued.

It is also pertinent to add that, as it is advisable only to restrict the groundwater development as far as possible to annual replenishable resources, the categorization also works out the relation between the annual replenishment and groundwater development. An area devoid of groundwater potential may not be considered for development and may remain safe and an area with good groundwater potential may be developed owing to its suitability for groundwater development and may become over exploited. Thus water augmentation efforts can be successful in such areas, where the groundwater potential is high and there is scope for augmentation.

2.1 GROUNDWATER ASSESSMENT OF UNCONFINED AQUIFER

The assessment of ground water includes assessment of dynamic and in-storage ground water resources, but the development planning should mainly depend on dynamic resource only as it gets replenished every year. Changes in static or in-storage resources reflect impacts of ground water mining. Such resources may not be replenishable annually and may be allowed to be extracted only during exigencies with proper recharge planning in the succeeding excess rainfall years.

2.1.1 Assessment of Annually Replenishable or Dynamic Ground Water Resources

The methodology for ground water resources estimation is based on the principle of water balance as given below –

Inflow – Outflow = Change in Storage (of an aquifer) **1**

Equation 1 can be further elaborated as -

$$\Delta S = R_{RF}+R_{STR}+R_{C}+R_{SWI}+R_{GWI}+R_{TP}+R_{WCS}\pm VF \pm LF - GE - T - E - B \qquad 2$$

Where,

- ΔS – Change is storage
- R_{RF} – Rainfall recharge
- R_{STR}- Recharge from stream channels
- Rc – Recharge from canals
- R_{SWI} – Recharge from surface water irrigation

R_{GWI}- Recharge from ground water irrigation
R_{TP}- Recharge from Tanks& Ponds
R_{WCS} – Recharge from water conservation structures
VF – Vertical flow across the aquifer system
LF- Lateral flow along the aquifer system (through flow)
GE-Ground Water Extraction
T- Transpiration
E- Evaporation
B-Base flow

It is preferred that all the components of water balance equation should be estimated in an assessment unit. Due to lack of data for all the components in most of the assessment units, it is proposed that at present the water budget may be restricted to the major components only, taking into consideration certain reasonable assumptions. The estimation is to be carried out using lumped parameter estimation approach keeping in mind that data from many more sources if available may be used for refining the assessment.

2.1.1.1 Rainfall Recharge

It is recommended that ground water recharge should be estimated on the basis of ground water level fluctuation and specific yield approach since this method takes into account the response of ground water levels to ground water input and output components. This, however, requires adequately spaced representative water level measurement for a sufficiently long period -for a minimum period of 5 years (preferably 10years), along with corresponding rainfall data and at least three spatially well distributed observation wells in the assessment unit, or one observation well per 100 sq. Km. Regarding frequency of water level data, three water level readings during pre and post monsoon seasons and in the month of January/May preferably in successive years, are the minimum requirements. The rainfall recharge during non-monsoon season is estimated using rainfall infiltration factor method only.

2.1.1.1.1 Ground water level fluctuation method

The ground water level fluctuation method is to be used for assessment of rainfall recharge in the monsoon season. The ground water balance equation in non-command areas is given by

$$\Delta S = R_{RF}+R_{STR}+R_{SWI}+R_{GWI}+R_{TP}+R_{WCS} \pm VF \pm LF - GE - T - E - B \qquad 3$$

Where,

ΔS – Change is storage
R_{RF} – Rainfall recharge
R_{STR}- Recharge from stream channels
R_{SWI} – Recharge from surface water irrigation (Lift Irrigation)
R_{GWI}- Recharge from ground water irrigation
R_{TP}- Recharge from tank& ponds
R_{WCS} – Recharge from water conservation structures
VF – Vertical flow across the aquifer system
LF- Lateral flow along the aquifer system (through flow)
GE-Ground water Extraction
T- Transpiration
E- Evaporation
B-Base flow

Whereas the water balance equation in command area will have another term Recharge due to canals (R_C) and the equation will be as follows:

$$\Delta S = R_{RF}+R_{STR}+R_{C}+R_{SWI}+R_{GWI}+R_{T}+R_{WCS} \pm VF \pm LF - GE - T - E - B \qquad 4$$

The change in storage can be estimated using the following equation:

$$\Delta S = \Delta h * A * S_Y \qquad 5$$

Where

ΔS – Change is storage
Δh - rise in water level in the monsoon season
A - Area for computation of recharge
Sy - Specific Yield

Substituting the expression in equation 5 for storage increase ΔS in terms of water level fluctuation and specific yield, the equations 3 &4 becomes 6 & 7 for non –command and command sub units,

$$R_{RF} = h \times Sy \times A - R_{STR} - R_{SWI} - R_{GWI} - R_{TP} - R_{WCS} \pm VF \pm LF + GE + T + E + B \qquad 6$$

$$R_{RF} = h \times Sy \times A - R_C - R_{STR} - R_{SWI} - R_{GWI} - R_{TP} - R_{WCS} \pm VF \pm LF + GE + T + E + B \qquad 7$$

Where base flow/ recharge to/from streams have not been estimated, the same is assumed to be zero.

The rainfall recharge obtained by using equation 6 & 7 provides the recharge in any particular monsoon season for the associated monsoon season rainfall. This estimate is to be normalized for the normal monsoon season rainfall as per the procedure indicated below.

$$R_{rf}\,(normal) = a \times r(normal) + b \qquad 8$$

where,

R_{rf} (normal) = Normalized Rainfall Recharge in the monsoon season.
r = Monsoon season rainfall
a and b = constants.

2.1.1.1.2 Rainfall Infiltration Factor method

The ground water extraction estimation included in the computation of rainfall recharge using Water Level Fluctuation approach is often subject to uncertainties. Therefore, it is recommended to compare the rainfall recharge obtained from Water Level Fluctuation approach with that estimated using Rainfall Infiltration Factor Method.

Recharge from rainfall is estimated by using the following relationship -

$$R_{rf} = RFIF * A * (R - a)/1000 \qquad 9$$

Where,

R_{rf}= Rainfall recharge in ham
A = Area in Hectares
RFIF = Rainfall Infiltration Factor
R = Rainfall in mm
a = Minimum threshold value above which rainfall induces ground water recharge in mm

10% of Normal annual rainfall is taken as Minimum Rainfall Threshold and 3000mm as Maximum Rainfall limit. The same recharge factor is used for both monsoon and non-monsoon rainfall, with the condition that the recharge due to non-monsoon rainfall is taken as zero, if it is less than 10% of normal annual rainfall. In using the method based on the specified norms, recharge due to both monsoon and non-monsoon rainfall may be estimated for normal rainfall, based on recent 30 to 50 years of data.

2.1.1.1.3 Percent Deviation

Percent Deviation (PD) is the difference between rainfall recharge estimation for normal monsoon season rainfall using the water table fluctuation method and Rainfall Infiltration Factor method. It is computed as

$$\text{PD} = \frac{R_{rf}\,(normal, wtfm) - R_{rf}\,(normal, rifm)}{\mathrm{R}_{\mathrm{rf}}\,(normal, rifm)} \times 100 \qquad \textbf{10}$$

where,

Rrf (normal, wlfm) = Rainfall recharge for normal monsoon season rainfall, estimated by the water level fluctuation method

Rrf (normal, rifm) = Rainfall recharge for normal monsoon season rainfall, estimated by the rainfall infiltration factor method

The rainfall recharge for normal monsoon season rainfall is finally adopted as per the criteria given below:

- If PD is greater than or equal to -20%, and less than or equal to +20%, Rrf (normal) is taken as the value estimated by the water level fluctuation method.
- If PD is less than -20%, Rrf (normal) is taken as equal to 0.8 times the value estimated by the rainfall infiltration factor method.
- If PD is greater than +20%, Rrf (normal) is taken as equal to 1.2 times the value estimated by the rainfall infiltration factor method.

2.1.1.2 Recharge from other Sources

Sl. No.	Sources	Estimation Formula	Parameters
1	**Recharge from Canals**	**R_C=WA * SF * Days**	R_C= Recharge from Canals WA=Wetted Area SF= Seepage Factor **Days= Number of Canal Running Days**
2.	**Recharge from Surface Water Irrigation**	**R_{SWI} =AD*Days*RFF**	R_{SWI} = Recharge due to applied surface water irrigation AD= Average Discharge Days=Number of days water is discharged to the Fields RFF= Return Flow Factor
3.	**Recharge from Ground Water Irrigation**	**R_{GWI} =GE_{IRR}*RFF**	R_{GWI} = Recharge due to applied ground water irrigation GE_{IRR}= Ground Water Extraction for Irrigation **RFF= Return Flow Factor**
4.	**Recharge due to Tanks &Ponds**	**R_{TP} =AWSA*RF**	R_{TP} = Recharge due to Tanks & Ponds AWSA= Average Water Spread Area RF= Recharge Factor
5.	**Rechargedue to Water Conservation Structures**	**R_{WCS} =GS*RF**	R_{WCS} = Recharge due to Water Conservation Structures GS= Gross Storage = Storage Capacity multiplied by number of fillings. RF= Recharge Factor

-

2.1.1.3 Lateral flow along the aquifer system (Through flow)

In equations 6 & 7, if the area under consideration is a watershed, the lateral flow across boundaries can be considered as zero in case such estimates are not available. If there is inflow and outflow across the boundary, theoretically, the net inflow may be calculated using Darcy law, by delineating the inflow and outflow sections of the boundary. Besides such delineation, the calculation also requires estimate of transmissivity and hydraulic gradient across the inflow and outflow sections. In case Lateral Flow is calculated using computer model, the same should be included in the water balance equation.

2.1.1.4 Baseflow and Stream Recharge

If stream gauge stations are located in the assessment unit, the base flow and recharge from streams can be computed using Stream Hydrograph Separation method, Numerical Modelling and Analytical solutions. If the assessment unit is a watershed, a single stream monitoring station at the mouth of the watershed can provide the required data for the calculation of base flow.

Base flow separation methods can be divided into two main types: non-tracer-based and tracer-based separation methods. Non-tracer methods include Stream hydrograph analysis, water balance method and numerical ground water modelling techniques.

Hydro-chemical tracers and environmental isotope methods also use hydrograph separation techniques based on mass balance approach. Stream recharge can also be estimated using the above techniques.

2.1.1.5 Vertical Flow from Hydraulically Connected Aquifers

This can be estimated, provided aquifer geometry and aquifer parameters are known. This can be calculated using the Darcy's law if the hydraulic heads in both aquifers and the hydraulic conductivity and thickness of the aquitard separating both the aquifers are known. Ground water flow modelling is an important tool to estimate such flows. As envisaged in the methodology, regional scale modelling studies will help in refining vertical flow estimates.

2.1.1.6 Evaporation and Transpiration

Evaporation can be estimated for the aquifer in the assessment unit if water levels in the aquifer are within the capillary zone. If field studies are not possible, for areas with water levels within 1.0m bgl, evaporation can be estimated using the evaporation rates available for other adjoining areas. If depth to water level is more than 1.0m bgl, the evaporation losses from the aquifer should be taken as zero.

Transpiration through vegetation is estimated if water levels in the aquifer are within the maximum root zone of the local vegetation. It is recommended to compute the transpiration through field studies. If water levels are within 3.5m bgl, transpiration can be estimated using the transpiration rates available for other areas. If it is greater than 3.5m bgl, thetranspiration should be taken as zero.

For estimating evapotranspiration, field tools like Lysimeters can be used to estimate actual evapotranspiration. Remote sensing based techniques like SEBAL (Surface Energy Balance Algorithm for Land) can be used for estimation of actual evapotranspiration. In case where such data is not available, evapotranspiration losses can be empirically estimated from PET data provided by IMD.

2.1.1.7 Recharge during Monsoon Season

The sum of normalized monsoon rainfall recharge and the recharge from other sources and lateral and vertical flows into the sub unit and stream inflows during monsoon season is the total recharge during monsoon season for the sub unit

2.1.1.8 Recharge during Non-Monsoon Season

The rainfall recharge during non-monsoon season is estimated using Rainfall Infiltration factor Method only when the non-monsoon season rainfall is more than 10% of normal annual rainfall. The sum of non-monsoon rainfall recharge and the recharge from other sources and lateral and vertical flows into the sub unit and stream inflows during non-monsoon season is the total recharge during non-monsoon season for the sub unit.

2.1.1.9 Total Annual Ground Water Recharge

The sum of the recharge during monsoon and non-monsoon seasons is the total annual ground water recharge for the sub unit. Similarly this is to be computed for all the sub units available in the assessment unit.

2.1.1.10 Annual Extractable Ground Water Resource (EGR)

The Annual Extractable Ground Water Resource (EGR) is computed by deducting the Total Annual Natural Discharge from Total Annual Ground Water Recharge

The Ground water baseflow contribution limited to the ecological flow of the river is determined using the present practice(allocation of unaccountable natural discharges to 5% & 10% of annual recharge may be retained in water level fluctuation & rainfall infiltration factor method respectively) where river stage data or the detailed data for quantitative assessment of the natural discharge are not available.

2.1.1.11 Estimation of Ground Water Extraction

Groundwater draft or extraction is to be assessed as follows.

$$\mathbf{GE_{ALL} = GE_{IRR} + GE_{DOM} + GE_{IND}} \qquad \mathbf{11}$$

Where,

GE_{ALL}=Ground water extraction for all uses
GE_{IRR}=Ground water extraction for irrigation
GE_{DOM} =Ground water extraction for domestic uses
GE_{IND} = Ground water extraction for industrial uses

2.1.1.11.1 Ground Water Extraction for Irrigation (GEIRR):

The methods for estimation of ground water extraction are as follows.

***Unit Draft Method:* –** In this method, season-wise unit draft of each type of well in an assessment unit is estimated and multiplied with the number of wells of that particular type to obtain season-wise ground water extraction by that particular structure.

***Crop Water Requirement Method:* –** For each crop, the season-wise net irrigation water requirement is determined and multiplied with the area irrigated by ground water abstraction structures.

***Power Consumption Method:* –**Ground water extraction for unit power consumption (electric) is determined and multiplied with number of units of power consumed for agricultural pump sets to obtain total ground water extraction for irrigation.

2.1.1.11.2 Ground Water Extraction for Domestic Use (GEDOM):

There are several methods for estimation of extraction for domestic use(GE_{DOM}). Some of the commonly adopted methods are described here.

***Unit Draft Method:* –** In this method, unit draft of each type of well is multiplied by the number of wells used for domestic purpose to obtain the domestic ground water draft.

***Consumptive Use Method:* –** In this method, population is multiplied with per capita consumption usually expressed in litre per capita per day (lpcd).

GE_{DOM}= Population X Consumptive Requirement X Lg **12**

Where,

Lg = Fractional Load on Ground Water for Domestic Water Supply

2.1.1.11.3 Ground water Extraction for Industrial use(GEIND):

The commonly adopted methods for estimating the extraction for industrial use are as below:

Unit Draft Method: - In this method, unit draft of each type of well is multiplied by the number of wells used for industrial purpose to obtain the industrial ground water extraction.

***Consumptive Use Pattern Method:* –** In this method, water consumption of different industrial units are determined. Number of Industrial units which are dependent on ground water are multiplied with unit water consumption to obtain ground water draft for industrial use.

GE_{IND}= Number of industrial units X Unit Water Consumption X Lg **13**

Where,

Lg = Fractional load on ground water for industrial water supply

Ground water extraction obtained from different methods need to be compared and based on field checks, the seemingly best value may be adopted. The storage depletion during a season where other recharges are negligible can be taken as ground water extraction during that particular period.

2.1.1.12 Stage of Ground Water Extraction

The stage of ground water extraction is defined by,

$$Stage\ of\ Ground\ Water\ Extraction(\%) = \frac{\text{Existing gross ground water extraction for all uses}}{\text{Annual Extractable Ground water Resources}} \times 100 \qquad \textbf{14}$$

The stage of ground water extraction is obtained separately for command areas, non-command areas and poor ground water quality areas.

2.1.1.13 Validation of Stage of Ground Water Extraction

The assessment based on the stage of ground water extraction has inherent uncertainties. In view of this, it is desirable to validate the 'Stage of Ground Water Extraction' with long term trend of ground water levels.

Long term Water Level trends are prepared for a minimum period of 10 years for both pre-monsoon and post-monsoon period. If the ground water resource assessment and the trend of long term water levels contradict each other, this anomalous situation requires a review of the ground water resource computation, as well as the reliability of water level data. The mismatch conditions are enumerated below.

SOGWE	Ground Water level trend	Remarks
≤70%	Decline in trend in both pre-monsoon and post-monsoon	Not acceptable and needs reassessment
>100%	No significant decline in both pre-monsoon and post-monsoon long term trend	Not acceptable and needs reassessment

2.1.1.14 Categorisation of Assessment Units

As emphasised in the National Water Policy, 2012, a convergence of Quantity and Quality of ground water resources is required while assessing the ground water status. So, estimation has been done separately where water quality is beyond permissible limits for the parameter salinity.

2.1.1.14.1 Categorization of Assessment Units Based on Quantity:

The categorization based on status of ground water quantity is defined by Stage of Ground Water extraction as given below:

Stage of Ground Water Extraction	Category
≤70%	Safe
>70%and ≤90%	Semi-Critical
>90%and ≤100%	Critical
> 100%	Over Exploited

2.1.1.14.2 Categorization of Assessment Units Based on Quality

As it is not possible to categorize the assessment units in terms of the extent of quality hazard, based on the available water quality monitoring mechanism and database on ground water quality, the Committee recommends that each assessment unit, in addition to the Quantity based categorization (safe, semi-critical, critical and over-exploited) should bear a quality hazard identifier. If any of the three quality hazards in terms of Arsenic, Fluoride and Salinity are encountered in the assessment sub unit in mappable units, the assessment sub unit may be tagged with the particular Quality hazard.

2.1.1.15 Allocation of Ground Water Resource for Utilisation

The Annual Extractable Ground Water Resources are to be apportioned between domestic, industrial and irrigation uses and as per the National Water Policy, requirement for domestic water supply is given priority. In situations where adequate data is not available to make this estimate, the following empirical relation is followed:

$$\textbf{Alloc} = 22 \times N \times L_g \ \textbf{mm per year} \qquad \textbf{15}$$

Where

Alloc=Allocation for domestic water requirement
N = population density in the unit in thousands per sq. km.
L_g = fractional load on ground water for domestic and industrial water supply (≤ 1.0)

In deriving equation 27, it is assumed that the requirement of water for domestic use is 60 lpcd . It can never be less than the present day extraction.

2.1.1.16 Net Annual Ground Water Availability for Future Use

The net annual ground water availability for future use is obtained by deducting the allocation for domestic useand current extraction for Irrigation and Industrial uses from the Annual extractable Ground Water Recharge. It is calculated separately for non-command areas and command areas.

2.1.1.17 Additional Potential Resources under Specific Conditions

2.1.1.17.1 Potential Resource Due to Spring Discharge:

Spring discharge occurs at the places where ground water level cuts the surface topography. It is equal to the ground water recharge minus the outflow through evaporation and evapotranspiration and vertical and lateral sub-surface flow. Spring discharge measurement is carried out by volumetric measurement of discharge of the springs. Spring discharges multiplied with time in days of each season gives the quantum of spring resources available during that season. The discharge measurement is made at least 4 times a year in parity with the existing water level monitoring schedule.

Potential ground water resource due to springs = Q x No of days **16**

Where

Q= Spring Discharge
No of days= No of days spring yields.

2.1.1.17.2 Potential Resource in Waterlogged and Shallow Water Table Areas:

In the area where the ground water level is less than 5m below ground level or in waterlogged areas, the resources up to 5m below ground level are potential and would be available for development in addition to the annual recharge in the area. The computation of potential resource to ground water reservoir in shallow water table areas can be done by adopting the following equation:

Potential ground water resource in shallow water table areas = (5-D) x A x S_Y **17**

Where

D = Depth to water table below ground surface in pre-monsoon period in shallow aquifers.
A= Area of shallow water table zone.
S_Y= Specific Yield

2.1.1.17.3 Potential Resource in Flood Prone Areas:

Ground water recharge from a flood plain is mainly the function of the following parameters-

- Areal extent of flood plain
- Retention period of flood
- Type of sub-soil strata and silt charge in the river water which gets deposited and controls seepage

As collection of data on all these factors is time taking and difficult, the potential recharge from flood plain is estimated on the same norms as for ponds, tanks and lakes.

Potential ground water resource in Flood Prone Areas = 1.4 xN x A/1000 **18**

Where

N = No of Days Water is Retained in the Area
A = Flood Prone Area

2.1.1.18 Apportioning of Ground Water Assessment from Watershed to Development Unit:

Where the assessment unit is a watershed, the ground water assessment is converted in terms of an administrative unit such as block/taluka/mandal. This may be done as follows.

A block may comprise of one or more watersheds, in part or full. First, the ground water assessment in the subareas, command, non-command and poor ground water quality areas of the watershed may be converted into depth unit (mm), by dividing the annual recharge by the respective area. The contribution of this subarea of the watershed to the block, is now calculated by multiplying this depth with the area in the block occupied by this sub-area. Then the contribution from the sub-areas of all watersheds occurring in the block is calculated to work out the total ground water resource of the block.

2.1.2 Assessment of In-Storage Ground Water Resources or Static Ground Water Resources

The computation of the static or in-storage ground water resources is done after delineating the aquifer thickness and specific yield of the aquifer material. The computations can be done as follows:-

SGWR = A *(Z_2 - Z_1) * S_Y **19**

Where,

SGWR = Static or in-storage Ground Water Resources
A = Area of the Assessment Unit
Z_2 = Bottom of Unconfined Aquifer
Z_1 = Pre-monsoon water level
S_Y = Specific Yield in the In storage Zone

2.1.3 Assessment of Total Ground Water Availability in Unconfined Aquifer

The sum of Annual Extractable Ground Water Recharge and the In storage ground water resources of an unconfined aquifer is the Total Ground Water Availability of that aquifer.

2.2 GROUNDWATER ASSESSMENT OF CONFINED AQUIFER SYSTEM

The assessment of the ground water resources of the confined aquifers is done by following ground water storage approach. If the areal extent of the confined aquifer is "A" then the total quantity of water added to or released from the entire aquifer is

$$\mathbf{Q = SA\Delta h} \qquad \mathbf{20}$$

Where

Q = Quantity of water confined aquifer can release (m^3)
S = Storativity
A = Areal extent of the confined aquifer (m^2)
Δh= Change in Piezometric head (m)

Once the piezometric head reaches below the top confining bed, it behaves like an unconfined aquifer and directly dewaters the aquifer and there is a possibility of damage to the aquifer as well as topography. The quantity of water released in confined aquifer due to change in pressure can be computed between piezometric head (h_t) at any given time 't' and the bottom of the top confining layer (h_o) by using the following equation.

$$\mathbf{Q_p = SA\Delta h = SA\,(h_t - h_0)} \qquad \mathbf{21}$$

If any development activity is started in the confined aquifer, the assessment is done for both the dynamic as well as in storage resources of the confined aquifer.

2.2.1 Dynamic Ground Water Resources of Confined Aquifer

To assess the dynamic ground water resources the following equation can be used with the pre and post monsoon piezometric heads of the particular aquifer.

$$\mathbf{Q_D = SA\Delta h = SA\,(h_{POST} - h_{PRE})} \qquad \mathbf{22}$$

Where

Q_D = Dynamic Ground Water Resource of Confined Aquifer (m^3)
S = Storativity
A = Areal extent of the confined aquifer (m^2)
Δh = Change in Piezometric head (m)
h_{post} =Piezometric head during post-monsoon period (m amsl)
h_{PRE} = Piezometric head during pre-monsoon period(m amsl)

2.2.2 In storage Ground Water Resources of Confined Aquifer

For assessing the in storage ground water potential of a confined aquifer, the resources between the pre monsoon piezometric head and bottom of the top confining layer is computed. That can be assessed using the following formula:

$$\mathbf{Q_I = SA\Delta h = SA\,(h_{PRE} - h_0)} \qquad \mathbf{23}$$

Where

Q_I =In storage Ground Water Resource of Confined Aquifer (m^3)

S = Storativity

A = Areal extent of the confined aquifer (m^2)

Δh = Change in Piezometric head (m)

h_0 = Bottom level of the top confining layer (m amsl)

h_{PRE} = Piezometric head during pre-monsoon period (m amsl)

If the confined aquifer is not being exploited for any purpose, the dynamic and static resources of the confined aquifer need not be estimated separately. Instead the in storage of the aquifer can be computed using the following formula.

$$Q_p = SA\Delta h = SA\,(h_{POST} - h_0) \qquad 24$$

Where

Q_p = In storage Ground Water Resource of the confined aquifer or the Quantity of water under pressure (m^3)

S = Storativity

A = Areal extent of the confined aquifer (m^2)

Δh = Change in Piezometric head (m)

H_{POST} = Piezometric head during post-monsoon period (m amsl)

h_0 = Bottom of the Top Confining Layer (m amsl)

The calculated resource includes small amount of dynamic resource of the confined aquifer also, which replenishes every year.

2.2.3 Assessment of Total Ground Water Availability of Confined Aquifer

If the confined aquifer is being exploited, the Total Ground Water Availability of the confined aquifer is the sum of Dynamic Ground Water Resources and the In storage ground water resources of that confined aquifer whereas if it is not being exploited, the Total Ground Water Availability of the confined aquifer comprises of only one component i.e. the In storage of the confined aquifer.

2.3 GROUNDWATER ASSESSMENT OF SEMI-CONFINED AQUIFER SYSTEM

The Assessment of Ground Water Resources of a semi-confined aquifer has some more complications. Proper study is needed to determine whether the recharge to this aquifer is computed in the over lying unconfined aquifer or underlying/overlying semi confined aquifers or not. If it is found through field studies that the resources are not assessed in any of the aquifers in the area, then the resources are assessed following the methodology similar tothat used in assessing the resources of Confined aquifers.

2.4 TOTAL GROUNDWATER AVAILABILITY OF AN AREA

The Total Ground water availability in any area is the Sum of Dynamic Ground Water Resources, the total static/in-storage ground water resources in the unconfined aquifer and the dynamic and In-storage resources of the Confined aquifers and semi confined aquifers in the area.

2.5 GROUNDWATER ASSESSMENT IN URBAN AREAS

The Assessment of Ground Water Resources in urban areas is similar to that of rural areas. Because of the availability of draft data and slightly different infiltration process and recharge due to other sources, the following few points are considered.

- Even though the data on existing ground water abstraction structures are available, accuracy is somewhat doubtful and individuals cannot even enumerate the well census in urban areas. Hence, it is recommended to use the difference of the actual demand and the supply by surface water sources as the withdrawal from the ground water resources.

- The urban areas are sometimes concrete jungles and rainfall infiltration is not equal to that of rural areas unless and until special measures are taken in the construction of roads and pavements. Hence, 30% of the rainfall infiltration factor for urban areas is considered as an adhoc arrangement till field studies in these areas are done and documented field studies are available.
- Because of the water supply schemes, there are many pipelines available in the urban areas and the seepages from these channels or pipes are huge in some areas. Hence this component is also to be included in the other resources and the recharge may be estimated. The percent losses may be collected from the individual water supply agencies, 50% of which can be taken as recharge to the ground water system.
- In the urban areas in India, normally, there is no separate channels either open or sub surface for the drainage and flash floods. These channels also recharge to some extent the ground water reservoir. The seepages from the sewerages, which normally contaminate the ground water resources with nitrate also contribute to the quantity of resources and hence same percent as in the case of water supply pipes may be taken as norm for the recharge on the quantity of sewerage when there is sub surface drainage system. If estimated flash flood data is available the same percent can be used on the quantum of flash floods to estimate the recharge from the flash floods.
- A separate ground water assessment has been done for urban areas with population more than 10 lakhs.

2.6 GROUNDWATER ASSESSMENT IN COASTAL AREAS

The Assessment of Ground Water Resources in coastal areas is similar to that of other areas. Because of the nature of hydraulic equilibrium of ground water with sea water, care is taken in assessing the ground water resources of this area. While assessing the resources in these areas, following few points are considered.

- The ground water resources assessment in coastal areas includes the areas where the influence of sea water has an effect on the existence of fresh water in the area.
- Wherever, the pre monsoon and post monsoon water levels are above mean sea level the dynamic component of the estimation will be same as other areas.
- If both these water levels are below sea level, the dynamic component is taken as zero.
- Wherever, the post monsoon water table is above sea level and pre monsoon water table is below sea level, the pre-monsoon water table is taken as at sea level.
- The static or in storage resources are is restricted to the minimum of 40 times the pre monsoon water table or the bottom of the aquifer.

2.7 GROUNDWATER ASSESSMENT IN WATER DEPLETION ZONE

There are areas where ground water level shows a decline even in the monsoon season. The reasons for this may be any one of the following : (a) There is a genuine depletion in the ground water regime, with ground water extraction and natural ground water discharge in the monsoon season(outflow from the region and base flow) exceeding the recharge. (b) There may be an error in water level data due to inadequacy of observation wells.

If it is concluded that the water level data is erroneous, recharge assessment may be made based on rainfall infiltration factor method. If, on the other hand, water level data is assessed as reliable, the ground water level fluctuation method may be applied for recharge estimation. As ΔS in equation 3& 4 is negative, the estimated recharge will be less than the gross ground water extraction in the monsoon season. It must be noted that this recharge is the gross recharge minus the natural discharges in the monsoon season. The immediate conclusion from such an assessment in water depletion zones will be that the area falls under the over-exploited category which requires micro level study.

2.8 MICRO LEVEL STUDIES FOR NOTIFIED AREAS

In all areas which are 'Notified' for ground water regulation by the Central and/ or State Ground Water Authorities, it is necessary to increase the density of observation wells for carrying out micro-level studies to reassess the ground water recharge and draft. Following approach may be adopted:

1. The area may be sub-divided into different hydrogeological sub-areas and into recharge area, discharge area and transition zone and also on quality terms.
2. The number of observation wells should be increased to represent each such sub-areas with at least one observation well with continuous monitoring of water levels.
3. Hydrological and hydrogeological parameters particularly the specific yield should be collected for different formations in each sub-area.
4. Details regarding other parameters like seepage from canals and other surface water projects should be collected after field studies, instead of adopting recommended norms. Base flow should be estimated based on stream gauge measurement.
5. The data of number of existing structures and unit draft should be reassessed after fresh surveys and should match with the actual irrigation pattern in the sub-area.
6. All data available with Central Ground Water Board, State Ground Water Departments and other agencies including research institutions and universities etc. should be collected for the watershed/sub-areas and utilised for reassessment.
7. Ground water assessment for each sub-area may be computed adopting the recommended methodology and freshly collected values of different parameters. The assessment may be made separately for monsoon and non-monsoon period as well as for command and non-command areas.
8. The ground water potential so worked out may be cross-checked with behaviour of ground water levels in the observation wells and both should match. If it does not, the factor that causes such an anomaly should be identified and the revised assessment should be re-examined.
9. Based on the micro-level studies, the sub-areas within the unit and the unit as a whole may be classified adopting norms for categorisation as recommended elsewhere in the methodology.

2.9 NORMS TO BE USED IN ASSESSMENT

The committee recommends that the state agencies should be encouraged to conduct field studies and use these computed norms in the assessment. For conducting field studies, it is recommended to follow the field tested procedures for computing the norms. There is the possibility of error creeping in at various levels in the field study and hence the committee is of the opinion to give a maximum and minimum values for all the norms used in the estimation. The committeecan foresee the handicap of the state agency which is not able to compute the norms by their own field study. In such cases, it suggests an average of the range of norms to be used as the recommended value for the norm.This has been further clarified in the following paragraphs.

2.9.1 Specific Yield

Recently under Aquifer Mapping Project, Central Ground Water Board has classified all the aquifers into 14 Principal Aquifers which in turn were divided into 42 Major Aquifers. Hence, it is required to assign Specific Yield values to all these aquifer units. The values recommended in the Table 2.1 may be followed in the future assessments. The Major aquifer map can be obtained from CGWB Regional offices.

The recommended Specific Yield values are to be used for assessment, unless sufficient data based on field study are available to justify the minimum, maximum or other intermediate values. The Norms suggested below are nothing but the redistribution of norms suggested by GEC-1997 methodology and hence people are encouraged to conduct field studies and strengthen the Norms database.

Table 2.1: Norms recommended for the specific yield

Sl.No	Principal Aquifer	Major Aquifers		Age	Recommended (%)	Minimum (%)	Maximum (%)
		Code	Name				
1	Alluvium	AL01	Younger Alluvium (Clay/Silt/Sand/ Calcareous concretions)	Quaternary	6	4	8
2	Alluvium	AL02	Pebble / Gravel/ Bazada/ Kandi	Quaternary	16	12	20
3	Alluvium	AL03	Older Alluvium (Silt/Sand/Gravel/Lithomargic clay)	Quaternary	10	8	12
4	Alluvium	AL04	Aeolian Alluvium (Silt/ Sand)	Quaternary	16	12	20
5	Alluvium	AL05	Coastal Alluvium (Sand/Silt/Clay)	Quaternary	10	8	12
6	Alluvium	AL06	Valley Fills	Quaternary	16	12	20
7	Alluvium	AL07	Glacial Deposits	Quaternary	16	12	20
8	Laterite	LT01	Laterite / Ferruginous concretions	Quaternary	2.5	2	3
9	Basalt	BS01	Basic Rocks (Basalt) - Weathered, Vesicular or Jointed	Mesozoic to Cenozoic	2	1	3
10	Basalt	BS01	Basic Rocks (Basalt) - Massive Poorly Jointed	Mesozoic to Cenozoic	0.3	0.2	0.5
11	Basalt	BS02	Ultra Basic - Weathered, Vesicular or Jointed	Mesozoic to Cenozoic	2	1	3
12	Basalt	BS02	Ultra Basic - Massive Poorly Jointed	Mesozoic to Cenozoic	0.3	0.2	0.5
13	Sandstone	ST01	Sandstone/Conglomerate	Upper Palaeozoic to Cenozoic	3	1	5
14	Sandstone	ST02	Sandstone with Shale	Upper Palaeozoic to Cenozoic	3	1	5
15	Sandstone	ST03	Sandstone with shale/ coal beds	Upper Palaeozoic to Cenozoic	3	1	5

Sl.No	Principal Aquifer	Major Aquifers		Age	Recommended (%)	Minimum (%)	Maximum (%)
		Code	Name				
16	Sandstone	ST04	Sandstone with Clay	Upper Palaeozoic to Cenozoic	3	1	5
17	Sandstone	ST05	Sandstone/Conglomerate	Proterozoic to Cenozoic	3	1	5
18	Sandstone	ST06	Sandstone with Shale	Proterozoic to Cenozoic	3	1	5
19	Shale	SH01	Shale with limestone	Upper Palaeozoic to Cenozoic	1.5	1	2
20	Shale	SH02	Shale with Sandstone	Upper Palaeozoic to Cenozoic	1.5	1	2
21	Shale	SH03	Shale, limestone and sandstone	Upper Palaeozoic to Cenozoic	1.5	1	2
22	Shale	SH04	Shale	Upper Palaeozoic to Cenozoic	1.5	1	2
23	Shale	SH05	Shale/Shale with Sandstone	Proterozoic to Cenozoic	1.5	1	2
24	Shale	SH06	Shale with Limestone	Proterozoic to Cenozoic	1.5	1	2
25	Limestone	LS01	Miliolitic Limestone	Quarternary	2	1	3
26	Limestone	LS01	KarstifiedMiliolitic Limestone	Quarternary	8	5	15
27	Limestone	LS02	Limestone / Dolomite	Upper Palaeozoic to Cenozoic	2	1	3
28	Limestone	LS02	KarstifiedLimestone / Dolomite	Upper Palaeozoic to Cenozoic	8	5	15
29	Limestone	LS03	Limestone/Dolomite	Proterozoic	2	1	3
30	Limestone	LS03	KarstifiedLimestone/Dolomite	Proterozoic	8	5	15
31	Limestone	LS04	Limestone with Shale	Proterozoic	2	1	3
32	Limestone	LS04	KarstifiedLimestone with Shale	Proterozoic	8	5	15
33	Limestone	LS05	Marble	Azoic to Proterozoic	2	1	3
34	Limestone	LS05	KarstifiedMarble	Azoic to Proterozoic	8	5	15
35	Granite	GR01	Acidic Rocks (Granite,Syenite, Rhyolite etc.) - Weathered , Jointed	Mesozoic to Cenozoic	3	2	4

Sl.No	Principal Aquifer	Major Aquifers		Age	Recommended (%)	Minimum (%)	Maximum (%)
		Code	Name				
36	Granite	GR01	Acidic Rocks (Granite,Syenite, Rhyolite etc.)-Massive or Poorly Fractured	Mesozoic to Cenozoic	0.3	0.2	0.5
37	Granite	GR02	Acidic Rocks (Pegmatite, Granite, Syenite, Rhyolite etc.) - Weathered, Jointed	Proterozoic to Cenozoic	3	2	4
38	Granite	GR02	Acidic Rocks (Pegmatite, Granite, Syenite, Rhyolite etc.) - Massive, Poorly Fractured	Proterozoic to Cenozoic	0.3	0.2	0.5
39	Schist	SC01	Schist - Weathered, Jointed	Azoic to Proterozoic	1.5	1	2
40	Schist	SC01	Schist - Massive, Poorly Fractured	Azoic to Proterozoic	0.3	0.2	0.5
41	Schist	SC02	Phyllite	Azoic to Proterozoic	1.5	1	2
42	Schist	SC03	Slate	Azoic to Proterozoic	1.5	1	2
43	Quartzite	QZ01	Quartzite - Weathered, Jointed	Proterozoic to Cenozoic	1.5	1	2
44	Quartzite	QZ01	Quartzite - Massive, Poorly Fractured	Proterozoic to Cenozoic	0.3	0.2	0.4
45	Quartzite	QZ02	Quartzite - Weathered, Jointed	Azoic to Proterozoic	1.5	1	2
46	Quartzite	QZ02	Quartzite- Massive, Poorly Fractured	Azoic to Proterozoic	0.3	0.2	0.4
47	Charnockite	CK01	Charnockite - Weathered, Jointed	Azoic	3	2	4
48	Charnockite	CK01	Charnockite - Massive, Poorly Fractured	Azoic	0.3	0.2	0.4
49	Khondalite	KH01	Khondalite, Granulites - Weathered, Jointed	Azoic	1.5	1	2
50	Khondalite	KH01	Khondalite, Granulites - Massive, Poorly Fractured	Azoic	0.3	0.2	0.4
51	Banded Gneissic Complex	BG01	Banded Gneissic Complex - Weathered, Jointed	Azoic	1.5	1	2
52	Banded Gneissic Complex	BG01	Banded Gneissic Complex - Massive, Poorly Fractured	Azoic	0.3	0.2	0.4
53	Gneiss	GN01	Undifferentiated metasedimentaries/ Undifferentiated metamorphic - Weathered, Jointed	Azoic to Proterozoic	1.5	1	2
54	Gneiss	GN01	Undifferentiated metasedimentaries/ Undifferentiated	Azoic to Proterozoic	0.3	0.2	0.4

Sl.No	Principal Aquifer	Major Aquifers		Age	Recommended (%)	Minimum (%)	Maximum (%)
		Code	Name				
			metamorphic - Massive, Poorly Fractured				
55	Gneiss	GN02	Gneiss -Weathered, Jointed	Azoic to Proterozoic	1.5	1	2
56	Gneiss	GN02	Gneiss-Massive, Poorly Fractured	Azoic to Proterozoic	0.3	0.2	0.4
57	Gneiss	GN03	Migmatitic Gneiss - Weathered, Jointed	Azoic	1.5	1	2
58	Gneiss	GN03	Migmatitic Gneiss - Massive, Poorly Fractured	Azoic	0.3	0.2	0.4
59	Intrusive	IN01	Basic Rocks (Dolerite, Anorthosite etc.) - Weathered, Jointed	Proterozoic to Cenozoic	2	1	3
60	Intrusive	IN01	Basic Rocks (Dolerite, Anorthosite etc.) - Massive, Poorly Fractured	Proterozoic to Cenozoic	0.3	0.2	0.5
61	Intrusive	IN02	Ultrabasics (Epidiorite, Granophyre etc.) - Weathered, Jointed	Proterozoic to Cenozoic	2	1	3
62	Intrusive	IN02	Ultrabasics (Epidiorite, Granophyre etc.) - Massive, Poorly Fractured	Proterozoic to Cenozoic	0.3	0.2	0.5

2.9.2 Rainfall Infiltration Factor

It is recommended that to assign Rainfall Infiltration Factor values to all the aquifer units recently classified by the Central Ground Water Board. The values recommended in Table 2.2 may be followed in the future assessments. The recommended Rainfall Infiltration Factor values are to be used for assessment, unless sufficient data based on field study is available to justify the minimum, maximum or other intermediate values.

An additional 2% of rainfall recharge factor may be used in such areas or parts of the areas where watershed development with associated soil conservation measures are implemented. This additional factor is subjective and is separate from the contribution due to the water conservation structures such as check dams, nalla bunds, percolation tanks etc. The norms for the estimation of recharge due to these structures are provided separately. This additional factor of 2% is at this stage, only provisional, and will need revision based on pilot studies.

The Norms suggested below are nothing but the redistribution of norms suggested by GEC-1997 methodology and hence people are encouraged to conduct field studies and strengthen the Norms database.

Table 2.2: Norms recommended for the Rainfall Infiltration Factor

Sl.No	Principal Aquifer	Major Aquifers		Age	Recommended (%)	Minimum (%)	Maximum (%)
		Code	Name				
1	Alluvium	AL01	Younger Alluvium (Clay/Silt/Sand/ Calcareous concretions)	Quaternary	22	20	24
2	Alluvium	AL02	Pebble / Gravel/ Bazada/ Kandi	Quaternary	22	20	24
3	Alluvium	AL03	Older Alluvium (Silt/Sand/Gravel/Lithomargic clay)	Quaternary	22	20	24
4	Alluvium	AL04	Aeolian Alluvium (Silt/ Sand)	Quaternary	22	20	24
5	Alluvium	AL05	Coastal Alluvium (Sand/Silt/Clay) -East Coast	Quaternary	16	14	18
5	Alluvium	AL05	Coastal Alluvium (Sand/Silt/Clay) - West Coast	Quaternary	10	8	12
6	Alluvium	AL06	Valley Fills	Quaternary	22	20	24
7	Alluvium	AL07	Glacial Deposits	Quaternary	22	20	24
8	Laterite	LT01	Laterite / Ferruginous concretions	Quaternary	7	6	8
9	Basalt	BS01	Basic Rocks (Basalt) - Vesicular or Jointed	Mesozoic to Cenozoic	13	12	14
9	Basalt	BS01	Basic Rocks (Basalt) – Weathered	Mesozoic to Cenozoic	7	6	8
10	Basalt	BS01	Basic Rocks (Basalt) - Massive Poorly Jointed	Mesozoic to Cenozoic	2	1	3
11	Basalt	BS02	Ultra Basic - Vesicular or Jointed	Mesozoic to Cenozoic	13	12	14
11	Basalt	BS02	Ultra Basic – Weathered	Mesozoic to Cenozoic	7	6	8
12	Basalt	BS02	Ultra Basic - Massive Poorly Jointed	Mesozoic to Cenozoic	2	1	3
13	Sandstone	ST01	Sandstone/Conglomerate	Upper Palaeozoic to Cenozoic	12	10	14
14	Sandstone	ST02	Sandstone with Shale	Upper Palaeozoic to Cenozoic	12	10	14
15	Sandstone	ST03	Sandstone with shale/ coal beds	Upper Palaeozoic to Cenozoic	12	10	14
16	Sandstone	ST04	Sandstone with Clay	Upper Palaeozoic to Cenozoic	12	10	14
17	Sandstone	ST05	Sandstone/Conglomerate	Proterozoic to Cenozoic	6	5	7
18	Sandstone	ST06	Sandstone with Shale	Proterozoic to Cenozoic	6	5	7

Sl.No	Principal Aquifer	Major Aquifers		Age	Recommended (%)	Minimum (%)	Maximum (%)
		Code	Name				
19	Shale	SH01	Shale with limestone	Upper Palaeozoic to Cenozoic	4	3	5
20	Shale	SH02	Shale with Sandstone	Upper PalaeozoictoCenozoic	4	3	5
21	Shale	SH03	Shale, limestone and sandstone	Upper Palaeozoic to Cenozoic	4	3	5
22	Shale	SH04	Shale	Upper Palaeozoic to Cenozoic	4	3	5
23	Shale	SH05	Shale/Shale with Sandstone	Proterozoic to Cenozoic	4	3	5
24	Shale	SH06	Shale with Limestone	Proterozoic to Cenozoic	4	3	5
25	Limestone	LS01	Miliolitic Limestone	Quarternary	6	5	7
27	Limestone	LS02	Limestone / Dolomite	Upper Palaeozoic to Cenozoic	6	5	7
29	Limestone	LS03	Limestone/Dolomite	Proterozoic	6	5	7
31	Limestone	LS04	Limestone with Shale	Proterozoic	6	5	7
33	Limestone	LS05	Marble	Azoic to Proterozoic	6	5	7
35	Granite	GR01	Acidic Rocks (Granite,Syenite, Rhyolite etc.) - Weathered , Jointed	Mesozoic to Cenozoic	11	10	12
36	Granite	GR01	Acidic Rocks (Granite,Syenite, Rhyolite etc.)-Massive or Poorly Fractured	Mesozoic to Cenozoic	2	1	3
37	Granite	GR02	Acidic Rocks (Pegmatite, Granite, Syenite, Rhyolite etc.) - Weathered, Jointed	Proterozoic to Cenozoic	11	10	12
38	Granite	GR02	Acidic Rocks (Pegmatite, Granite, Syenite, Rhyolite etc.) - Massive, Poorly Fractured	Proterozoic to Cenozoic	2	1	3
39	Schist	SC01	Schist - Weathered, Jointed	Azoic to Proterozoic	7	5	9
40	Schist	SC01	Schist - Massive, Poorly Fractured	Azoic to Proterozoic	2	1	3
41	Schist	SC02	Phyllite	Azoic to Proterozoic	4	3	5
42	Schist	SC03	Slate	Azoic to Proterozoic	4	3	5
43	Quartzite	QZ01	Quartzite - Weathered, Jointed	Proterozoic to Cenozoic	6	5	7

Sl.No	Principal Aquifer	Major Aquifers		Age	Recommended (%)	Minimum (%)	Maximum (%)
		Code	Name				
44	Quartzite	QZ01	Quartzite - Massive, Poorly Fractured	Proterozoic to Cenozoic	2	1	3
45	Quartzite	QZ02	Quartzite - Weathered, Jointed	Azoic to Proterozoic	6	5	7
46	Quartzite	QZ02	Quartzite- Massive, Poorly Fractured	Azoic to Proterozoic	2	1	3
47	Charnockite	CK01	Charnockite - Weathered, Jointed	Azoic	5	4	6
48	Charnockite	CK01	Charnockite - Massive, Poorly Fractured	Azoic	2	1	3
49	Khondalite	KH01	Khondalite, Granulites - Weathered, Jointed	Azoic	7	5	9
50	Khondalite	KH01	Khondalite, Granulites - massive, Poorly Fractured	Azoic	2	1	3
51	Banded Gneissic Complex	BG01	Banded Gneissic Complex - Weathered, Jointed	Azoic	7	5	9
52	Banded Gneissic Complex	BG01	Banded Gneissic Complex - Massive, Poorly Fractured	Azoic	2	1	3
53	Gneiss	GN01	Undifferentiated metasedimentaries/ Undifferentiated metamorphic - Weathered, Jointed	Azoic to Proterozoic	7	5	9
54	Gneiss	GN01	Undifferentiated metasedimentaries/ Undifferentiated metamorphic - Massive, Poorly Fractured	Azoic to Proterozoic	2	1	3
55	Gneiss	GN02	Gneiss -Weathered, Jointed	Azoic to Proterozoic	7	5	9
56	Gneiss	GN02	Gneiss-Massive, Poorly Fractured	Azoic to Proterozoic	2	1	3
57	Gneiss	GN03	Migmatitic Gneiss - Weathered, Jointed	Azoic	7	5	9
58	Gneiss	GN03	Migmatitic Gneiss - Massive, Poorly Fractured	Azoic	2	1	3
59	Intrusive	IN01	Basic Rocks (Dolerite, Anorthosite etc.) - Weathered, Jointed	Proterozoic to Cenozoic	7	6	8
60	Intrusive	IN01	Basic Rocks (Dolerite, Anorthosite etc.) - Massive, Poorly Fractured	Proterozoic to Cenozoic	2	1	3

Sl.No	Principal Aquifer	Major Aquifers		Age	Recommended (%)	Minimum (%)	Maximum (%)
		Code	Name				
61	Intrusive	IN02	Ultra Basics (Epidiorite, Granophyre etc.) - Weathered, Jointed	Proterozoic to Cenozoic	7	6	8
62	Intrusive	IN02	Ultra Basics (Epidiorite, Granophyre etc.) - Massive, Poorly Fractured	Proterozoic to Cenozoic	2	1	3

2.9.3 Norms for Canal Recharge

Unlike other norms, the Recharge factor for calculating Recharge due to canals is given in two units' viz. ham/million m^2 of wetted area/day and cumecs per million m^2 of wetted area. As all other norms are in ham, the committee recommends the norm in ham/million m^2 of wetted area for computing the recharge due to canals.

There is a wide variation in the values of the recharge norms proposed by GEC 1997.The Canal seepage norm is approximately 150times the other recharge norms. In the absence of any field studies to refine the norms it is decided by the committee to continue with the same norms. The committee strongly recommends that each state agency must conduct one filed study at least one in each district before completing the first assessment using this methodology. The committee also suggests a recommended value and minimum and maximum values as in the case of other norms. Where specific results are available from case studies in some states, the adhoc norms are to be replaced by norms evolved from these results.

The Norms suggested in Table 2.3 below are nothing but the rationalization and redistribution of norms suggested by GEC-1997 methodology and hence people are encouraged to conduct field studies and strengthen the Norms database.

Table2.3: Norms recommended for the Recharge due to Canals

Formation	Canal Seepage factor ham/day/million Square meters of wetted Area		
	Recommended	Minimum	Maximum
Unlined canals in normal soils with some clay content along with sand	17.5	15	20
Unlined canals in sandy soil with some silt content	27.5	25	30
Lined canals in normal soils with some clay content along with sand	3.50	3	4
Lined canals in sandy soil with some silt content	5.5	5	6
All canals in hard rock area	3.5	3	4

2.9.4 Norms for Recharge Due to Irrigation

The Norms Suggested by GEC-1997 gives for only three ranges of water levels and it creates a problem in the boundary conditions. For instance as a result of the variation in water level from 24.9 to 25.1m bgl in the adjoining blocks, change occurs in the return flow from irrigation in the range of 10% to 15%. Hence to reduce the discrepancy it is recommended to have linear relationship of the norms in between 10m bgl water level and 25m bgl water level. It is proposed to have the same norm of 10m bgl zone for all the water levels less than 10m. Similarly the norm recommended for 25m may be used for the water levels more than 25m as well. The Recommended Norms are presented in Table 2.4.

For surface water, the recharge is to be estimated based on water released at the outlet. For ground water, the recharge is to be estimated based on gross draft. Where continuous supply is used instead of rotational supply, an additional recharge of 5% of application may be used.Wherespecific results are available from case studies in some states, the adhoc norms are to be replaced by norms evolved from these results.

Table 2.4: Norms recommended for the recharge from irrigation

DTW	Ground Water		Surface Water	
m bgl	Paddy	Non Paddy	Paddy	Non Paddy
<=10	45.0	25.0	50.00	30.0
11	43.3	23.7	48.3	28.7
12	40.4	22.1	45.1	26.8
13	37.7	20.6	42.1	25.0
14	35.2	19.2	39.3	23.3
15	32.9	17.9	36.7	21.7
16	30.7	16.7	34.3	20.3
17	28.7	15.6	32.0	18.9
18	26.8	14.6	29.9	17.6
19	25.0	13.6	27.9	16.4
20	23.3	12.7	26.0	15.3
21	21.7	11.9	24.3	14.3
22	20.3	11.1	22.7	13.3
23	18.9	10.4	21.2	12.4
24	17.6	9.7	19.8	11.6
>=25	20.0	5.0	25.0	10.0

2.9.5 Norms for Recharge due to Tanks & Ponds

As the data on the field studies for computing recharge from Tanks & Ponds are very limited, it is recommended to follow the same norm as followed in GEC 1997in future assessments also. Hence the norm recommended by GEC-2015 for Seepage from Tanks & Ponds is 1.4 mm / day.

2.9.6 Norms for Recharge due to Water Conservation Structures

Even though the data on the field studies for computing recharge from Water Conservation Structures are very limited, it is recommended that the Recharge from the water conservation structures is 40% of the Gross Storage based on the field studies by Non-Government Organizations. Hence, the norm recommended by GEC-2015 for the seepage from Water Conservation Structures is 40% of gross storage during a year which means 20% during monsoon season and 20% during non-monsoon Season.

2.9.7 Norm for Percapita Requirement

As the option is given to use the actual requirement for domestic needs, the Requirement Norm recommended by the committee is 60 lpcd for domestic needs. This can be modified if the actual requirement is known.

2.9.8 Norm for Natural Discharges

The Discharge Norm used in computing Unaccounted Natural Discharge is 5% if water table fluctuation method is used or 10% if rainfall infiltration method is used for assessing the Rainfall recharge. This committee recommends tocompute the base flow for each assessment unit. Wherever, there is no assessment of base flow, earlier norms recommended by GEC 1997 i.e., 5% or 10% of the Total Annual Ground Water Recharge as the Natural Discharges may be continued.

2.9.9 Unit Draft

GEC-1997 recommends to use well census method for computing the ground water draft. The norm used for computing ground water draft is the unit draft. The unit draft can be computed by field studies. This method involves selecting representative abstraction structure and calculating the discharge from that particular type of structure and collecting the information on how many hours of pumping is being done in various seasons and number of such days during each season. The Unit Draft during a particular season can be computed using the following equation:

$$Unit\ Draft = Discharge\ in\ m^3 |hr \times No. of\ \ Pumping\ hrs\ in\ a\ day \times No. of\ \ days \qquad \textbf{25}$$

One basic drawback in the methodology of computing unit draft is that there is no normalization procedure for the same. As per GEC-1997 guidelines, the recharge from rainfall is normalized for a normal rainfall. It means that even though the resources are estimated in a surplus rainfall year or in a deficit rainfall year, the assessment is normalized for a normal rainfall which is required for planning. For recharge from other sources, average figures/ values are taken. If the average figures are not available for any reason,60% of the design figures are taken. This procedure is very much essential as the planning should be for average resources rather than for the recharge due to excess rainfall or deficit rainfall. But the procedure that is being followed for computing unit draft does not have any normalization procedure. Normally, if the year in which one collects the draft data in the field is an excess rainfall year, the abstraction from ground water will be less. Similarly, if the year of the computation of unit draft is a drought year the unit draft will be high. Hence, there is a requirement to devise a methodology that can be used for the normalization of unit draft figures. The following are the two simple techniques, which can be followed. If the unit draft values for one rainfall cycle are available for at least 10 years second method shown in equation 40 is to be followed or else the first method shown in equation 39 may be used.

$$Normalized\ Unit\ Draft = \frac{Unit\ Draft \times Rainfall\ \ for\ the\ Year}{Normal\ Rainfall} \qquad \textbf{26}$$

$$Normalized\ Unit\ Draft = \frac{\sum_{i=1}^{n} Unit\ Draft_i}{Number\ of\ Years} \qquad \textbf{27}$$

Although GEC-1997 methodology recommends a default value for the unit drafts, each State is using its own values, generally after conducting field studies, even though without a documentation. Hence, it is felt that this norm may be computed by the state agency, which is going to assess the norms before commencement of the assessment. But it is strongly recommended that the field studies should be documented and submitted along with the results of the assessment.

CHAPTER 3

3.0 RAINFALL OF INDIA

Rainfall is the main source of ground water recharge in the country. However, distribution of rainfall has a wide variation both in space and time. Rain gauge stations are established and maintained by different departments and Undertakings of Central and State governments and also by private parties as per their specific data requirements. Though the period of seasons varies from place to place, for climatological purposes especially for rainfall, a year is divided into 4 seasons: Winter (January and February), Pre monsoon (March to May), South West Monsoon (June to September) and Post Monsoon (October to December). Most part of India receives rainfall mainly during SW Monsoon season. However, main Rainfall season in Tamil Nadu is October–December. Jammu and Kashmir, Himachal Pradesh and Uttarakhand receive significant rainfall in all four seasons.

Over 75% of the annual rainfall is received in the four rainy months of June to September only thereby leading to large variations on temporal scale. The average annual rainfall is 119 cm, but it has great spatial variations. The areas on the Western Ghats and the Sub-Himalayan areas in North East and Meghalaya Hills receive heavy rainfall of over 250 cm annually, whereas the areas of Northern parts of Kashmir and Western Rajasthan receive rainfall less than 40 cm. The state-wise distribution of annual normal rainfall is depicted in Fig 3.1 and the monthly rainfall normals are shown in Table 3.1. These monthly rainfall normals were computed by the India Meteorological Department based on data of network of 2412 stations all over the India. The two significant features of India's rainfall is that, in the north India, rainfall decreases westwards and in the Peninsular India, it decreases eastwards and then increases in the coastal region.

In 2016, the country received annual rainfall of 91% of its normal rainfall i.e. 118.7 cm. During SW monsoon season it received 97% of normal rainfall i.e. 89 cm. The country experienced deficiency in rainfall as compared to its normal rainfall during the months of June (10%), August (8%) and September (3%). However, in July, it was 7% more than its normal rainfall.

The country received maximum rainfall in the month of July as 309.2 mm and minimum in the month of November as 7.7 mm. However, on comparing with normals, it is observed that the maximum positive departure is of 9% from its normal rainfall in the month of May whereas the maximum negative departure of rainfall was of 74% in the month of November. The state wise Monthly Actual Rainfall (mm) for the year 2016 is given in Table 3.2.

(Source: Rainfall Statistics of India 2016 of India Meteorological Department (Report no ESSO/IMD/HS/R.F. Report/01(2017)/23.

The annual rainfall distribution 2016, subdivision-wise, as per the India Meteorological Department is given in Figure 3.2 and south-west monsoon rainfall (June-September) distribution is given in Figure 3.3. and post-monsoon rainfall distribution (Oct-Dec) is given in figure 3.4. Perusal of the figure 3.2 indicates that, out of 36 meteorological sub-divisions, one had excess rainfall (>120% of normal), 23 had normal rainfall (80% to 120% of normal) and 12 had deficient rainfall (60% to 80% of normal). Deficit rainfall was observed in Telangana, Karnataka, Tamil Nadu, Kerala, western parts of Gujarat, Delhi, Himachal Pradesh, Haryana, Punjab and Jammu & Kashmir states. Normal Rainfall was observed in rest of the country except Eastern Rajasthan where it was Excess. Perusal of figure 3.3 indicates out of 36 meteorological divisions, in comparison with normal rainfall, three sub-divisions had excess rainfall (120% to 160% of normal), twenty two had normal rainfall (80% to 120% of normal), and ten had deficit rainfall (60% to 80% of normal). that Perusal of Figure 3.4 indicates that out of 36 meteorological divisions, in comparison with normal rainfall, 3 sub-divisions have rainfall large excess (more than 160% of normal), one had excess rainfall (120% to 160% of normal), seven had normal rainfall (80% to 120% of normal), twelve had deficit rainfall (60% to 80% of normal) and thirteen had large deficit or scanty rainfall (less than 60% of normal).

Table 3.1 State-wise Monthly Rainfall Normals (mm)

STATES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A & N ISLAND (UT)	53.7	29.2	25.0	81.5	358.5	438.6	407.7	403.8	432.4	296.7	253.7	145.5
ARUNACHAL PRADESH	50.1	98.0	179.7	278.8	291.9	500.4	536.1	359.9	371.6	183.0	45.8	38.4
ASSAM	16.2	32.2	78.4	173.1	304.6	427.2	454.2	356.6	285.4	131.9	25.1	11.9
MEGHALAYA	16.3	23.9	75.5	210.1	432.3	779.8	923.0	607.4	476.6	237.7	42.6	11.9
NAGALAND	18.7	28.8	62.7	136.0	215.0	344.5	402.2	352.8	230.4	120.6	38.1	10.0
MANIPUR	14.0	32.0	57.7	119.1	181.3	421.2	378.8	343.7	260.8	170.0	49.6	11.6
MIZORAM	11.3	28.1	94.5	149.3	319.9	434.6	456.0	443.4	374.3	235.6	65.1	14.7
TRIPURA	11.1	33.6	93.9	222.8	393.6	463.6	410.7	354.0	260.8	176.8	43.2	11.2
SIKKIM	54.8	88.8	166.4	223.0	340.1	494.0	494.0	431.2	381.6	238.7	37.6	21.4
WEST BENGAL	14.4	19.5	28.8	54.0	132.0	303.1	411.3	362.4	313.6	128.3	21.1	7.3
ODISHA	10.8	21.0	27.0	37.5	70.2	214.1	337.0	362.1	236.7	111.6	27.7	4.8
JHARKHAND	16.1	17.3	17.1	18.4	43.9	197.5	334.6	315.8	244.0	75.2	9.9	6.5
BIHAR	13.3	9.7	10.1	16.3	51.1	168.5	343.5	291.6	224.0	64.8	6.9	5.8
UTPRADESH	17.4	13.5	9.7	5.3	15.4	93.0	281.8	293.6	177.7	46.3	4.6	7.0
UTTARAKHAND	52.1	54.1	57.6	33.3	65.1	167.8	428.1	426.3	206.9	58.6	9.7	21.3
HARYANA	17.6	14.8	12.6	7.4	13.6	45.1	163.3	171.2	80.2	17.4	4.8	6.7
CHANDIGARH (UT)	44.3	38.9	33.2	14.8	30.1	120.0	282.4	287.5	154.3	31.8	9.9	23.4
DELHI	16.4	16.3	15.3	8.9	19.3	59.8	220.7	245.5	110.2	20.5	5.6	8.6
PUNJAB	25.2	24.3	25.3	12.5	15.7	44.4	186.0	170.4	91.1	22.0	5.7	13.3
HIMACHAL PRADESH	97.5	98.0	114.2	65.4	65.3	95.4	306.9	283.0	140.0	42.5	20.3	45.4
JAMMU & KASHMIR	95.7	117.2	151.9	97.5	76.6	64.1	192.4	186.0	92.1	38.9	33.0	59.9
RAJASTHAN	4.5	4.6	3.6	3.6	10.8	44.5	156.8	150.8	66.9	10.7	4.8	2.2
MADHYA PRADESH	13.7	9.6	7.9	3.3	6.8	117.7	316.2	335.2	183.2	35.4	10.4	9.0
GUJARAT	0.5	0.3	1.2	0.1	3.9	106.3	256.4	196.5	113.5	20.6	10.2	1.0
DADRA & NAGAR HAVELI (UT)	0.0	0.2	0.0	0.0	9.1	349.2	832.9	630.2	350.0	40.1	14.8	0.0
DAMAN & DIU (UT)	0.1	0.4	0.2	0.1	6.1	284.3	636.0	452.6	247.5	37.6	14.8	0.3
GOA	0.5	0.1	0.5	7.4	87.4	905.7	1103.4	680.8	280.4	155.4	35.1	10.2
MAHARASHTRA	4.8	3.4	6.0	7.3	19.9	204.8	339.0	283.5	180.0	75.3	19.3	7.8
CHHATISGARH	10.5	10.3	12.7	14.4	19.7	185.5	377.5	374.8	215.5	63.3	9.2	5.5
ANDHRA PRADESH	5.7	7.5	9.2	21.0	60.6	88.9	132.5	134.7	148.3	166.5	89.4	25.7
TELANGANA	5.8	5.5	9.4	16.5	30.9	135.9	238.2	218.8	162.3	92.2	21.6	5.5
TAMILNADU	17.4	13.4	18.4	42.6	67.5	45.9	67.9	87.3	115.9	179.9	169.1	87.1
PUDUCHERRY (UT)	29.5	27.2	16.8	12.8	40.0	47.9	76.1	112.9	118.0	272.3	403.3	234.5
KARNATAKA	1.8	2.0	6.5	34.4	82.1	197.2	274.2	202.4	158.4	137.3	41.0	9.9
KERALA	8.7	15.6	30.4	109.5	239.8	649.8	726.1	419.5	244.2	292.3	150.9	37.5
LAKSHADWEEP (UT)	20.8	14.7	11.8	48.9	171.7	330.2	287.7	217.5	163.1	157.1	117.7	58.8

Fig 3.1 State-wise annual normal rainfall (1951-2000)

Table 3.2 State-wise Monthly Actual Rainfall (mm) – 2016

STATES	JAN	FEB	Winter Totals	MAR	APR	MAY	Pre Monsoon Totals	JUN	JUL	AUG	SEP	SW Monsoon Totals	OCT	NOV	DEC	Post Monsoon Totals	Annual
A&N ISLAND (UT)	72.0	15.8	87.8	5.4	2.4	191.1	198.9	429.4	301.2	227.7	604.3	1562.6	287.2	181.7	533.7	1002.6	2851.9
ARUNACHAL PRADESH	29.4	73.2	102.6	128.4	333.1	278.9	740.4	379.4	620.1	145.7	532.9	1678.1	172.7	8.4	4.6	185.7	2706.8
ASSAM	20.3	19.6	39.9	69.5	345.7	340.4	755.6	328.0	406.5	182.6	273.6	1190.7	108.4	39.1	6.9	154.4	2140.6
MEGHALAYA	14.0	2.2	16.2	45.3	264.7	307.8	617.8	581.7	934.6	199.6	260.1	1976.0	235.8	34.9	10.8	281.5	2891.5
NAGALAND	20.0	9.6	29.6	22.3	57.1	125.3	204.7	237.3	294.4	244.8	207.9	984.4	75.1	67.3	3.8	146.2	1364.9
MANIPUR	4.0	42.3	46.3	20.0	106.5	180.1	306.6	360.2	381.1	208.7	310.2	1260.2	112.7	51.1	0.4	164.2	1777.3
MIZORAM	1.5	31.0	32.5	63.7	161.6	294.1	519.4	352.9	345.6	359.6	417.1	1475.2	146.1	60.3	0.0	206.4	2233.5
TRIPURA	2.9	63.2	66.1	118.7	224.7	495.0	838.4	254.1	322.7	356.5	255.6	1188.9	122.8	163.7	2.0	288.5	2381.9
SIKKIM	54.2	22.7	76.9	214.3	181.7	337.4	733.4	485.5	515.6	255.8	561.0	1817.9	128.1	0.0	0.2	128.3	2756.5
WEST BENGAL	9.5	29.9	39.4	23.5	20.0	129.9	173.4	277.5	449.9	362.1	292.6	1382.1	93.1	14.4	0.1	107.6	1702.5
ODISHA	2.2	16.7	18.9	15.2	8.6	74.9	98.7	164.2	280.3	320.8	266.2	1031.5	93.5	10.4	0.5	104.4	1253.5
JHARKHAND	12.6	7.6	20.2	17.5	1.0	72.8	91.3	122.9	301.0	395.6	287.5	1107.0	45.6	0.0	0.0	45.6	1264.1
BIHAR	9.3	0.6	9.9	5.6	3.9	84.0	93.5	128.7	356.4	150.8	357.9	993.8	60.8	0.0	0.0	60.8	1158.0
UTTAR PRADESH	4.1	1.6	5.7	9.9	0.2	35.0	45.1	70.4	343.7	208.2	109.2	731.5	19.5	0.0	0.0	19.5	801.8
UTTARAKHAND	5.4	29.3	34.7	45.8	9.9	99.3	155.0	174.4	508.4	308.5	111.4	1102.7	12.7	0.0	3.5	16.2	1308.6
HARYANA	0.0	1.1	1.1	20.7	0.6	26.8	48.1	34.8	155.1	133.8	13.7	337.4	5.2	0.0	0.9	6.1	392.7
CHANDIGARH (UT)	0.0	1.3	1.3	57.9	15.8	59.5	133.2	133.6	131.1	150.5	41.7	456.9	0.1	0.1	22.8	23.0	614.4
DELHI	0.0	1.1	1.1	17.9	0.1	22.5	40.5	59.7	312.0	103.1	48.0	522.8	3.5	0.0	0.0	3.5	567.9
PUNJAB	6.5	6.0	12.5	34.6	0.8	24.8	60.2	52.6	153.1	144.8	17.4	367.9	1.9	0.5	1.1	3.5	444.1
HIMACHAL PRADESH	18.7	38.4	57.1	114.4	47.5	70.2	232.1	101.3	194.0	272.7	56.8	624.8	5.3	0.0	2.2	7.5	921.5
JAMMU & KASHMIR	34.5	44.4	78.9	191.4	82.0	58.4	331.8	62.9	193.0	181.8	45.1	482.8	3.3	0.0	6.1	9.4	902.9
RAJASTHAN	0.3	.1	1.4	5.4	0.2	6.5	12.1	45.8	189.0	277.6	23.9	536.3	24.5	0.0	0.0	24.5	574.3
MADHYA PRADESH	11.7	1.0	12.7	9.0	0.0	13.4	22.4	105.8	484.7	424.1	117.7	1132.3	35.6	0.0	0.0	35.6	1203.0
GUJARAT	0.0	0.0	0.0	0.4	0.0	0.8	1.2	31.0	173.7	253.7	79.5	537.9	65.7	0.0	0.0	65.7	604.8
DADRA & NAGAR HAVELI (UT)	NA	NA	NA	N.A	N.A	N.A	NA	170.9	1126.4	1075.1	360.0	85.7	85.7	N.A	N.A	85.7	171.4
DAMAN & DIU (UT)	0.0	0.0	0.0	0.4	0.0	0.0	0.4	200.6	621.2	591.5	390.0	1803.3	54.2	0.0	0.0	54.2	1857.9

Table 3.2 State-wise Monthly Actual Rainfall (mm) – 2016

STATES	JAN	FEB	Winter Totals	MAR	APR	MAY	Pre Monsoon Totals	JUN	JUL	AUG	SEP	SW Monsoon Totals	OCT	NOV	DEC	Post Monsoon Totals	Annual
GOA	0.0	0.0	0.0	0.0	0.1	8.8	8.9	1213.8	966.8	483.1	296.6	2960.3	85.8	9.3	0.9	96.0	3065.2
MAHARASHTRA	0.2	2.6	2.8	11.6	2.9	8.3	22.8	197.0	467.0	240.8	262.5	1167.3	79.0	0.5	0.4	79.9	1272.8
CHHATISGARH	6.1	3.6	9.7	24.5	4.4	19.6	48.5	164.2	361.0	357.1	295.6	1177.9	79.8	0.0	0.0	79.8	1315.9
ANDHRA PRADESH	4.3	0.5	4.8	2.4	1.9	103.9	108.2	163.7	131.3	89.5	168.3	552.8	40.5	9.9	44.3	94.7	760.5
TELANGANA	1.2	0.2	1.4	11.5	4.3	55.1	70.9	194.0	235.8	133.7	336.3	899.8	70.4	0.5	0.4	71.3	1043.4
TAMILNADU	2.5	0.8	3.3	3.1	6.3	102.4	111.8	63.1	87.0	54.8	48.8	253.7	65.9	33.7	66.4	166.0	534.8
PUDUCHERRY (UT)	0.7	0.0	0.7	0.4	0.0	125.3	125.7	45.9	20.7	155.7	115.0	337.3	39.2	54.6	98.1	191.9	655.6
KARNATAKA	1.9	0.4	2.3	4.1	9.2	74.7	88.0	234.6	237.7	116.9	117.1	706.3	30.1	7.1	16.1	53.3	849.9
KERALA	3.0	16.4	19.4	22.4	33.3	258.4	314.1	595.7	441.5	231.0	84.1	1352.3	105.1	57.9	22.0	185.0	1870.8
LAKSHADWEEP (UT)	59.6	12.1	71.7	3.2	2.6	77.4	83.2	321.1	262.6	86.2	75.6	745.5	58.6	32.0	74.7	165.3	1065.7
Country Average	11.8	14.2	26.0	38.3	55.2	118.9	212.5	237.2	369.6	263.5	217.8	1014.6	73.7	23.9	26.4	122.6	1369.0

Note

1. Where the data is not available, it is mentioned as NA

2. Post Monsson total refers to NE Monsoon totals in the State of Kerala, Tamil Nadu & Andhra Pradesh

3. Data Source:

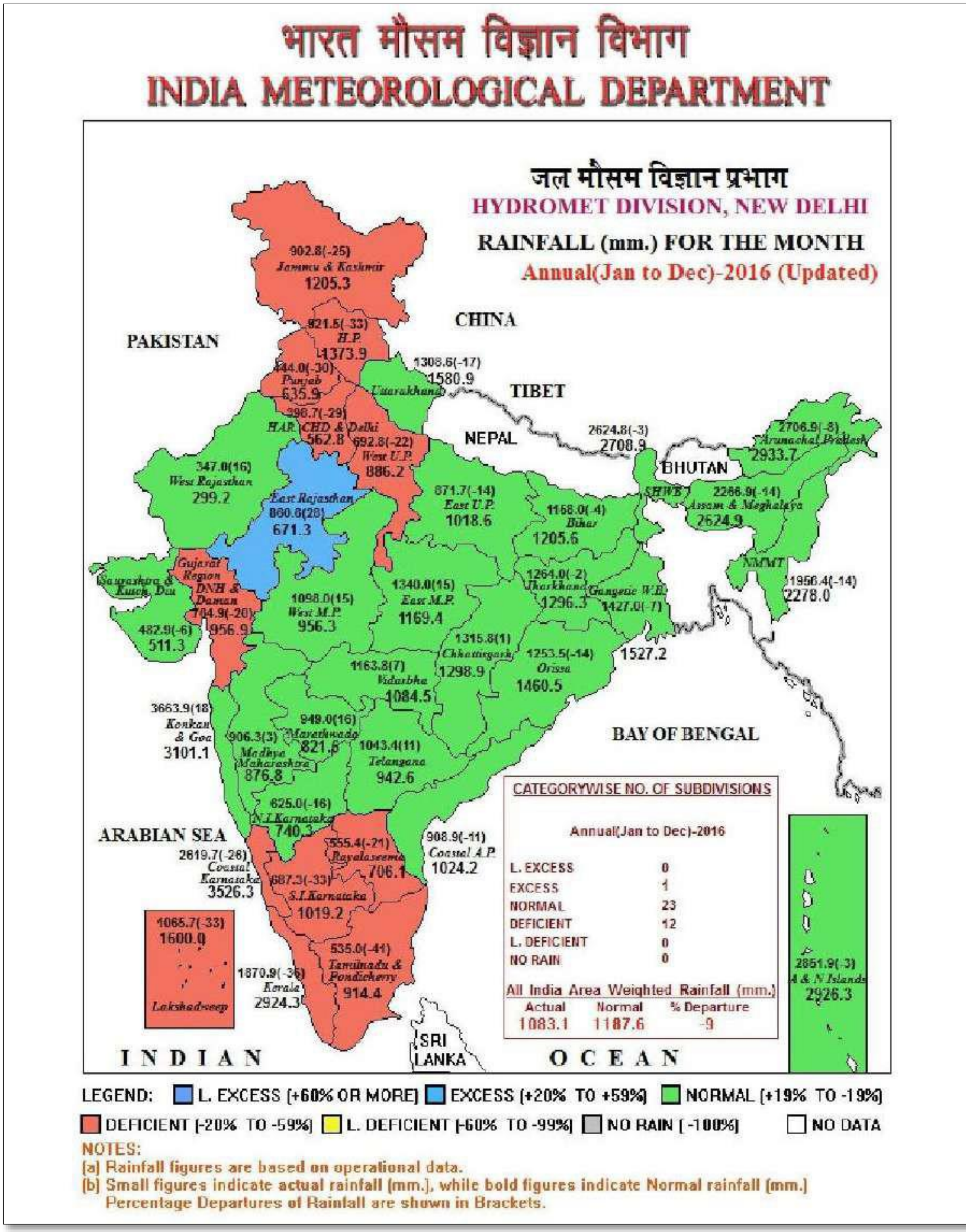

Fig. 3.2 Sub-Division wise Annual Rainfall Map of India – 2016

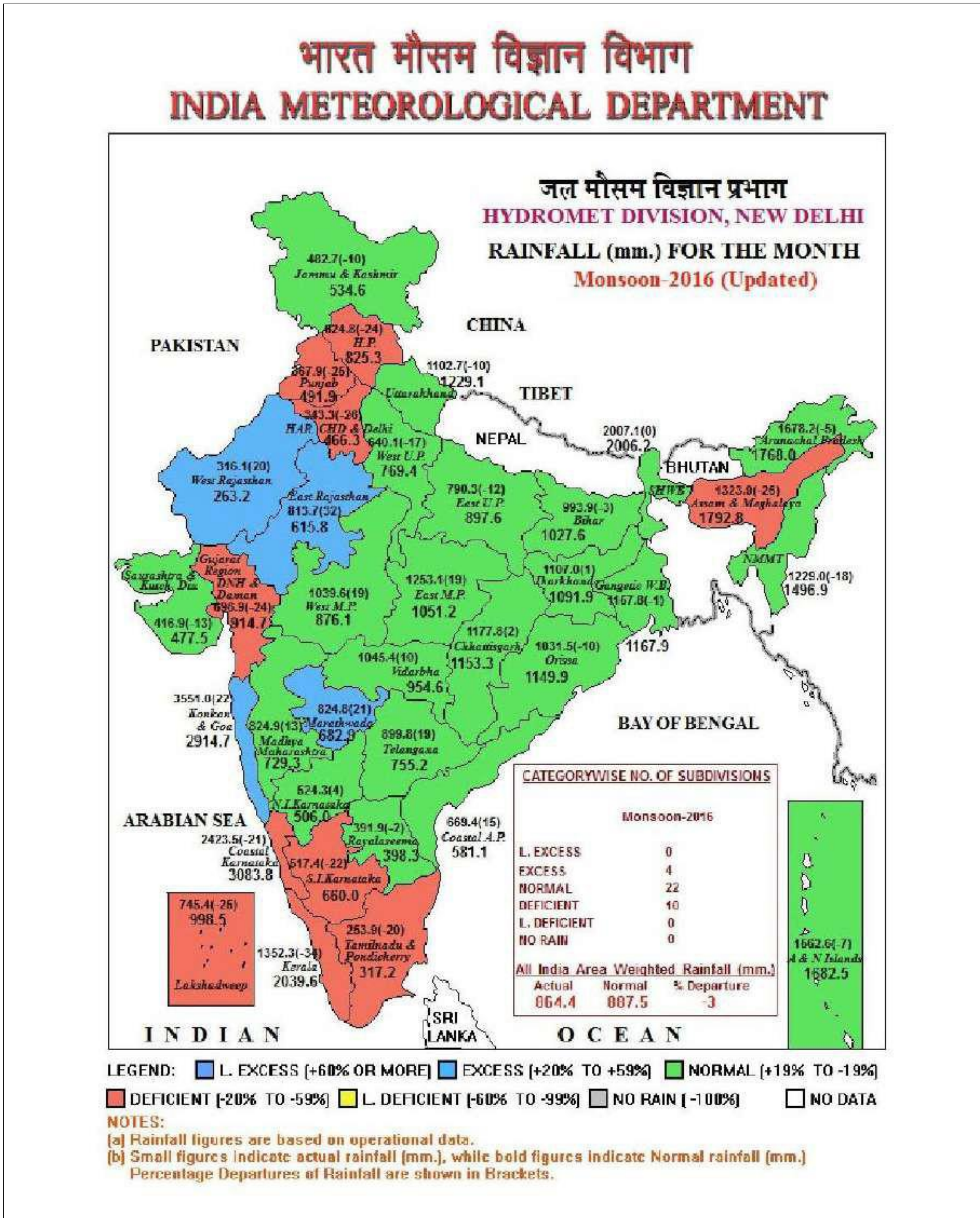

Fig 3.3 Sub-Division wise South-West monsoon map of India- 2016

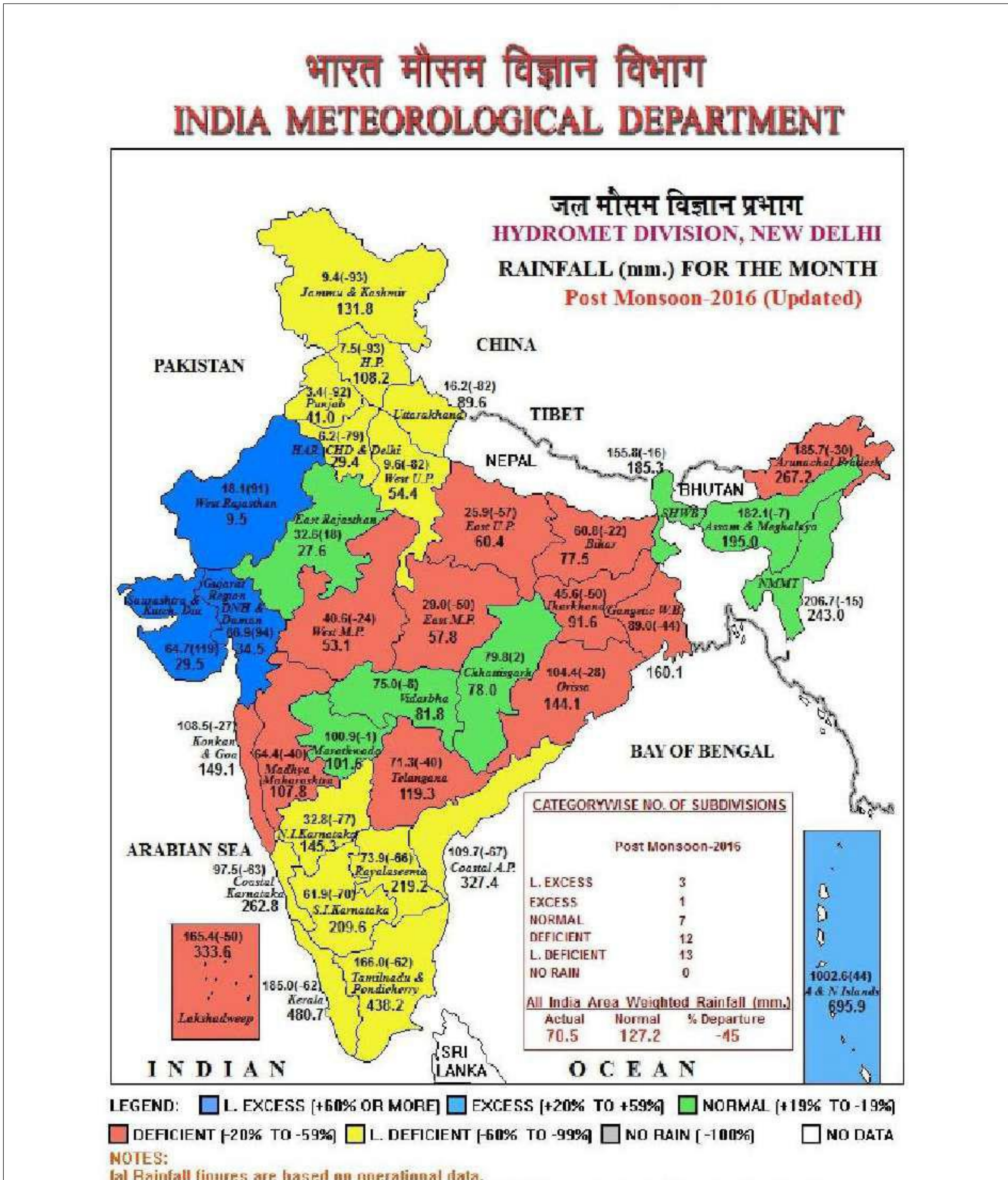

Fig. 3.4 Sub-Division wise Post-monsoon Rainfall Map of India-2016

CHAPTER 4

4.0 HYDROGEOLOGICAL SETUP OF INDIA

India is occupied by a variety of hard and fissured formations, including crystalline, trappean basalt and consolidated sedimentaries (including carbonate rocks), with patches of semi-consolidated sediments in narrow intra-cratonic basins. Apart from this, the northern part of the country and south of Himalayan terrain is occupied by alluvial formation stretching from Rajasthan in the west to Brahmaputra valley in the east. Rugged topography, compact and fissured nature of the rock formations combine to give rise to discontinuous aquifers, with moderate to poor yield potentials. The near surface weathered mantle coupled with deeper fractures form an important aquifer in case of hard rocks. In hard rock terrains, deep weathered pediments, lowlands, valley fills and abandoned river channels, generally have adequate thickness of porous material, to act as repositories of groundwater.

4.1 AQUIFER SYSTEMS OF INDIA

Various rock formations with different hydrogeological characteristics act as distinct aquifer systems of varying dimensions. The aquifer systems of India can be broadly categorized in to 14 Principal Groups. A brief description of the Principal Aquifer Systems (Fig. 4.1), as identified by CGWB (CGWB 2012)is given below.

4.1.1 Alluvial aquifers

The Quaternary sediments comprising Recent Alluvium, Older Alluvium, Aeolian Alluvium (Silt/ Sand) and Coastal Alluvium of Bay of Bengal are by and large important unconsolidated formations constituting major alluvial aquifers. These sediments are essentially composed of clays, silts, sands, pebbles, Kankar etc. These are by far the most significant ground water reservoirs for large scale and extensive development. The hydrogeological environment and ground water regime in the Indo-Ganga-Brahmaputra basin indicate the existence of potential aquifers having enormous fresh ground water reserves. 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 part below the zone of fluctuation as well as in the deeper confined aquifers. The coastal aquifers show wide variation in water quality, both laterally and vertically, thus imposing quality constraints for groundwater development.

4.1.2 Laterite

Laterites are formed from the leaching (chemical weathering) of parent sedimentary rocks (sandstones, clays, limestones); metamorphic rocks (schists, gneisses, migmatites) and igneous rocks (granites, basalts, gabbros, peridotites). It is rich in iron and aluminium, formed in hot and wet tropical areas. Laterites are the most wide spread and extensively developed aquifer especially in the peninsular states of India. Laterite forms potential aquifers along valleys and topographic lows where the thickness of the saturated zone is more and can sustain large diameter open wells for domestic and irrigation use.

4.1.3 Sand stone, shale aquifers

The sand stone and shale aquifers generally belong to the group of rocks ranging in age from Carboniferous to Mio-Pliocene. The terrestrial freshwater deposits belonging to Gondwana System and the Tertiary deposits along the west and east coast of the peninsular region are included under this category. The Gondwana sandstones form highly potential aquifers, locally. Elsewhere, they have moderate potential and in places they yield meagre supplies. The

Gondwanas, Lathis, Tipams, Cuddalore sandstones and their equivalents are the most extensive productive aquifers in this category.

4.1.4 Lime stone aquifer

The consolidated sedimentary rocks include carbonate rocks such as limestones, dolomite and marble. Among the carbonate rocks, limestones occupy the largest area. In the carbonate rocks, the principal water bearing zones are the fractures and solution cavities. Consolidated sedimentary rocks of Cuddapah and Vindhyan subgroups and their equivalents consist of limestones/dolomites apart from other major litho-units such as conglomerates, sandstones, shales, slates and quartzites.

4.1.5 Basalt aquifers

Basalt is a basic volcanic rock which forms alternate layers of compact and vesicular beds of lava flows as seen in the Deccan trap area. The groundwater occurrence in basalts are controlled by nature and extent of weathering, presence of vesicles and lava tubes, thickness of flows, number of flows and the nature of inter-trappean layers. Basaltic aquifers have usually medium to low permeability. Groundwater occurrence in the Deccan Traps is controlled by the contrasting water bearing properties of different flow units, thus, resulting in multiple aquifer system, at places. The water bearing zones are the weathered and fractured zones.

4.1.6 Crystalline aquifers

The crystalline hard rock aquifers such as granite, gneisses and high grade metamorphic rocks such as charnockites and khondalites constitute good repository of ground water. Most of the results of groundwater exploration projects have proven that hard rocks neither receive nor transmit water, unless they are weathered and/or fractured. The aquifers are the weathered zone or the fracture system. The fracture system includes fractures, joints, bedding planes, and solution holes. These openings do not have an even distribution and are rather localized. The weathered zone is underlain by semi-weathered rock, fractured rock followed by bedrock. The depth of the bed rock varies from 30-100 m.

In hard rock terrains, ground water occurs under phreatic condition in the mantle of weathered rock, overlying the hard rock, while within the fissures, fractures, cracks, joints within the hard rock, ground water is mostly under semi-confined or in the confined state. Compared to the volume of water stored under semi-confined condition within the body of the hard rock, the storage in the overlying phreatic aquifer is often much greater. In such cases, the network of fissures and fractures serves as a permeable conduit feeding this water to the well. Ground water flow rarely occurs across the topographical water divides and each basin or sub-basin can be treated as a separate hydrogeological unit for planning the development of ground water resources.

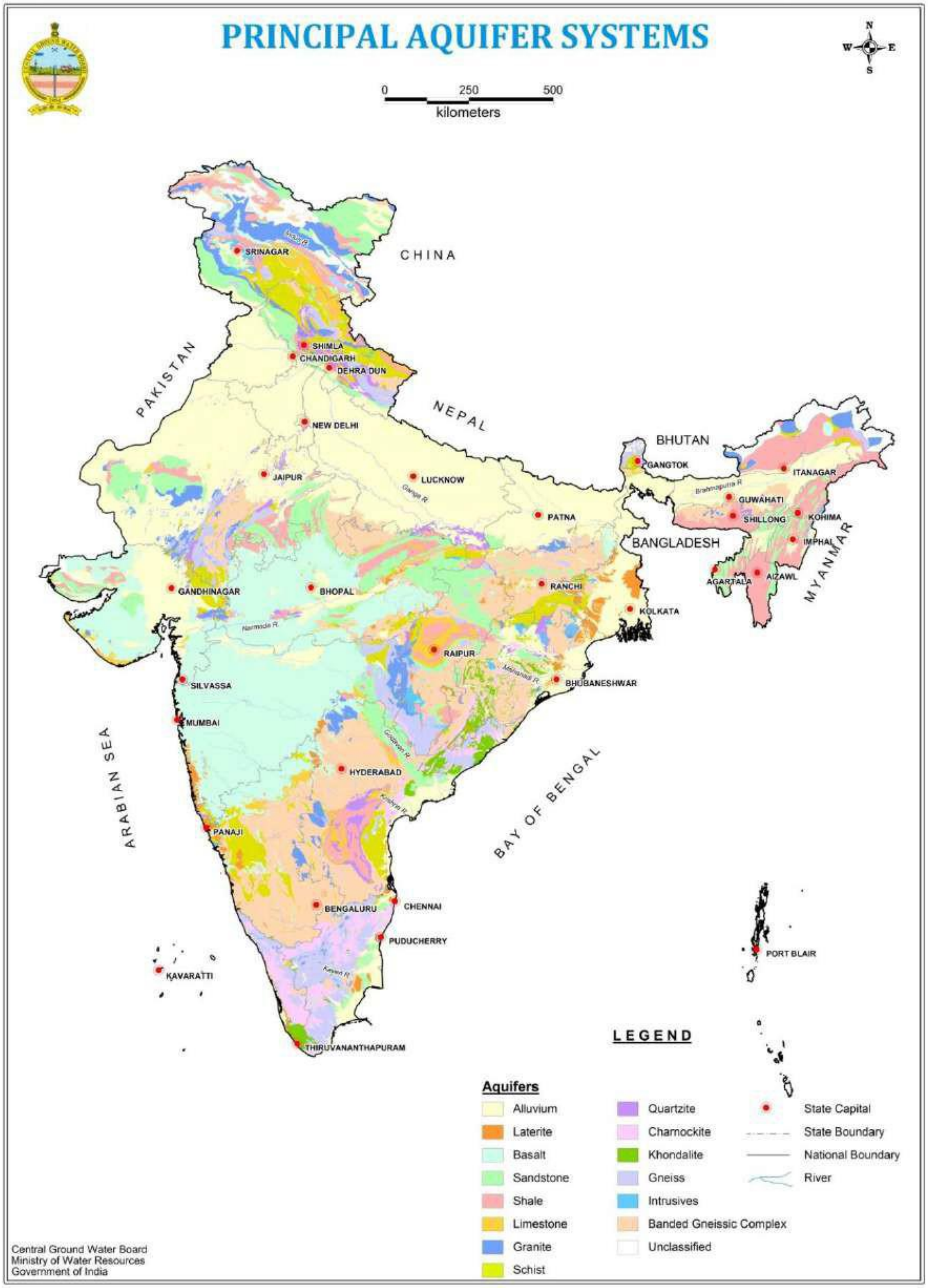

Fig 4.1 Principal Aquifer Systems of India

CHAPTER 5

5.0 GROUNDWATER LEVEL SCENARIO IN THE COUNTRY

Ground water level is one of the basic data element, which reflects the ground water regime in an area. Central Ground Water Board (CGWB) monitors ground water levels four times a year during January, April/ May, August and November through a network of 23125 observation wells as on 31.03.2017, spreading throughout the country. The periodicity of ground water level monitoring by the State Governments varies from State to State. The primary objective of monitoring the ground water level is to record the response of ground water regime to the natural and anthropogenic stresses on recharge and discharge components which are governed bygeology, climate, physiography, land use pattern and hydrologic characteristics. Natural conditions affecting the regime include climatic parameters like rainfall, evapotranspiration etc.. Anthropogenic influences include pumpage from the aquifer, recharge due to irrigation systems and other practices like waste disposal etc. Water level data generated and archived by CGWB along with data from State Government departments have been used for assessment of ground water resources. An outline of groundwater scenario during the period of assessment is given below.

5.1 GROUND WATER LEVEL SCENARIO (2016)

Depth to water level map of India for the pre-monsoon 2016 (Fig 5.1) indicates that very shallow water level of less than 2m bgl (below ground level) has been observed locally, in isolated pockets in few states, such as Assam, Andhra Pradesh, Himachal Pradesh and Gujarat. Water level in the range of 2 to5m bgl, is mostly reported from parts of Sub-Himalayan area, major part of Brahmaputra valley and parts of eastern coast (Odisha, Andhra Pradesh and Tamil Nadu states).In major parts of north-western states, depth to water level generally ranges from 10 to 20m bgl. In the western parts of the country, deeper water level is recorded in the depth range of 20 to 40m bgl. In south western parts of Haryana,Delhi and north central & western part of Rajasthan, water level is more than 40m bgl.In the peninsular part of the country water level broadly varies from 5 to 20m bgl.In the western coastal area, water level is generally in the range of 5-10m bgl, whereas in the east coast the average water level range is 2 to 5m bgl

In eastern states, water level in general ranges from 2 to10m bgl(except central part of West Bengal where water level ranges from 10 to 20m bgl). In north central India water level generally varies between 10-20 m bgl, except in isolated pockets where water level less than 10m bgl has been observed.

The post monsoon (November-2016) depth to water level map (Fig 5.2) indicates that in the states of Uttar Pradesh, Bihar, Odisha, Chhattisgarh, Assam, Jharkhand, West Bengal and Maharashtra, generally the depth to water level varies from 2-5 meter below ground level. Shallow water level of less than 2 m bgl is observed in the parts of Assam, Odisha, Andhra Pradesh, Maharashtra, southern part of Rajasthan and eastern part of Uttar Pradesh and also isolated pockets in Chhattisgarh, Jharkhand and Madhya Pradesh. In major parts of north-western states depth to water level generally ranges from 10-40m bgl. In the western parts of the country deeper water level is recorded in the depth range of 20-40m bgl and more than 40 m bgl. In some parts of Haryana, and Delhi and almost major parts of Rajasthan, water level of more than 40m bgl is recorded. Along the eastern & western coast water level is generally upto 10mbgl. Central part of West Bengal recorded water level in the range of 5-20 m bgl. In Central India water level generally varies between 2 and 10 m bgl, except in isolated pockets where water level more than 10 m bgl has been observed.In southern part of the country, more than 10m depth to water level has been recorded in the central part of Karnataka, southern part of Telangana,south western part of Andhra Pradesh and western part of Tamil Nadu.

5.2 COMPARISON OF GROUNDWATER LEVEL SCENARIO 2013 & 2017 ASSESSMENT

The water level during premonsoon and post monsoon periods considered during the 2013 assessment & 2017 assessment are provided as Fig 5.3 & 5.4 respectively. The changes in the water level indicates that the zone of fluctuation in which the annual replenishable resources are assessed are either going down or rising. The fall in water level indicates that the additional groundwater extraction is being compensated by the in storage resources, resulting in the over exploitation over and above the natural replenishment.

5.2.1 Fluctuation of Water level from May 2012 to May 2016

Water level rise in May, 2016 with respect to May 2012 is observed as scattered patches in almost all the states. It is more evident in Rayalaseema region of Andhra Pradesh state, central parts of Rajasthan state, southern parts of Telangana state, north coastal parts of Andhra Pradesh state, northern parts of Tamil Nadu state, parts of Chhattisgarh, central India comprising Madhya Pradesh, northern parts of Maharashtra state. It is also seen in states of Assam, Jharkhand, Bihar and Uttar Pradesh as isolated small patches. It is comparatively less than the area where fall in water levels are encountered from May 2012 to May 2016. Water level fluctuation where fall is more than 2m, is prominent in Uttar Pradesh, Gujarat, Maharashtra, Rajasthan, Haryana, Punjab, northern and central Telangana, western parts of Andhra Pradesh, Karnataka and Southern parts of Tamil Nadu states.

5.2.2 Fluctuation of Water level from Nov 2012 to Nov 2016

Water level rise in Nov, 2016 with respect to Nov, 2012 is observed prominently in Rayalaseema region of Andhra Pradesh state, southern parts of Rajasthan state, western parts of Telangana state, most parts of Maharashtra, Rajasthan and Gujarat state, Bihar, Jharkhand and West Bengal states. It is also seen in central Assam, eastern Uttar Pradesh, southern West Bengal, and north eastern parts of Odisha state. It is comparatively less than the area where there is aas fall in water level from Nov 2012 to Nov 2016. Water level fluctuation where fall is more than 2m is recorded mainly in Uttar Pradesh, Maharashtra, Rajasthan, Haryana, Punjab, northern and eastern Telangana , most parts of Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Odisha and Assam states

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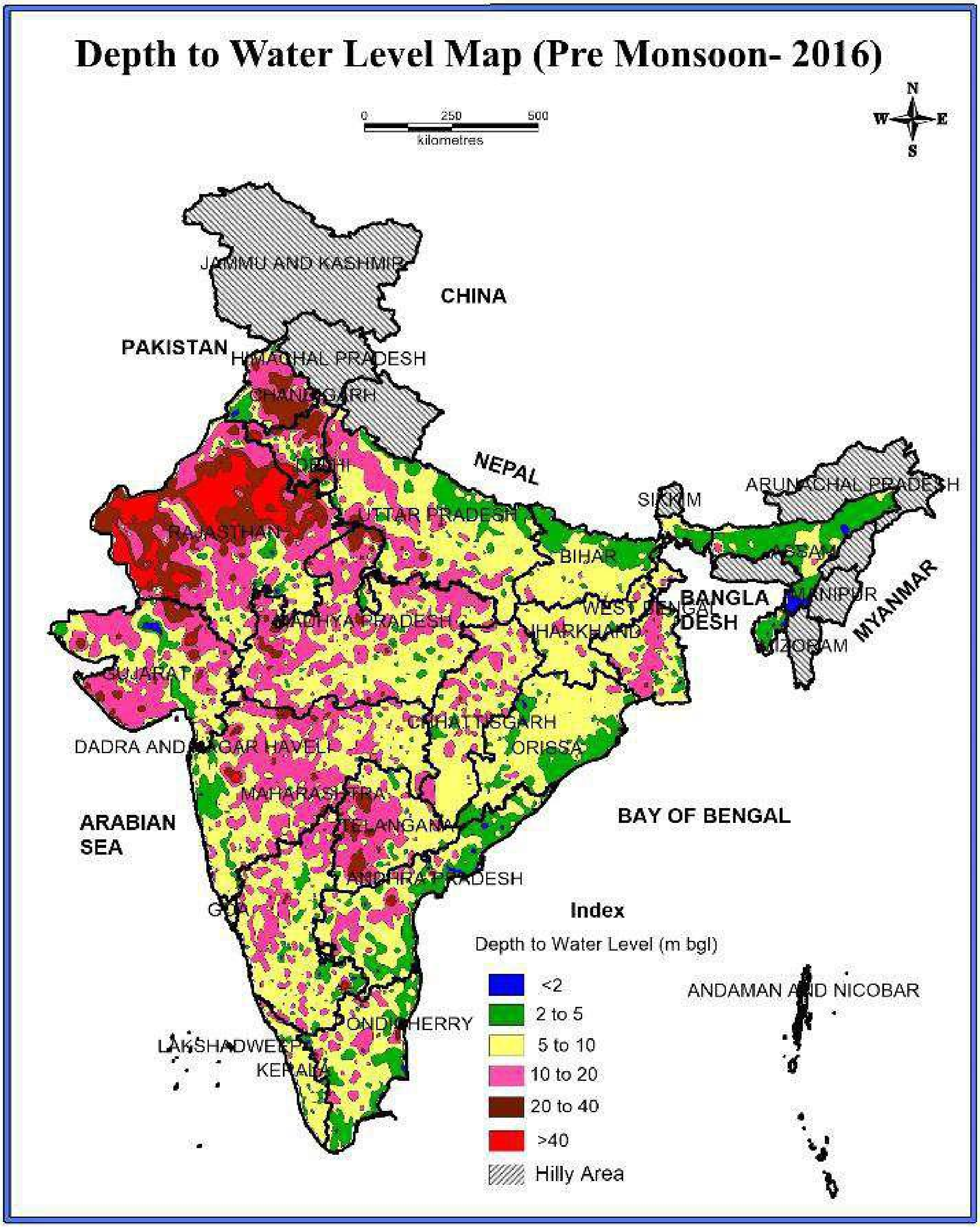

Fig. 5.1 Pre-monsoon Depth to Water Level Map-2016

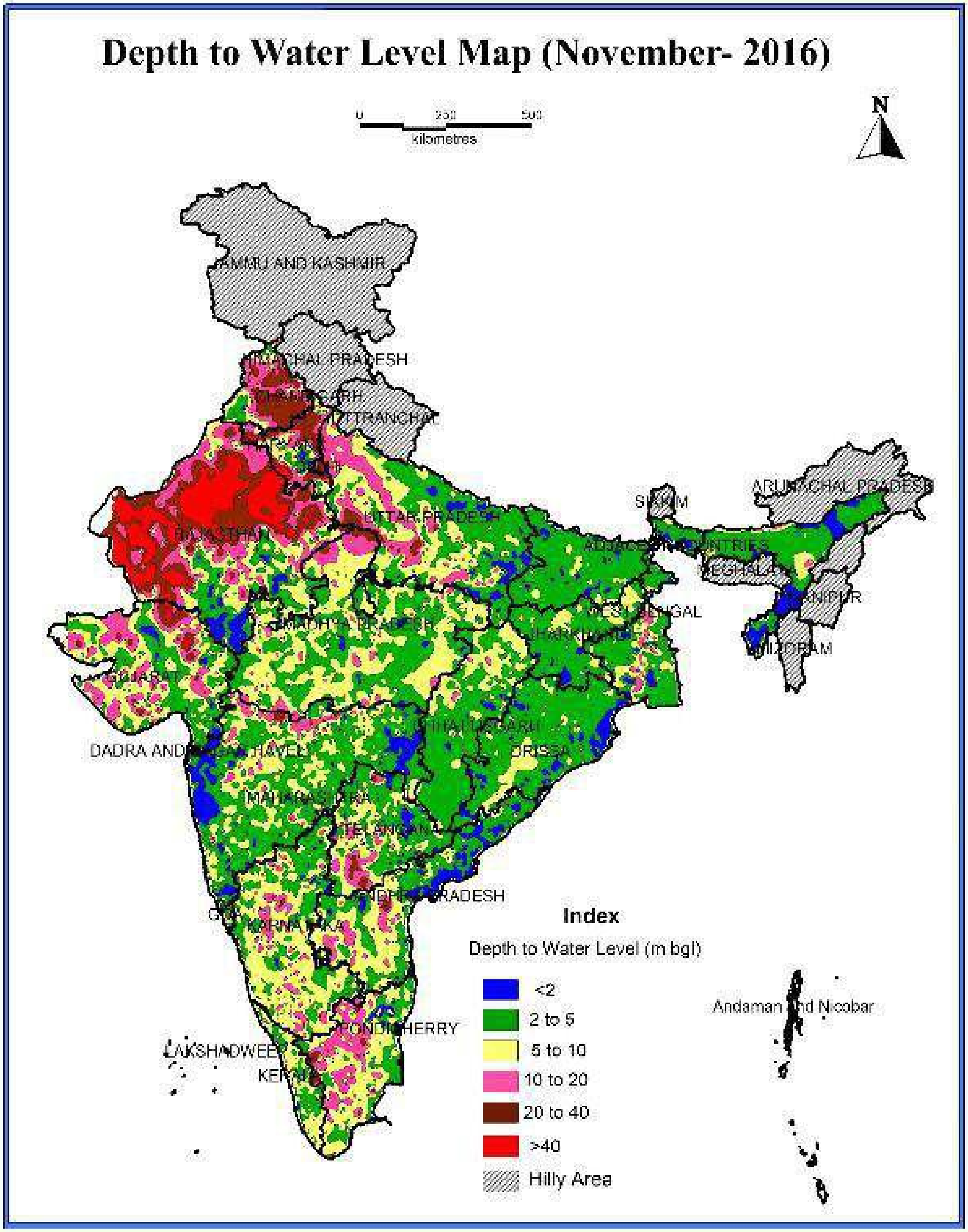

Fig. 5.2 Post-monsoon Depth to Water Level Map-2016

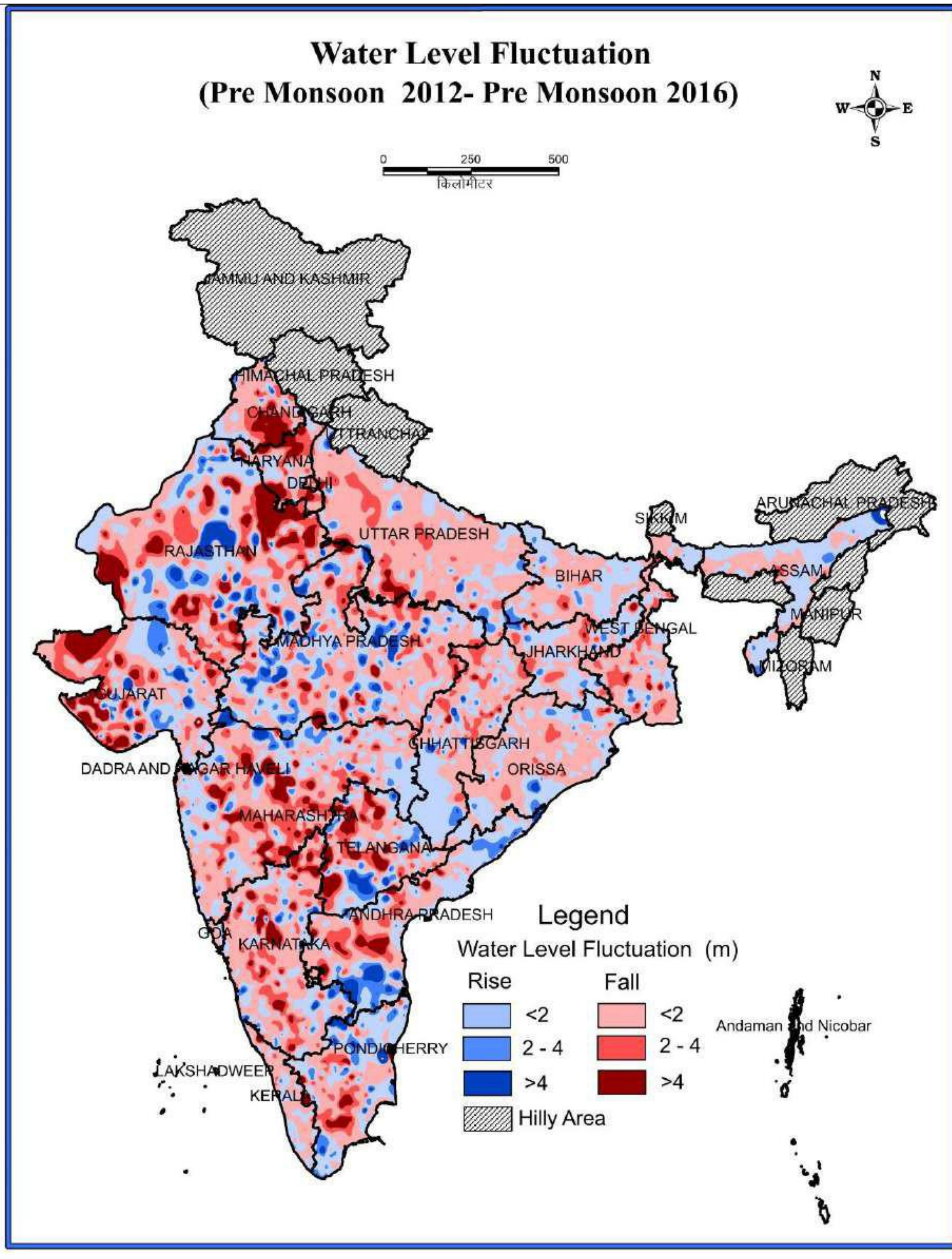

Fig. 5.3 Fluctuation from May, 2012 to May, 2016

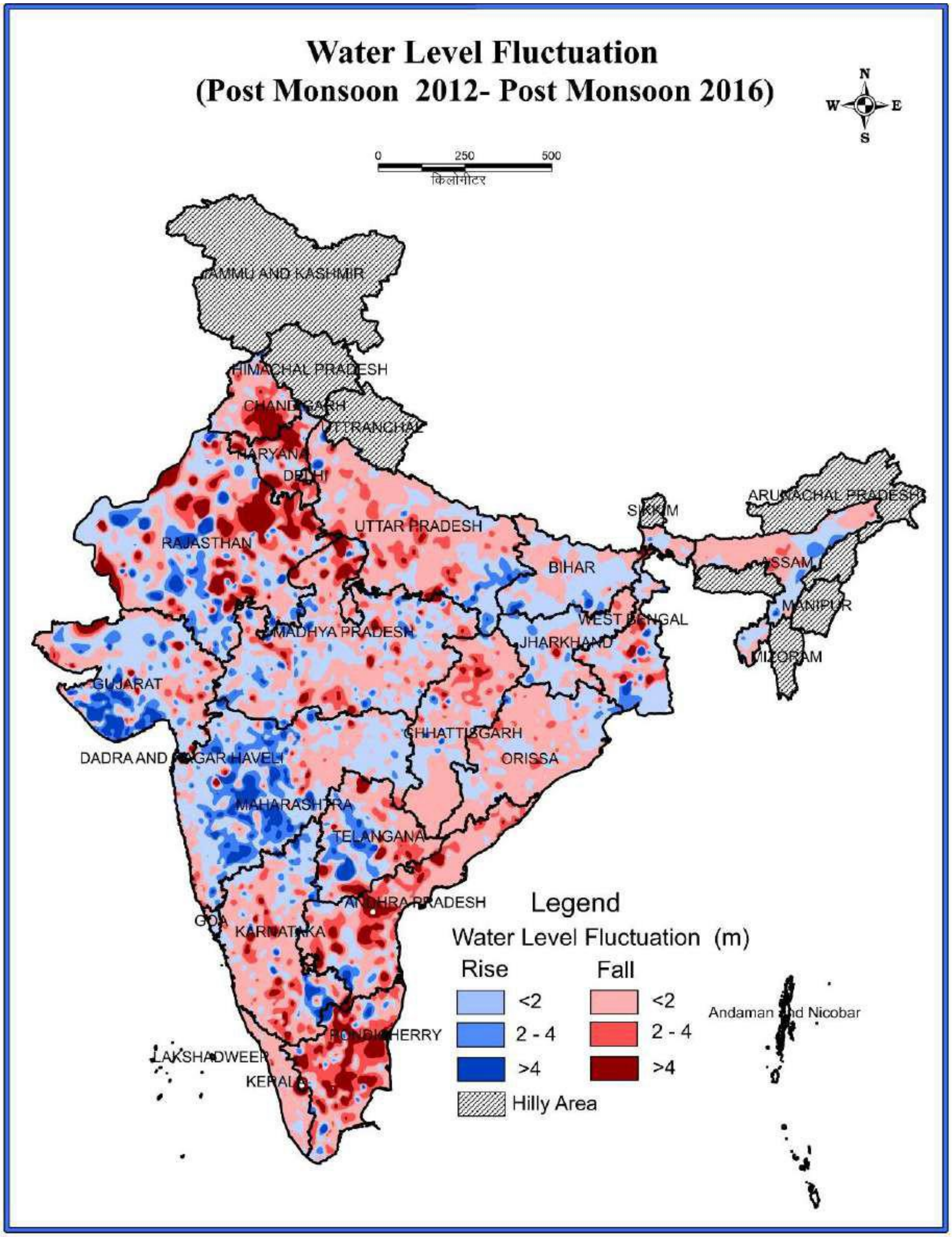

Fig 5.4 Water Level Fluctuation from Nov, 2012 to Nov 2016

CHAPTER 6

6.0 GROUNDWATER RESOURCES OF INDIA

The Dynamic ground water resources (as in March 2017)of the entire country have been assessed jointly by CGWB and State Ground Water Departments under the supervision of the State level Committees. The dynamic ground water resources are also known as Annual Ground Water Recharge, since it gets recharged every year from rainfall and other sources (secondary sources) such as applied irrigation water, surface water bodies, water conservation structures, etc. Methodology adopted for the assessments has been outlined in Chapter 2 of this report. This section provides a summary of the Groundwater Resources Assessment 2017 (GWRA-2017) made for the country.

6.1 DYNAMIC FRESH GROUND WATER RESOURCES

As per the 2017 assessment of Dynamic Ground water resources, the Total Annual Ground Water Recharge for the entire country has been assessed as 432 billion cubic meter (bcm) and Total natural discharges works out to be 39 bcm. Hence, Annual extractable Ground Water Resources for the entire country is 393 bcm.

Major source of ground water recharge is the monsoon rainfall, which is about 58% of the total annual ground water recharge i.e. 252 bcm (Fig.6.1). The overall contribution of rainfall (both monsoon & non-monsoon) to country's total annual Ground water recharge is 67% and the share of other sources viz. canal seepage, return flow from irrigation, recharge from tanks, ponds and water conservation structures taken together is 33%.

The contribution in Annual Ground Water Recharge from rainfall during monsoon season is more than 70% in the states/UT of Assam, Goa, Gujarat, Jharkhand, Madhya Pradesh, Meghalaya, Mizoram, Nagaland, Rajasthan, Sikkim, Andaman & Nicobar, Dadra & Nagar Haveli Daman & Diu and Lakshadweep. (Fig 6.2).

State-wise Ground Water Resources of India (as on 31st March 2017) are given in **Annexure I** and the district-wise figures for each State are given in **Annexure II**. The over-all scenario of ground water resource and extraction in the country is given in **Fig. 6.1, 6.2, 6.3, 6.4 & 6.5.**

Volumetric estimates are dependent on the areal extent of the assessment units. In order to compare the ground water resource of different assessment units, the volumetric estimates of annual ground water recharge have been converted to depth units (m) by dividing the annual groundwater recharge by the area of the respective assessment units (km^2). Spatial variation in annual ground water recharge (m) is shown in **Fig 6.3.** Annual Groundwater recharge is significantly high in the Indus-Ganga-Brahmaputra alluvial belt in the North, East and North East India covering the states of Punjab, Haryana, Uttar Pradesh, Bihar, West Bengal and valley areas of North Eastern States, where rainfall is plenty and thick piles of unconsolidated alluvial formations are conducive for recharge. Annual Ground Water Recharge in these regions varies from 0.25 to more than 0.5 m. The coastal alluvial belt particularly Eastern Coast also has relatively high annual ground water recharge, in the range 0.25 to more than 0.5 m. In western India, particularly Rajasthan and parts of northern Gujarat that have arid climate, the annual ground water recharge is scanty, mostly up to 0.025 m. Similarly, in major parts of the southern peninsula covered with hard rock terrains, annual ground water recharge mostly ranges from 0.10 to 0.15m. This is primarily because of comparatively low infiltration and storage capacity of the rock formations prevailing in the region. The remaining part of Central India is mostly characterized by moderate recharge in the range of 0.10 to 0.25 m.

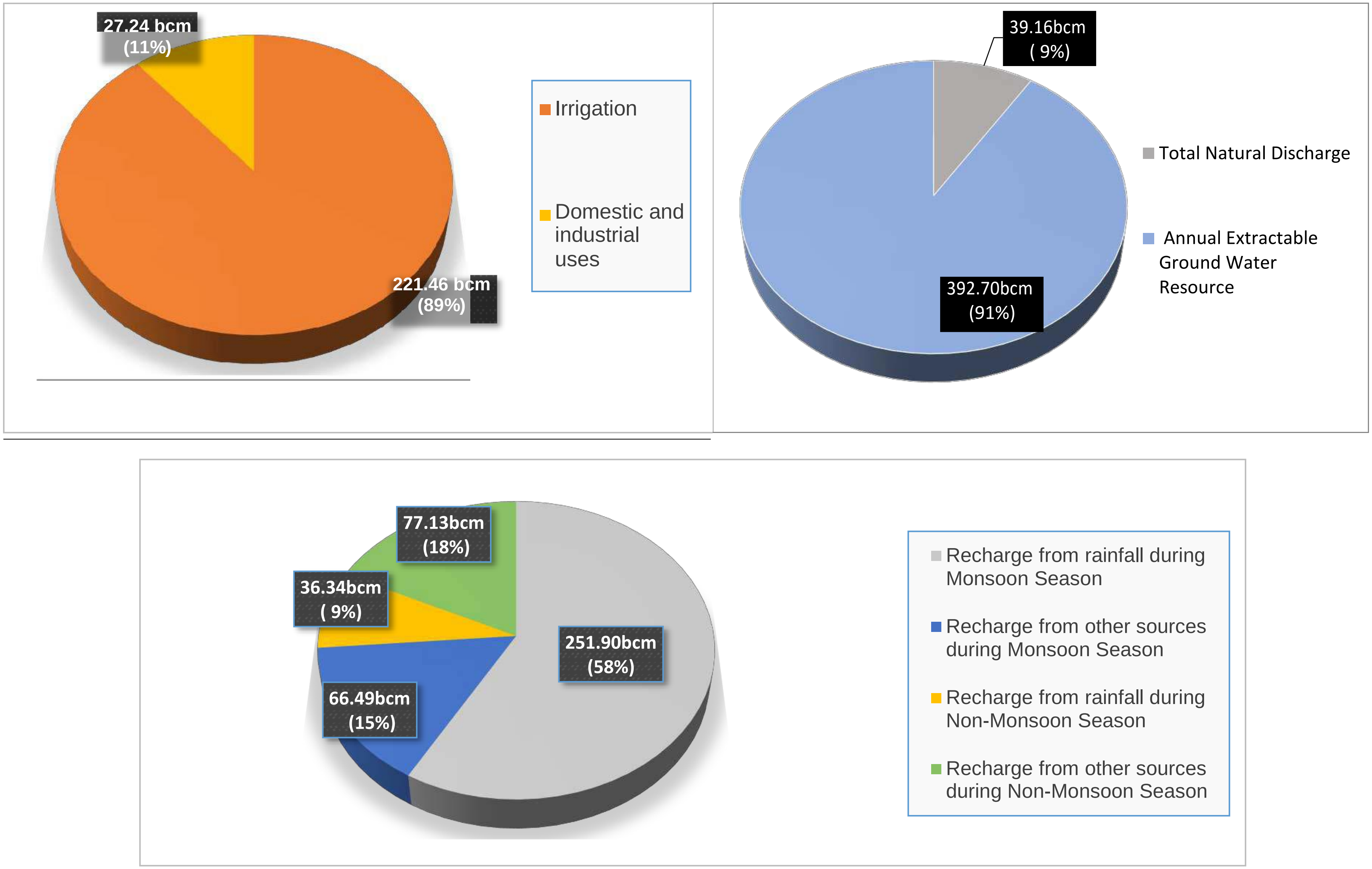

Fig 6.1 Ground Water Resources and Extraction Scenario in India,2017

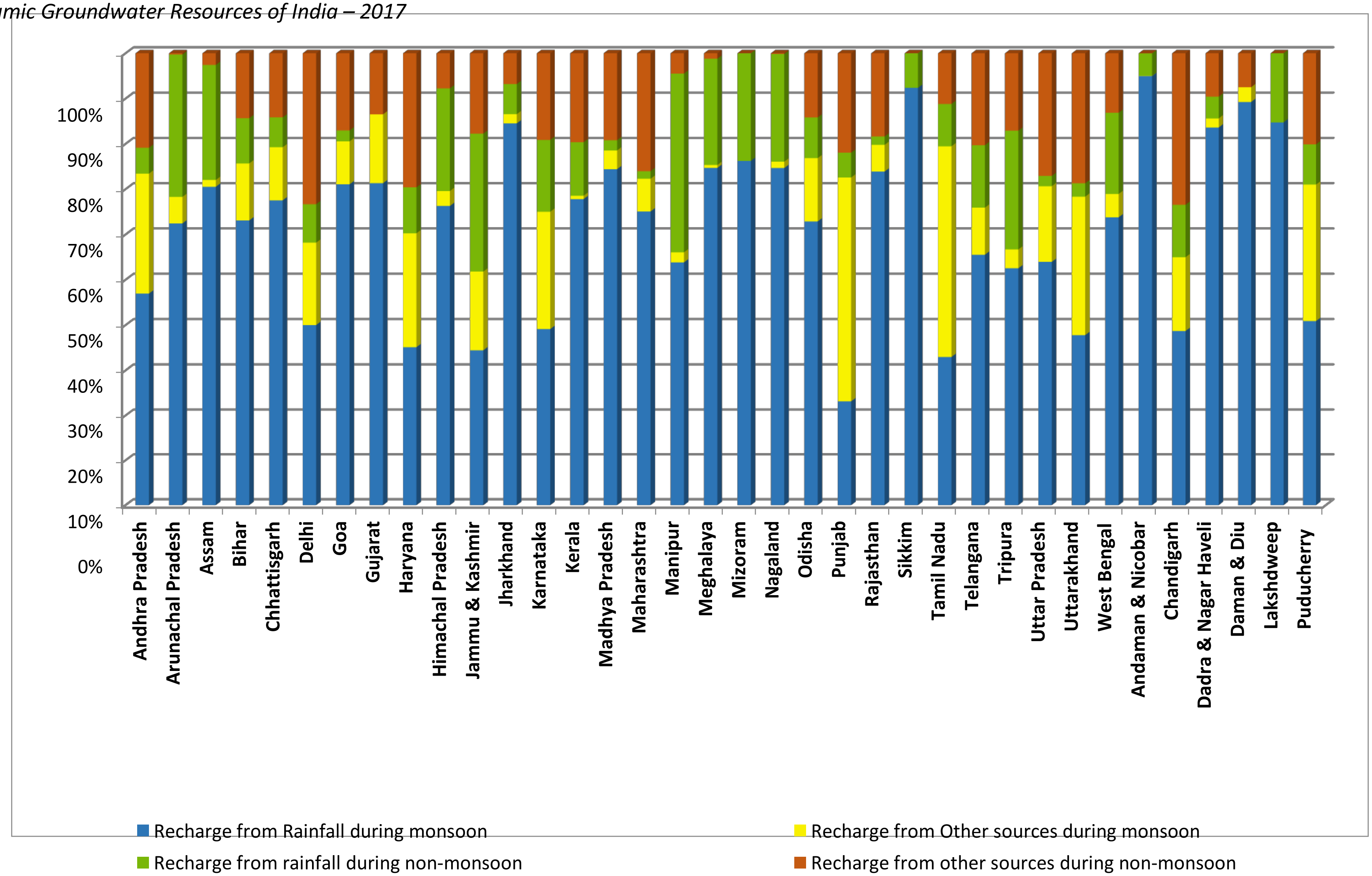

Fig.6.2 State wise contribution of recharge components in Total Annual Ground Water Recharge of India, 2017

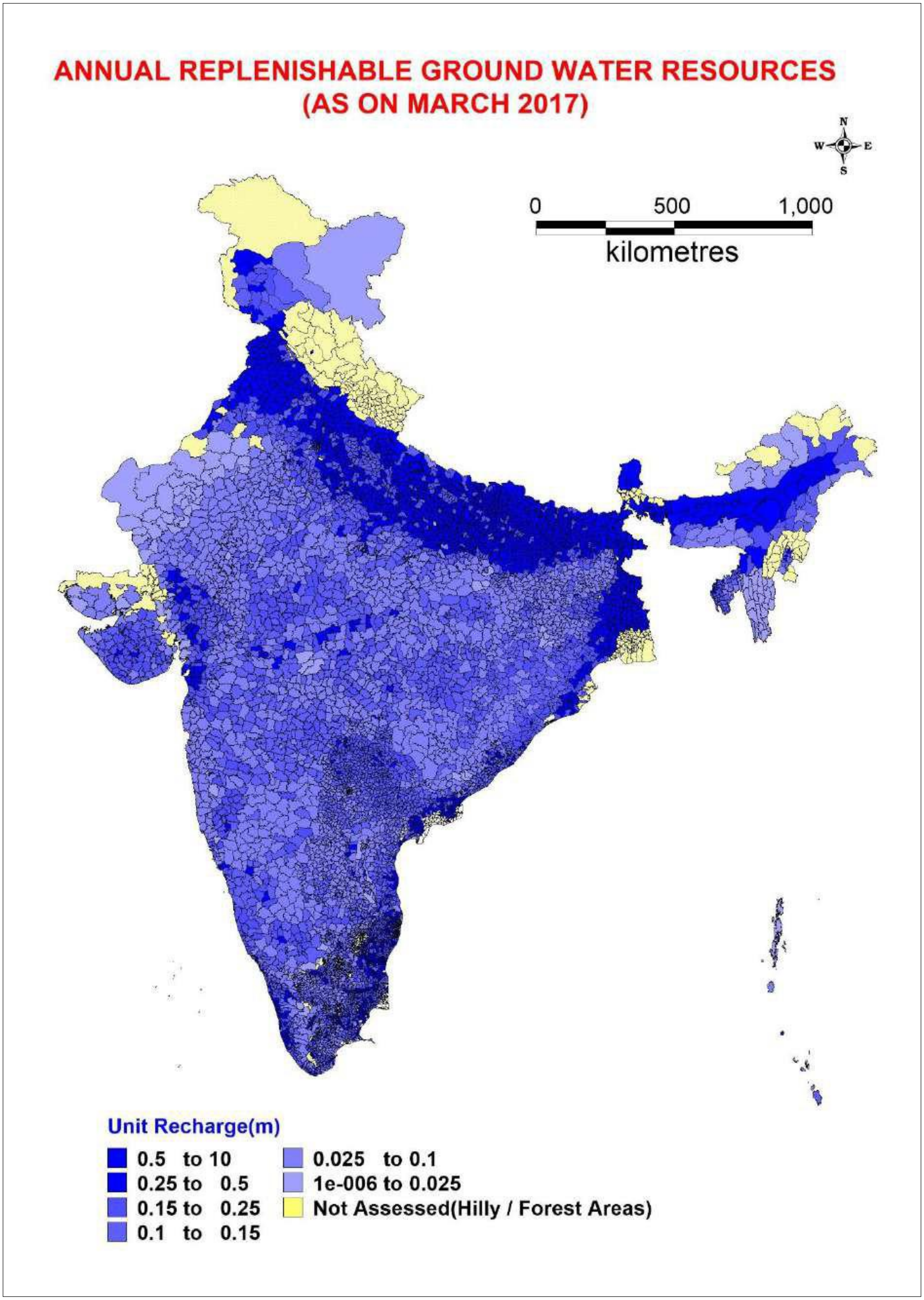

Fig 6.3 Spatial variation in annual ground water recharge, 2017

The overall estimate of Annual Ground Water Recharge for the entire country shows a decrease of 15 bcm in the present estimate as compared to the last assessment i.e. 2013. The Annual Ground water extraction for irrigation, domestic and Industrial uses has also decreased by 4.35bcm. The main reasons for these variations is attributed to changes in methodology, refinement of parameters for resources estimation, refinement in well census data and changing ground water regime.

6.2 GROUND WATER EXTRACTION

The assessment of ground water extraction is carried out considering the Minor Irrigation Census data and sample surveys carried out by the State Ground Water Departments. The Total Annual Ground Water Extraction of the entire country for the year 2017 has been estimated as 248.69bcm. Agriculture sector is the predominant consumer of ground water resources. About 89% of total annual ground water extraction i.e. 221.46bcm is for irrigation use. Only 27.24bcm is for Domestic & Industrial use, which is about 11% of the total extraction. In the states of Arunachal Pradesh, Delhi, Goa, Jammu & Kashmir, Kerala, Mizoram, Nagaland, Sikkim and Tripura and Union Territories of Andaman & Nicobar Island, Chandigarh, Dadra & Nagar Haveli, and Lakshadweep the ground water extraction for domestic & industrial uses is more than 40% **(Fig 6.4).**

6.3 STAGE OF GROUND WATER EXTRACTION

The overall stage of ground water development in the country is 63%. The stage of ground water Extraction is very high in the states of Delhi, Haryana, Punjab and Rajasthan, where it is more than 100%, which implies that in these states the annual ground water consumption is more than annual extractable ground water resources. In the states of Himachal Pradesh, Tamil Nadu, Uttar Pradesh and UTs of Chandigarh and Puducherry, the stage of ground water Extraction is between 70-100%. In rest of the states / UTs the stage of ground water development is below 70%.

6.4 CATEGORIZATION OF ASSESSMENT UNITS

Out of the total 6881 assessment units (Blocks/ Taluks/ Mandals/ Districts/Firkas/Valleys), 1186 has been categorized as Over-exploited, 313 as Critical, 972 as Semi-critical, and 4310 units as Safe. There are 100 assessment units, which are completely saline **(Annexure – III). The percentage** of Over-exploited and Critical administrative units more than 25% of the total units are in Delhi, Haryana, Himachal Pradesh, Karnataka, Punjab, Rajasthan, Tamil Nadu & Puducherry (**Fig. 6.5**). The State-wise categorization of Blocks/ Taluks/ Mandals/ Districts/Firkas/Valleys and Quality problems in assessment units are given in Annexure IV (A) and (B).

The state wise summary of assessment units improved or deteriorated from 2013 to 2017 assessment and detailed comparison of categorization of assessment units from 2013 and 2017 are given in Annexure V (A) and (B).

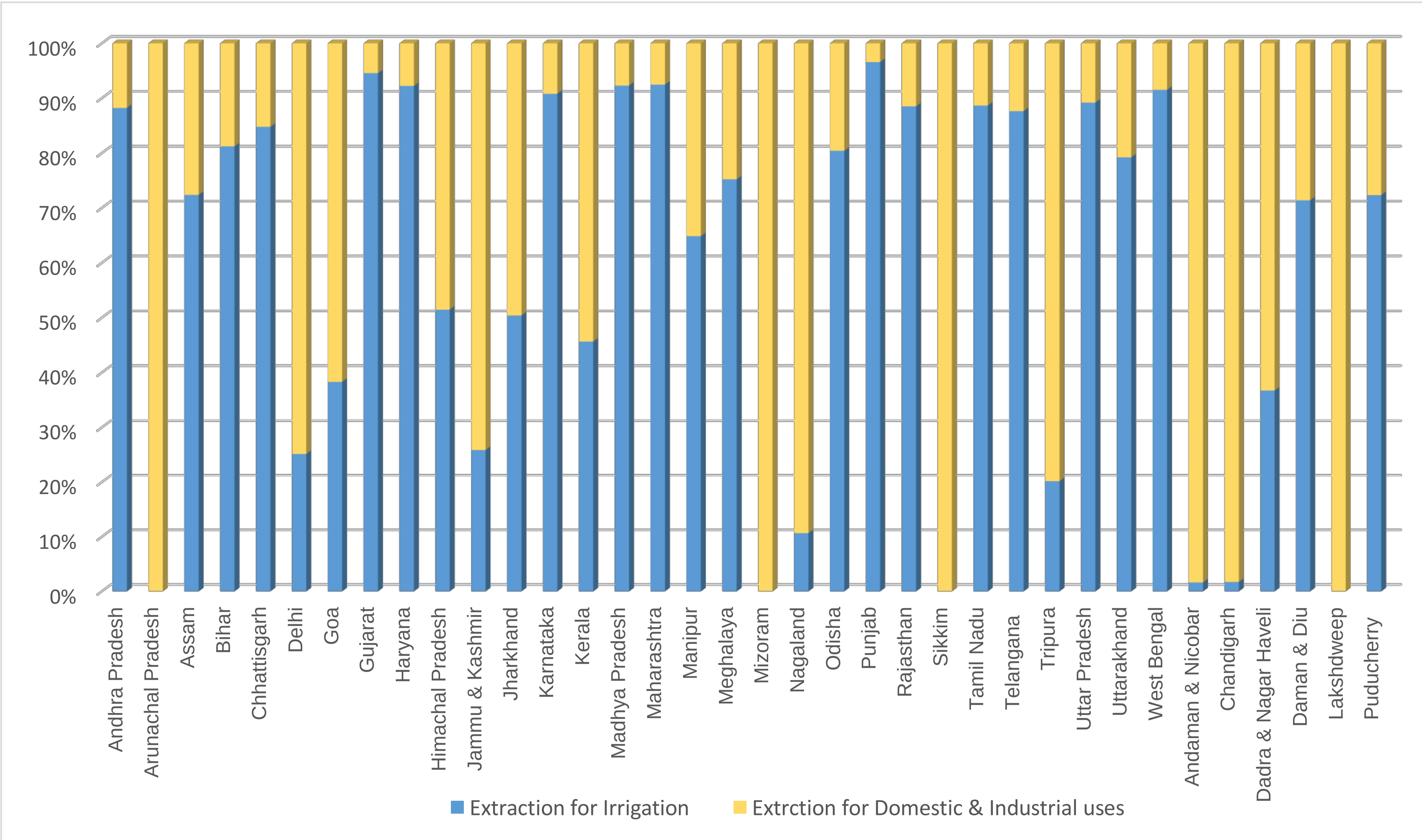

Fig. 6.4 State wise Irrigation Draft *Vs* Domestic & Industrial Draft

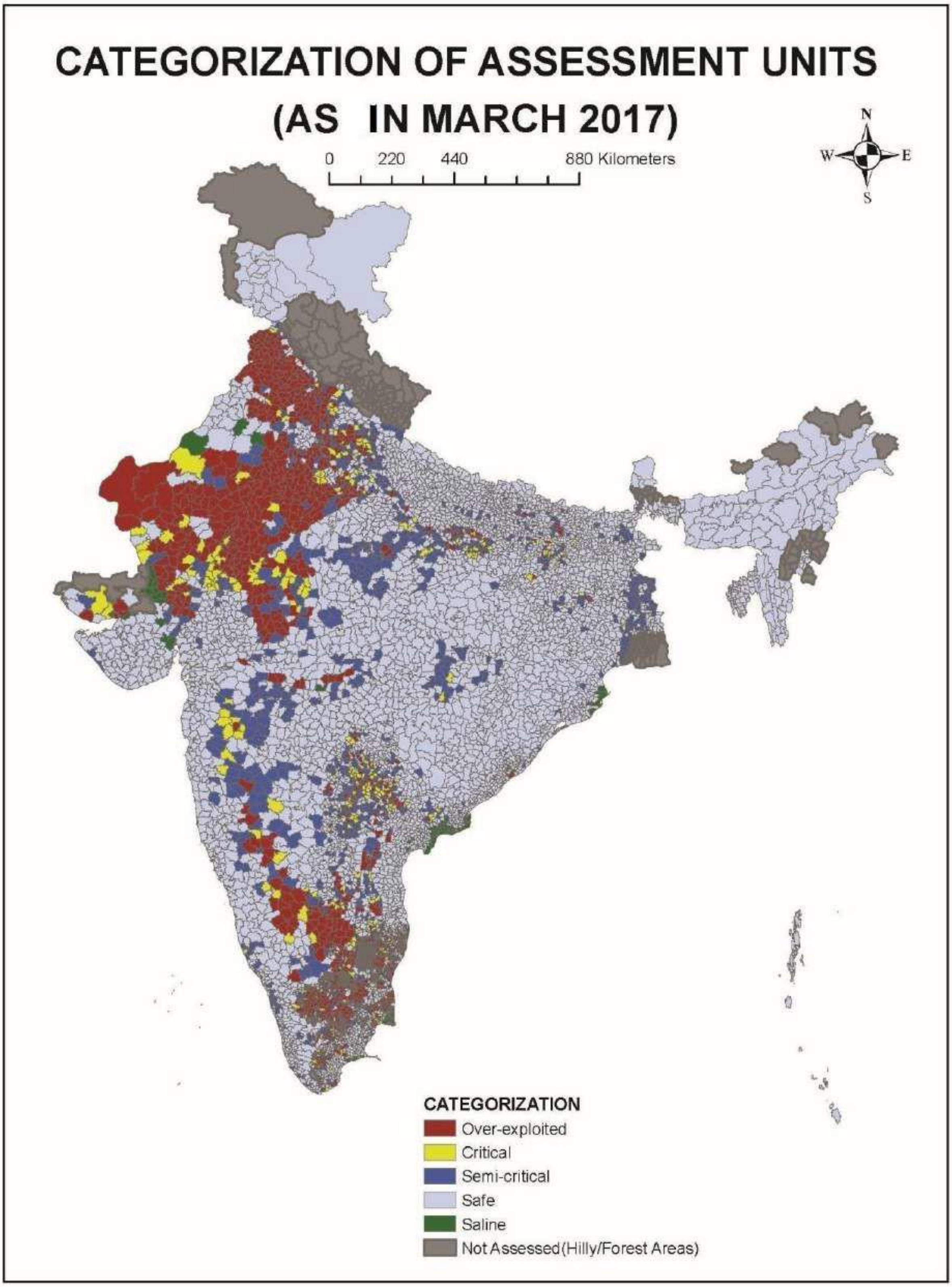

Fig 6.5 Categorization of Assessment Units

CHAPTER 7

7.0 STATE WISE GROUND WATER RESOURCES SCENARIO

The ground water conditions, its availability and utilization scenario and categorization of assessment units in different states are given in Annexure I, II, III & IV. State wise summaries are given below. There are minor changes in the terminology used in GEC-2015 methodology and the corresponding changes for the terms have been tabulated below:

GEC- 97 Methodology	GEC-2015 methodology
Annual Replenishable Resources	Total Annual Groundwater Recharge
Net Groundwater Availability	Annual Extractable Groundwater Resources
Annual Groundwater Draft for all uses	Current Annual Groundwater Extraction for all uses
Projected Demand for Domestic and Industrial uses up to 2025	Annual ground water allocation for domestic water supply as on 20 25
Groundwater Availability for future irrigation	Net Annual Groundwater Availability for future Use
Stage of Groundwater Development	Stage of Ground Water Extraction

7.1 Andhra Pradesh

The State is divided into 748 watersheds as the State is predominantly covered by hard rocks. The Ground water resources of these watersheds were estimated separately for Command, Non Command and Poor ground Water Quality areas for the reference year 2017. The state is underlain by diverse rock types of different geological ages from Pre-Cambrian to Recent. As much as 80% of the State is underlain by hard rock formations like Archaeans, Pre-Cambrians, Cuddapahs, Kurnools and Deccan traps. The remaining 20% is underlain by soft rocks including Gondwanas, Rajahmundry sandstone and Recent Alluvium.

The Ground water resources have been assessed watershed wise and are apportioned to mandals. The Total Annual Ground Water Recharge of the State has been estimated as 21.22 bcm and Annual extractable resource is 20.15bcm. The Current Annual Ground Water extraction for all uses is 8.90bcm and Stage of Ground Water extraction is 44.15%. Out of 670 mandals, 45 have been categorized, as ‘Over-exploited’, 24 as ‘Critical’, 60 as ‘Semi-Critical’, 501 as ‘Safe’ and 40 are ‘Saline mandals.

As compared to 2013 assessment, the Total Annual Groundwater Recharge for the State has increased from 20.39bcm to 21.22bcm, which is attributed to government interventions, e.g. water conservation activities like Neeru-Chettu and emphasis on Micro Irrigation. The number of over-exploited mandals has also decreased from 61 to 45 due to the above reasons.

7.2 Arunachal Pradesh

The state of Arunachal Pradesh is underlain by diverse rock types of different geological ages from Pre-Cambrian to Recent. Major part of the state is covered with consolidated crystalline rocks and meta-sediments of Precambrian and Palaeozoic age, while Tertiary sediments consisting of semi-consolidated argillaceous assemblage, represented by the Disang, Barail, Tipam, Siwalik and Dihing groups of rock, occupy periphery areas bordering Assam and behave as run-off and in select patches functions as infiltration zone. In consolidated formations, ground water potential appears to be limited. Semi-consolidated Tertiary formations are likely to give moderate or poor yield and expected to be controlled by aquifer geometry and structural features. Ground water in both consolidated and semi-consolidated formations also manifests as springs and in all geological formations springs occur as both seasonal and perennial in nature.

Unconsolidated Quaternary sediments comprising the terrace deposits of Pleistocene (Bhabar zone) and also the terrace and alluvial fan deposits of Holocene age prevail in the fringe valley areas and as thin carpet in isolated structural valleys and with considerable thickness in open and wide valleys joining Brahmaputra Alluvial plains. The unconsolidated alluvial sediments in the valley areas act as good repositories for ground water development. Valleys adjoining Assam are most promising where good thickness of granular zones is distributed. Discharge of the deep tube wells, tapping mostly unconsolidated Quaternary sediments & at places Upper Tertiary formations, varies from 1.4 m^3/hr to 54 m^3/hr, while transmissivity ranges from 1 to 661 m^2/day. Storativity ranges from 0.35×10^{-3} to 6.65×10^{-3}.

The ground water resource estimation of the state has been done district-wise. The ground water resources of five districts namely Upper Siang, Anjaw, Dibang Valley, KurungKumey and Tawang could not be estimated as they are hilly areas. The Annual Ground Water Recharge of the State has been estimated as 3.025bcm and Annual Extractable Annual Ground Water Resources is 2.667 bcm. The Current Annual Ground Water Extraction is 0.007 bcm and Stage of Ground Water Extraction is 0.28%. All the districts have been categorized as 'Safe' and there is no saline area in the state. As compared to 2013 assessment, the Total Annual Groundwater Recharge has decreased from 4.43bcm to 3.025bcm.There is no significant change in the current annual ground water extraction. The consideration of outflow components such as evaporation , transpiration and rainfall recharge above threshold value have resulted in the reduction in recharge.

7.3 Assam

The State is underlain mainly by unconsolidated Quaternary formation in Brahmaputra valley and potential aquifers lie at shallow as well as deeper zone. The semi-consolidated Tertiary formations are found to occur in the southern part of Karbi Anglong, Cachar, Karimganj and Hailakandi districts and in Upper Assam covering southern fringe of Dibrugarh, Tinsukia, Sibsagar, Jorhat, Golaghat districts. The consolidated Precambrian rocks occur mainly in N.C. Hills, Karbi-Anglong, Kamrup, Goalpara, Dhubri, and Nagaon.

Ground water resources have been assessed district-wise due to paucity of block wise data. The Total Annual Groundwater Recharge of the State has been estimated as 28.67bcm and Annual Extractable Groundwater Resources is 24.26bcm. The Current Annual Groundwater Extraction for all uses is 2.73bcm and Stage of Ground Water Extraction is 11.25%. All the 28 districts have been categorized as 'Safe' and there is no saline area in thestate.

As compared to 2013 assessment, the Total Annual Groundwater Recharge for the state has decreased from 32.11bcm in 2013 to 28.67bcm in 2017, annual extractable ground water resources decreased from 28.90bcm in 2013 to 24.26bcm in 2017 and total ground water extraction decreased from 4.74bcm in 2013 to 2.73bcm in 2017. This resulted change in stage of ground water extraction from 16.4% in 2013 to 11.25% in 2017.

This decrease in resources is due to adoption of calculation as per GEC 2015 methodology. Natural discharge due to evaporation and evapotranspiration was calculated this year. Further, in respect of rainfall recharge, 3000 mm rainfall as maximum threshold value and 10 % of normal annual rainfall as minimum threshold value for each assessment units were considered during 2017. The reduction in the annul ground water extraction for irrigation from 2013 to 2017 is due to change in unit draft value from 2.68 to 1.68ham as per Irrigation Department, Govt. of Assam. In spite of increase in ground water extraction for domestic and industrial use from 2013 to 2017 due to growth in population as well as growth in industries, there is reduction in groundwater extraction for all uses since ground water extraction for irrigation, having major share in total ground water extraction, has reduced. All the above factors contributed for decrease in stage of ground water extraction by 5.15%.

7.4 Bihar

The state is covered with Gangetic alluvium in more than 89% of its geographical area. The consolidated formations occupy fringes in the southern parts of the state. Dug wells and shallow tube wells tapping the phreatic zone are the common groundwater abstraction structures. The estimation of dynamic ground water resources has been carried out in 534 blocks of the state. The Total Annual Groundwater Recharge has been worked out as 31.41bcm with the Annual Extractable Ground Water Resources as 28.99bcm. The Current Annual Ground Water Extraction for all uses has been estimated as 13.26bcm and the Stage of Ground Water Extraction of the state is 46%. Out of the total 534 assessed blocks, 432 are safe, 72 are Semi-Critical, 18 are critical and 12 are over-exploited. There are no saline blocks in the state

As compared to 2013 assessment, the Total Annual Groundwater Recharge and Annual Extractable Annual Ground Water Resources for the State have increased from 31.31 to 31.41bcm and 28.49 to 28.99bcm respectively. The Annual Ground water extraction has increased from 12.73 to 13.26 bcm. The changes in the parameters have been made on the basis of refinement of geomorphology map and the groundwater extraction revised on the basis of revision of well census data.

7.5 Chhattisgarh

The state is underlain by diverse rock types of different geological ages from Pre-Cambrian to Recent. 87% area of the State is underlain by hard rock and the ground water in the area is being tapped mostly by dug wells constructed in the weathered zone and bore wells to tap the deeper aquifers. The yield of open (dug) wells varies from 1 to 2lps and the yield of the bore wells ranges from < 1 to 5lps. About 13% area of the State is occupied by Semi-consolidated sedimentary rocks where Dug wells & tube wells have yield range of 1 to 10lps.

The estimation of ground water resources has been carried out block-wise. The Total Annual Groundwater Recharge of the State has been assessed as 11.57bcm and Annual extractable Ground Water resource is 10.57bcm. The Total Current Annual Ground Water extraction is 4.70bcm and Stage of Ground Water Extraction is 44.43%. Out of 146 blocks, 22 have been categorized as ‘Semi-critical’, 2 as ‘Critical’, 122 as ‘Safe’ and there is no Over-exploited block. In Chhattisgarh, the ground water development concentrates in the central part of the state (Chhattisgarh basin) more as compared to the other parts of the state. Therefore, most of the Semi-critical, critical and over exploited blocks are falling in the Central part of the State. As compared to 2013 assessment, there is a reduction in the Total Annual Groundwater Recharge from 12.80 to 11.57bcm, while there is an increase in ground water extraction from 4.40 to 4.70bcm. Stage of ground water extraction has changed from 37% to 44%. The change in area, validated by the Statistical Hand book of the State has resulted in the reduction of the recharge, while the revision of well census data has resulted in the increase in draft.

7.6 Delhi

The state is covered by diverse rock types of different geological ages from Pre-Cambrian to Recent. As much as 89% of the State is occupied by alluvium and ground water is being tapped mostly through tube wells. Yields of tube wells vary from 4 to 10lps in older alluvial deposits and from 25 to 55lps in newer alluvium. About 11% of the State is occupied by quartzitic hard rock where bore wells have yield of 0.6 to 5lps.

The Ground water resources assessment has been carried out tehsil-wise. The Total Annual Groundwater Recharge of the State has been assessed as 0.32bcm and Annual Extractable Groundwater Resources is 0.30bcm. The Total Current Annual Ground Water extraction is 0.36bcm and Stage of Ground Water Extraction is 120%. Out of 34 tehsils, 22 have been categorized as ‘Over-exploited’, 2 as critical, 7 as ‘Semi-Critical’, and 3 as ‘Safe’.

As compared to 2013 assessment, the Total Annual Groundwater Recharge and Annual Ground Water extractable resources has decreased from 0.34 to 0.32bcm and 0.31 to 0.30bcm respectively. There is a slight decrease in the Annual Ground water extraction for the state from 0.392 to 0.36bcm and the Stage of Ground Water Extraction has decreased from 127% to 120%. The state is over-exploited in terms of ground water extraction.

The marginal decrease in the Total Annual Groundwater Recharge is attributed to refinement in the data pertaining to canals/drains and decrease in rainfall. The decrease in the groundwater extraction can be attributed to reduction in irrigation draft due to urbanization and increased piped water supply by DJB, increase in ground water salinity in many areas of NCT Delhi has also led to less withdrawal of ground water.

7.7 Goa

Major part of Goa State is covered by consolidated formations of Dharwar Super Group. Ground water occurs under unconfined to semi-confined 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 Ground Water Resources has been assessed taluk-wise. Total Annual Groundwater Recharge has been assessed as 0.27bcm and Annual extractable Ground Water resources as 0.16bcm. The Annual Ground Water extraction is 0.05bcm and Stage of Ground Water Extraction is 34%. All 12 taluks in the state have been categorized as 'Safe'.

As compared to 2013 assessment the Total Annual Groundwater Recharge and annual extractable ground water resources have increased marginally whereas the annual Ground Water extraction remained unchanged. Hence, the stage of Ground Water extraction has decreased from 37% to 34%.

7.8 Gujarat

The state is underlain by diverse rock types of different geological ages from Pre-Cambrian to Recent. As much as 60 % of the State is underlain by hard rock and rest by soft rock / alluvium formations. In hard rock areas, the ground water is tapped mostly through dug wells constructed in the weathered zone. Dug cum bore wells and deep bore wells are common for irrigation. In alluvium & soft rock areas, deep tube wells are common for both irrigation and domestic usage. The yield of open (dug) wells varies from 2 to 10 m^3/day, whereas that of tube wells ranges from less than 10 to 100m^3/day. The assessment of ground water resources has been carried out Taluk-wise. Total Annual Groundwater Recharge of the State has been assessed as 22.37bcm and Annual Extractable Ground Water Resourcesas 21.25bcm. The Annual Ground Water extraction has been assessed as 13.58 bcm and Stage of Ground Water extraction as 64%. Out of 248 assessment units (there is an increase of assessment units from 223 in 2013 to 248 during 2017 assessment), 25 talukas have been categorized as 'Over-exploited', 5 as 'Critical', 11 as 'Semi-Critical', 194 as 'Safe' and there are 13 saline talukas in the state. There is increase in saline blocks from 10 in 2013 to 13 at present.

As compared to 2013 estimate, Total Annual Groundwater Recharge has increased from 20.85 to 22.37bcm and Annual Extractable Ground Water Resource has increased from 19.79 to 21.25bcm. The increase in recharge can be attributed to recharge from surface water irrigation through Narmada canal. The annual Ground Water extraction has increased from 13.44 to 13.58 bcm due to increase in number of Ground Water extraction structures. Consequently, there is change in categorization also. There is an increase in saline blocks from 10 to 13 , which have been reorganized from the existing saline blocks and 02 additional over exploited blocks are due to reorganization from the existing over exploited blocks.

7.9 Haryana

Haryana State is mainly occupied by the alluvial deposits, which cover around 98% of the state while hard rock covers around 2%. Alluvial deposits are of Older and Newer types and consist chiefly of clay, silt and fine to medium sand. Other deposits are piedmont deposits, which are confined to a narrow zone, about 2 to 4 km wide, between Siwalik Hills and alluvial plains. Sand-dunes are found in the districts of Bhiwani, Mahendragarh, Hissar and Sirsa. Coarse sand, gravels and boulders are found to occur in piedmont areas and in the adjacent alluvial tracts. The hard rock formations belong to the formation of Delhi systems of Pre-Cambrian age and occupy the southern part of the state, while Shivalik system of Tertiary age are occupying the northern most part of the state.

Total Annual Groundwater Recharge of the State has been assessed as 10.15bcm and Annual Extractable Ground Water Resource is 9.13bcm. The Total Current Annual Ground Water extraction is 12.50bcm and Stage of Ground Water extraction is 137%. Out of total 128 assessed blocks taken for study, 78 have been categorized as 'Over-exploited', 3 as 'Critical', 21 as 'Semi Critical' and 26 as 'Safe'. Total Annual Groundwater Recharge have decreased from 11.36 to 10.15bcm, annual extractable resources have decreased from 10.30 to 9.13bcm and the annual ground water extraction from 13.92 to 12.50bcm. The state of ground water extraction has increased from 135% to 137%. Parameters have been changed as per GEC methodology and have resulted in reduction in recharge. The reduction in draft is due to reduction in yield of wells. In the reorganization of blocks, the new blocks have been made from Over Exploited blocks and have remained in Over Exploited category. Further, the categorization has been made on the basis of stage of extraction, which has resulted in change in categorization.

7.10 Himachal Pradesh

The diverse physiographic, climatic, topographic and geologic conditions have given rise to diversified ground water situation in different parts of the state. The rock formations ranging in age from Archean to Recent occupy the state and control the occurrence and movement of ground water depending upon aquifer composition, structure and deposition. Hilly and mountainous parts with steep slopes mainly constitute the run off areas and have low ground water potential. In valley and low-lying areas, unconsolidated / semi-consolidated formations form potential aquifers.

In consolidated formations the water availability is restricted to weathered mantle, joints/fractures, weak planes, bedding planes and limestone caverns. The limestone associated with Phyllite and quartzite forms potential aquifers. In granites, potentiality of the aquifer is highly dependable on the fracture intensity. In granitic aquifers the discharge ranges between 1-3 lps. Groundwater in hard rock areas is either developed though bore wells or natural springs are tapped for both drinking and irrigation purposes.

In the unconsolidated formations the occurrence and movement of ground water is highly dependent on lithology particularly the presence of clay content. The unconsolidated formations are confined to valley areas, having good yield prospects that can sustain moderate to high capacity deep tube wells. The yield of the tube wells depends on the thickness of the total granular zones available within the aquifers tapped which ranges from 5-40 lps in different valleys. The Ground water resources have been assessed valley-wise.

Total Annual Groundwater Recharge of the State has been assessed as 0.51bcm and Annual Extractable Groundwater Resources is 0.46bcm. The Current Annual Groundwater Extraction for all uses is 0.39bcm and Stage of Ground Water Extraction is 86%. Out of the 8 assessment units, 4 have been categorized as 'Over-exploited', 1 as 'Semi Critical', 3 as 'Safe' and there is no saline assessment unit in the state.

As compared to 2013 estimates, there is marginal reduction in the Total Annual Groundwater Recharge and Annual Extractable Ground Water resources. However, the Ground Water Draft has increased from 0.27 to 0.39bcm in 2017. This is due to refinement in the number of abstraction structures as per well census data. Hence, Stage of extraction has increased consequently.

7.11 Jammu & Kashmir

Jammu, Kashmir and Ladakh are the three regions of Jammu & Kashmir state representing different ground water regimes. In Outer Plains of Jammu Region, extending between River Ravi in the east to Munawar Tawi in the west, the ground water occurs in piedmont deposits belonging to upper Pleistocene to Recent age, comprising unconsolidated sediments in the form of terraces and coalescent alluvial fans developed by the streams debauching out of Siwalik Hills. There exist a number of isolated valleys in middle Himalayas where ground water occurs in valley fill deposits comprising of lacustrine to fluvio-glacial sediments. Ground water in such valleys generally occurs under confined conditions. Kashmir valley covers an area of 5600 km and is occupied by Karewas that consist of a huge pile of alternating bands of sand, silt and clay interspersed by glacial boulder beds. The sands are mostly fine to very fine grained and there is considerable lateral facies variation in the nature of sediments with an aggregate thickness of 2500-3000 m. Ground water in the Karewas of Kashmir valley occurs under both confined as well as unconfined conditions.In Leh plains of Ladakh Region, the sediments comprise of morainic and fluvio-glacial boulders, cobbles underlain by lacustrine deposits consisting of clay and silt.About 15000 sq. km. area in Jammu Region is occupied by hilly terrain, comprising soft or friable sandstones, Clays, Shales, Conglomerates to hard traps and metamorphics such as quartzite and crystalline limestone ranging in age from Precambrian (Salkhala series) to Miocene. The Ground water resources of the state of Jammu & Kashmir have been assessed for valley areas and outer plains of 22 districts of the State. The total recharge of ground water involves several components and the rainfall being the major one. The other components are seepage from canal and return flow from surface water and ground water irrigation. Total Annual Groundwater Recharge of the State has been estimated as 2.89bcm and Annual Extractable Ground Water Resources is 2.60bcm. The Total Current Annual Ground Water extraction is 0.76bcm and the Stage of Ground Water extraction is 29%. All the assessment units have been categorized as 'Safe'.

As compared to the 2013assessment, the Total Annual Groundwater Recharge and Annual Extractable Ground Water Resources have decreased from 5.25 to 2.89bcm and 4.82 to 2.60 bcm respectively. The Annual Ground Water extraction has decreased from 1.18 to 0.76 bcm. The Stage of Groundwater Extraction has increased from 24.4% to 29.5%.The changes in area due to local revenue records and reduction in rainfall recharge have resulted in reduction of recharge. A reduction in draft is observed due to revision of well census data on the basis of functional wells. However, there is no change in categorization

7.12 Jharkhand

The state is underlain by diverse rock types of different geological ages ranging from Archaean to Recent. The major rock types are igneous and metamorphic rocks covering nearly 85 percent of the geographical area of the state. The weathered zone ranging between 10-25 m acts as a good repository of ground water. However, the secondary porosities below the weathered zones also form potential aquifers. The yield of the exploratory wells ranges from negligible to 151 m^3/hr. The yield of the dug wells ranges from 0.5 to 0.75m^3/hr. The dug wells tapping the weathered mantle have an average yield of 0.5 to1.2 m^3/hr. In Gondwana Super group, bore well discharge ranges between 7 to10m^3/hr and in Tertiary formations, yield ranges from 18 to 78m^3/hr. The Younger Alluvium deposits are confined to patches. The depth of dug wells in general ranges between 10 to 15m bgl and that of shallow tube wells varies between 20 to 40m bgl.

The Ground water resources have been assessed block-wise. Total Annual Groundwater Recharge of the State has been assessed as 6.21bcm and Annual Extractable Ground Water Resources is 5.69bcm. The Annual Ground Water extraction is 1.58bcm and Stage of Ground Water extraction is 28%. Out of 260 blocks, 3 blocks has been categorized as 'Over-exploited', 2 as 'Critical', 10 as 'Semi-Critical', and 245 as 'Safe' and there are no saline block in the state.

As compared to 2013 assessment, Total Annual Groundwater Recharge and Annual Extractable Ground Water Resources have decreased from 6.56 to 6.21bcm and 5.99 to 5.69bcm respectively. The Annual Ground water extraction for the state has increased from

1.35 to 1.58 bcm and the Stage of Ground Water extraction has increased from 23% to 28%. Refinement of parameters on the basis of studies has resulted in the decrease of assessed recharge. The increase in stage of extraction is due to urbanisation and industrialisation in Bermo, Chas Ramgarh, Jamshedpur and Kanke blocks, mining activity in Dhanbad, Jharia, Baghmara, Baliapur, Topchachi, Chandrpura, Khelari, Mandu and Patratu blocks and agricultural activities in Silli block of Jharkhand state. Additionally coal mining industry has been identified as a major groundwater dewatering source through their activity.

7.13 Karnataka

Karnataka State is underlain by rock types ranging in age from Archaean to Recent. Major portion of the State is covered by Peninsular Gneisses, Granites and Dharwar Schists of Archaean age. Substantial area in the northern part of Karnataka is underlain by basalts, which form a continuation of the Deccan Traps occurring in Maharashtra. The sedimentaries comprising Bhima and Kaladgis occupy a small area in the northern districts. The recent alluvium is restricted to a narrow belt in the coastal area and along stream courses.

The aquifer systems are classified into nine major groups depending upon their characteristics and are Banded Gneissic Complex (BGC), Basalt, Schists, Granites, Charnockites, Limestones, Laterites, Sandstones and alluvium.

The Annual Ground Water Recharge has been assessed as 16.84bcm and the Annual extractable Ground Water resource is 14.79bcm. The Current Annual Ground Water extraction is 10.34bcm and the Stage of Ground Water Extraction is 70%. Out of the 176 taluks, 97have been categorized as ‘Safe’, 26 as ‘Semi critical’, 8 as ‘Critical’ and 45 as ‘Over exploited’.

As compared to 2013 assessment, there is marginal decrease in Annual Ground Water Recharge, Annual Extractable Groundwater Resources and an increase in the Current Annual Groundwater Extraction for all uses from 9.76 to 10.34bcm in 2017.Hence, the stage of ground water extraction has increased from 66% to 70%. The increase in ground water extraction is a result of the revision of well census data and consequently there is an increase in stage of extraction by 4%.

7.14 Kerala

The state of Kerala is underlain by diverse rock types of different geological ages from Pre-Cambrian to Recent. Nearly, 88% of the State is underlain by crystalline rocks of Archaean age comprising schistose formations, Charnockites, Khondalites and gneisses. All these formations are intruded by dykes of younger age. The sedimentary formations of Tertiary age occurring along the western parts of the State comprise four distinct beds viz. Alleppey, Vaikom, Quilon and Warkali. The crystalline and the Tertiary formations are lateritized along the midland area. Yields of open (dug) wells in these areas vary from 2 to 10m^3/day, whereas that of bore wells ranges from less than 1 to 35lps. About 12% of the State is underlain by Semi-consolidated and unconsolidated sedimentary formations where dug wells and filter points have yields of 1 to 35m^3/day, whereas deep tube wells have yields in the range of 1 to 57lps. Laterites, which cover most of the geological formations in the major part of the state also forms an important aquifer in the state with dug wells having yields in the range of 0.5 to 6m^3/day.

The Ground water resources for the state have been assessed block-wise. Total Annual Groundwater Recharge has been estimated as 5.77bcm and Annual Extractable Ground Water Resource is 5.21bcm. The Annual Ground Water extraction is 2.67bcm and Stage of Ground Water extraction is 51%. Out of 152 blocks, 1 has been categorized as ‘Over-exploited’, 2 as ‘Critical’, 30 as ‘Semi-Critical’ and 119 as ‘Safe’. There is no saline block in the state.

As compared to 2013 assessment, Total Annual Groundwater Recharge of the state has decreased from 6.27 to 5.77 bcm, Annual Extractable Ground Water Resources from 5.66 to

5.21 bcm. The annual ground water extraction has increased from 2.63 to 2.67bcm and the stage of ground water extraction from 47% to 51%. The change in precipitation, consequent water level fluctuation and deeper water levels are reasons for marginal reduction in the recharge figures. The number of semi critical blocks is increased from 18 to 30 and the increase is mainly due to the present computation method because of which some of the blocks have exceeded the 'safe category' limit of Stage of ground water extraction and became semi critical.

7.15 Madhya Pradesh

The State of Madhya Pradesh has varied hydrogeological characteristics due to which ground water potential differs from place to place. The state is underlain by various geological formations ranging in age from the Archaean to the Recent. Hard rock areas cover more than 80% of total land area of the State. These hard-rock areas show wide variations and complexities in nature and composition of rocks, geological structures, geomorphological set up and hydro meteorological conditions. The crystalline rocks of Archaean age like granite, gneiss, granulites, schist, quartzite and granitoids occupy about 15% of geographical area of the State. The basaltic rocks of Deccan lava flows are the predominant formations and occupy nearly 45% of total geographical area. The consolidated sedimentary rocks of Vindhyan Super Group and Mahakoshal (Cuddapah) Super Group of Proterozoic age occupy about 19% of total geographical area and the semi consolidated (Gondwana Formation) occupies about 7%. Recent unconsolidated alluvial sediments occupy about 14% of total geographical area.

Total Annual Groundwater Recharge of the State has been assessed as 36.42bcm and Annual Extractable Ground Water Resources is 34.47bcm. The Annual Ground Water extraction is 18.88bcm and Stage of Ground Water extraction is 55%. Out of 313 blocks, 22 blocks has been categorized as 'Over Exploited', 7 as 'Critical', 44 as 'Semi-Critical' and 240 blocks as 'Safe' and there are no saline blocks. As compared to 2013 assessment, there is a marginal increase in the recharge and reduction in the groundwater extraction. The revision of well census data can be attributed to the reduction in groundwater extraction, while the changes in the parameters can be attributed to marginal rise in recharge.

7.16 Maharashtra

The State is underlain by diverse rock types of different geological ages from Pre-Cambrian to Recent. The state is mostly covered by Deccan Traps. The other geological formations, older and younger than Deccan Traps, occur in the northeast and as isolated patches in the Sindhudurg and Ratnagiri districts. Large part of the State is underlain by Basaltic hard rocks where dug wells are predominant. They mostly tap the weathered zone and fractures/joints. The yield of dug wells varies from 3 to 5 lps. A small part of the State is occupied by Semi-consolidated sedimentary rocks where tubewells have an yield of 5 to 45lps. The central part of Maharashtra which is a drought prone area, receives very less rainfall i.e. from 400 to 700mm, but the geology is favourable for the groundwater recharge. Hence, in this area the dependency on groundwater is very high. Two-third of irrigation wells are from this area only. This primarily includes parts from Dhule, Nashik, Jalgaon, Ahmednagar, Pune, Satara, Sangli, Solapur, Osmanabad, Beed and Aurangabad districts.

The Ground water resources have been assessed for 1531 watersheds in the state and subsequently apportioned to block level. Total Annual Groundwater Recharge of the State has been estimated as 31.64bcm and Annual Extractable Ground Water Resources is 29.90bcm. The Annual Ground Water extraction is 16.33bcm and Stage of Ground Water extraction is 54.6%. Out of 353 blocks, 11 have been categorized as 'Over-exploited', 9 as 'Critical', 61 as 'Semi-critical' and remaining 271 as 'Safe' and one block as saline.

As compared to 2013 assessment, the Annual Ground Water Recharge in 2017 has decreased from 33.19 to 31.64bcm, Annual Extractable Ground Water Recharge from 31.48 to 29.90bcm and Annual ground water extraction from 17.07 to 16.33bcm. There is a marginal increase in the stage of ground water extraction from 54.2% to 54.6%. The changes in GEC-

2015 methodology in the norms (Threshold values for rainfall recharge, seepage from WCS), marginal decrease in draft due to revision of well census data on the basis of functional wells are the main reasons for the changes The increase in stage of extraction and categorization are attributed to more reduction in recharge in comparison to the reduction in extraction.

7.17 Manipur

The State of Manipur is occupied by mostly North South parallel hill ranges made up of consolidated and semi-consolidated rocks ranging in age from pre-Mesozoic to Miocene. The consolidated rocks confined to the eastern part of the state along the Myanmar border. The semi-consolidated formations, which cover almost the entire state, comprise shale, siltstone, sandstone and conglomerate. These formations belong to Disang, Barail, Surma and Tipam group of rocks. In the Western and central part of the state, unconsolidated alluvium of quaternary age occurs in the valleys and topographical lows. Groundwater is restricted to secondary porosity in joints, fissures, fractures and weathered residuum of consolidated and semi-consolidated rocks and inter-granular pore spaces of alluvial deposits. In the valley, ground water is utilized through tube wells, tapping granular zones with 10 to 20m thickness, and the yield of the tube well varies from 10 to 30m^3/hr.

The Ground water resources for the state have been assessed district-wise due to paucity of block wise data. Total Annual Groundwater Recharge of the State has been assessed as 0.43bcm and Annual Extractable Ground Water Resources as 0.39bcm. The Annual Ground Water extraction is 0.006bcm and Stage of Ground Water extraction is 1.44%. All the districts have been categorized as 'Safe' and there is no saline area in the state. The comparison with previous assessment shows there is a decrease in the total Annual Ground Water Recharge by 0.04 bcm, which is due to the fact that, in the last four years the state experienced low non-monsoon rainfall specially in Manipur valley. Increase in ground water extraction from 2013 to 2017 is due to increase in population as well as consideration of industrial extraction during 2017.

7.18 Meghalaya

The Meghalaya State is essentially occupied by hard rocks belonging to the Archaean gneissic complex with acidic and basic intrusives and Precambrian Shillong Group of parametamorphites. Groundwater occurs under unconfined condition in the weathered residuum and fractured rocks and restricted to about 150 m depth. The development of ground water is mostly by dug wells which is restricted to the weathered zone and through bore wells including hand pumps which mainly tap the semi-weathered and fractured zones in the hard rock. The south-western, southern and south-eastern parts of the state is covered by semi-consolidated formations comprising sandstones, shales, conglomerates, limestones etc. belonging to Cretaceous – Tertiary age. The aquifers are formed by rock strata that are granular/porous, fissured/fractured or cavernous. These aquifers are thick and discontinuous in nature. The unconsolidated sediments comprising sand, gravel, silt, clay, etc. are found to occur as thin veneer along rivulets and as valley-fills.

The Ground water resources have been assessed district-wise due to paucity of block wise/ watershed wise data. Total Annual Groundwater Recharge of the State has been assessed as 1.83 bcm and Annual extractable Ground Water resources as 1.64bcm. The Annual Ground Water extraction is 0.04bcm and Stage of Ground Water Extraction is 2.28%. All the 11 districts have been categorized as 'Safe'.

As compared to 2013 assessment, the Annual Ground Water Recharge and annual extractable Ground Water resources have decreased from 3.31 to 1.83bcm and 2.98 to 1.64bcm respectively. The reasons can be attributed to inclusion of threshold value for rainfall to effect recharge in GEC2015 methodology .The Annual Ground Water extraction has also increased from 0.012 to 0.04 bcm due to refinement in data. Stage of ground water extraction has consequently increased from 0.4 % to 2.28%.

7.19 Mizoram

The state is occupied mainly by the rocks of the Tertiary formation ranging in age from Oligocene to Miocene to Recent. The Barail form the lower most rock units comprising siltstone and bands of soft and hard fine grained sandstone with strings of carbonaceous material and occur in the north eastern part of the state. The Surma is divided into two formations, Bhuban and Bokabil. The Bhuban is made up of grey sandstone and shale and occupies the major part of the state all along the length of the state. The Bokabil, predominantly argillaceous, mostly occurs along the western part of the state. The Tipam sandstone is of semi-consolidated nature comprising medium to coarse grained sandstone with subordinate shale and occurs in limited extent in the north western part of the state. The alluvial deposits comprising silt, clay and sands occur in the valley fill area with very limited thickness. Ground water is confined only to valley filled areas and secondary porosities of semi-consolidated rocks. These aquifers are the main source for springs. Ground water stored in the hill slopes emanates in the form of springs, which are being used as a source for water supply. In the valley area, the yield potential of tube wells within the depth range of 200m tapping Tertiary sandstone ranges from 120 to 330liters per minute for drawdown of 13 to 20 m. The transmissivity and Storativity are to the tune of 11 to 46 m^2/day and $4.28x10^{-4}$respectively.

The ground water resources for the state have been assessed block-wise. Total Annual Groundwater Recharge has been assessed as 0.213bcm and Annual Extractable Ground Water Resou is 0.192bcm. The Annual Ground Water extraction is 0.007bcm and Stage of Ground Water extraction is 3.8%. All the 26 assessed blocks have been categorized as ‘Safe’. There are no saline areas in the state. As compared to 2013 estimate, there is a increase in annual ground water recharge, ground water extraction and as well as in stage of ground water extraction. The data from MIRSAC (Mizoram Remote Sensing Agency), DEM datawas used to demarcate recharge worthy area, due to which the area has increased compared with 2013 assessment. This has resulted in increase in the recharge figures and refinement in census data has resulted in increase in extraction and consequently the stage of extraction has also increased.

7.20 Nagaland

The state is covered by rocks ranging in age from Pre-Cretaceous to Recent. The rock sequences comprise the geosynclinals facies, represented by Disang Group, Barail Group, Surma Group, Tipam Group, Namsang formation and Dihing Group. While the Disang and Surma Group of rocks are mainly argillaceous, the Barail and Tipam groups are arenacious. The Girujan clay formation overlying the Tipam sandstones is characterized by typical blue, mottled clay and argillaceous sand stone beds. Older rocks occupy southern parts of the State, whereas younger rocks are exposed in the northern parts. The unconsolidated alluvial plains, comprising clay, sand pebble, cobble and boulder assemblages, occupy the narrow, intermontane and open valleys in the northern part of the state bordering upper reaches of Brahmaputra flood plains of Assam. The consolidated formations are confined to the south eastern part of the State along the Burma (Myanmar) border.

Ground water development potentiality in valley fill and alluvial deposits are restricted to construction of open wells having depth of 15 to 20metres and deep tube well down to 100 m depth which yield to the tune of 10 to 45 m^3/day with more than 5m drawdown. Water bearing formations pertaining to Tertiary deposits are found to have moderate potentials which can sustain deep tube wells having yield prospects varying from 10 to 20m^3/hr. The valleys underlain by Tipam sandstones form good aquifers with yield prospects varying from 30 to 80m^3/hr. In the consolidated formations, ground water abstraction structures can be constructed in structurally weak zones. Ground water emerges as perennial springs which are the main source of water supply for domestic needs in the state.

The ground water resources for the state have been assessed district-wise due to paucity of block-wise data. Total Annual Groundwater Recharge of the State has been assessed as 2.20bcm and Annual Extractable Ground Water Resource as 1.98bcm. The Annual Ground

Water extraction is 0.02bcm and Stage of Ground Water extraction is 1%. All the 11 districts have been categorized as 'Safe'. There are no saline areas in the state. As compared to 2013 estimates, the Total Annual Groundwater Recharge of the State has increased from 1.94 to 2.20bcm and similarly, the Annual Extractable Ground Water Resource has increased from 1.75 to 1.98bcm and annual ground water extraction decreased from 0.034 to 0.020 bcm. This variation is due to re-calculation of recharge worthy areas for the state. The reasons for increase are change in rainfall infiltration factor. As per the revised guidelines (GEC 15) for semi-consolidated formations rainfall infiltration factor taken is 12% and for valley fill deposits, it is 22%.

7.21 Odisha

The state is underlain by diverse rock types, which range in age from Precambrian to Cenozoic era. The Precambrians occupy nearly 80% of the total geographical area of the State. The Tertiary and the Quaternary Alluvial formations are restricted mainly to the narrow coastal tracts. The Gondwana group of rocks belonging to Paleozoic and Mesozoic era occurs in isolated patches in different parts of the State. These formations occur in Talcher area of Angul district and in river valley area of Sambalpur and Sundargarh districts. Groundwater abstraction in the state is mostly done by dug wells constructed in the weathered zone in hard rock areas and in shallow phreatic aquifers in alluvial areas. The yield of open (dug) wells varies from 1 to 5lps. However, at present, bore wells, shallow to medium deep tube wells, filter point tube wells are also in use for ground water abstraction both for domestic and irrigational purpose. The yield of bore wells varies from 2 to 5 lps in general depending on the occurrence of saturated fractures at depths. The yield from shallow and medium deep tube wells may vary from 6 to 10lps in general depending on the aquifer disposition.

The Ground water resources in the state have been assessed block-wise. Total Annual Groundwater Recharge of the State has been assessed as 16.74bcm and Annual extractable Ground Water resource as 15.57bcm. The Annual Ground Water extraction is 6.57bcm and Stage of Ground Water Extraction is 42%. Out of the total of 314 Blocks in the state, 303have been categorized as 'Safe', 5 blocks are semi-critical and the remaining 6 blocks are 'Saline'. As compared to 2013 estimates, there is a reduction in Annual Ground Water Recharge and annual extractable ground water resources, while there is an increase in annual ground water extraction. The state of ground water extraction has also increased significantly from 30% to 42%. Increase in ground water extraction for irrigation is the main factor for change in stage of extraction and has resulted in 5 numbers of safe blocks becoming semi critical.

7.22 Punjab

Punjab is one of the smallest states of India having 3 perennial rivers namely Sutlej, Beas and Ravi and one non- perennial river Ghaggar.The Punjab State is a flat alluvial plain having a thin belt of mountains along north eastern border and stable sand dunes are seen dotting the landscape in the south western parts. The alluvial deposits in the State comprise sand, silt and clays often mixed with kankar. Sandy zones of varying grade constitute abundant ground water resources & act as a reservoir. The alluvial plain towards the hills is bordered by the piedmont deposits comprising Kandi and Sirowal. Immediately south-west of the hills, Kandi belt is 10 to 15km wide followed by Sirowal which imperceptibly merges with the alluvial plain. Kandi deposit explored up to 450m depth show gradation from boulders to clays and at places an admixture of various grades in different proportions. The Sirowal deposit is essentially composed of finer sediments but occasional gravel beds are also encountered in them.

The ground water resources for the state have been assessed block-wise. Total Annual Groundwater Recharge of the State has been assessed as 23.93bcm and Annual Extractable Ground Water Resource as 21.59bcm. The Annual Ground Water extraction is 35.78bcm and Stage of Ground Water extraction is 166%. Out of the 138 assessed blocks, 109 blocks have been categorized as 'Over-exploited', 2 as 'Critical', 5 as 'Semi-Critical', and 22 as 'Safe' and there are no saline block in the state.

As compared to 2013 estimates, the Annual Ground Water Recharge has decreased from 25.91 to 23.93bcm and similarly, Annual Extractable Ground Water Resource decreased from 23.39 to 21.59 bcm and total current annual ground water extraction increased from 34.81 to 35.78 bcm. The stage of ground water extraction has increased from 149 to 166%. The reduction in recharge is due to the changes in norms as recommended in the revised GEC 2015 methodology and increased draft is due to revision of well census data.

7.23 Rajasthan

The State of Rajasthan has diversified geology, ranging from Archean metamorphics to recent alluvial sediments. Based upon geological diversities, geomorphological setup and ground water potentialities, the state of Rajasthan can be divided into three broad hydrogeological units.(i) Unconsolidated formation (ii) Semi-consolidated formation (iii) Consolidated (Fissured formation). Large part of the State is underlain by Quaternary sediments (Thar Desert) consisting of clay, silt, sand and gravel of various grades. The fine sand and clay with or without Kankar layers have formed multi layered aquifer system. Exploratory drilling data reveals that the yield vary from meagre to 10 m^3/day, transmissivity ranges between 80 to 300 m^2/day and storage co-efficient vary from 1.1x $10^{-5}$to 3.9x10^{-6}in the state. Sandstone belonging to the Vindhyan formation is compact in nature and has low primary porosity. Ground Water occurs within the weathered residue and in the secondary porosity underneath. In general, the thickness varies from 5 to 10m. Yield potential is limited due to compact nature of the formation. The limestone is also having low ground water potential. The yields of dug wells vary from 0.25 to 0.75m^3/day. The yield of the wells drilled in Vindhayan formation has been observed to be 15m^3/day, tapping fractures between 50-75mbgl. In consolidated formation (Fissured) the thickness of the weathered zone varies from 5 to 50m. Ground Water occurs under unconfined condition within the weathered zone. The results of the exploratory drilling carried out by CGWB in hard rock areas indicate presence of productive fractures down to a depth of 100m and yield varies from 3 to 15m^3/day, whereas transmissivity varies from 3 to 30 m^2/day.

The Ground water resources for the state have been assessed block-wise. Total Annual Groundwater Recharge of the State has been assessed as 13.21bcm and Annual Extractable Ground Water Resource as 11.99bcm. The Annual Ground Water extraction is 16.77bcm and the Stage of ground water extraction in the state is 140%. Out of the 295 assessed blocks, 185 blocks have been categorized as ‘Over Exploited’, 33 as ‘Critical’, 29 as ‘Semi-Critical’, 45 blocks as ‘Safe’ and 3 as ‘Saline’.

As compared to 2013 estimate, the Annual Ground Water Recharge and Annual Extractable Ground Water Resource have increased from 12.51 to 13.21bcm and 11.26 to 11.99bcm respectively. Annual ground water extraction and stage of ground water extraction has increased marginally from 15.71 to 16.77bcm and 139.52 to 139.88% respectively. The marginal change in recharge is due to changes in norms of GEC-2015 methodology and increased draft is due to revision of well census data.

7.24 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 Carbonate rocks and Gondwanas over a gneissic basement and occasional alluvial terrains along streams and river courses, Ground Water occurs largely in disconnected localized pockets and in deeper fractures zones and springs are the main source of water. The total annual ground water recharge is 5.63bcm, annual extractable resource is 1.52bcm. The annual ground water extraction is very insignificant i.e., 0.000874 bcm. In two districts, namely, north and west districts, the annual ground water extraction is zero. The stage of ground water extraction is 0.057% and all the assessment units are in safe category. The assessment has been made for the first time for the State of Sikkim.

7.25 Tamil Nadu

Tamil Nadu state is underlain by diverse hydrogeological formations. Nearly 73% of the state is occupied by hard rocks, semi-consolidated and consolidated formations which are mainly confined to the eastern part including the coastal tract. In the hard rock areas, groundwater is developed through dug wells tapping the weathered zone and dug cum bore wells and bore wells tap the deeper fractures down to a depth of 300m. In semi consolidated and unconsolidated formation, shallow zones are tapped by filter points and shallow tube wells and deeper zones through deeper tube wells. . The yield of open wells vary from 1 to 3lps, whereas in dug wells tapping soft rocks including sedimentary formations, the yield is up to 10lps. The yield from unconsolidated and semi consolidated formations are in general 10 to 20lps and also as high as 40 lps are also noticed at select places.

The Ground water resources for the state have been assessed firka wise. Total Annual Groundwater recharge of the State has been assessed as 20.22bcm and Annual extractable Ground Water resources as 18.20bcm. The Annual Ground Water extraction is 14.73bcm and Stage of Ground Water Extraction as 81%. Out of 1166 firkas, 462 have been categorized as ‘Over Exploited’, 79 as ‘Critical’, 163 as ‘Semi-Critical’,427 as ‘Safe’ and 35 firkas have been categorized as ‘Saline’. As compared to 2013 estimate, Total Annual Groundwater recharge has decreased from 20.65 to 20.22bcm and the annual ground water extraction has increased from 14.36 to 14.73bcm. Consequently, there is an increase in the stage of ground water extraction from 77% to 81%. The marginal reduction in recharge is due to changes in norms of GEC-2015 methodology and increased draft due to revision of well census data.

7.26 Telangana

The state of Telangana shares its boundaries with Andhra Pradesh, Chattisgarh, Maharashtra and Karnataka. The state has 2 major rivers, the Godavari and the Krishna. The River Godavari with its tributaries Pranahita, Manjeera, Maneru, Indravati, and Kinnerasani drains through the northern parts of the State. The river flows through Adilabad, Karimnagar, Nizamabad, Medak, Warangal and Khammam districts. The River Krishna with its tributaries Tungabhadra, Bheema, Musi, Paleru and Munneru flows through the Southern parts of the State. It drains through Mahabubnagar, Ranga Reddy and Nalgonda districts.

Telangana state is characterized by wide range of geological formations from Archaean to Recent age. Nearly 85% of the state is underlain by hard rocks (consolidated formations) belonging to the Peninsular Gneissic Complex, Dharwar and Eastern Ghats of Archaean to Middle Proterozoic age, Pakhal Group of rocks belonging to Middle to Upper Proterozoic age and Deccan Traps. In hard rocks average well yields are around 50 to 125lpm. The rest of the state is underlain by semi consolidated sediments formations encompassing Gondwanas, Tertiary group of formations and Sub-Recent to Recent unconsolidated sediments. In Kamthi sandstones, the tube-wells constructed down to 250mbgl and yield varies from 13 to 162m^3/hour. Within the 200m depth range yield varies from 1.5 to 16.6lps for draw-down of 9 to 30m. Transmissivity of these aquifers varies between 28 and 950m^2/day. The unconsolidated formations are represented by inland river alluvium. The alluvial aquifers have high porosity and permeability. Filter points are most common in this formation. Filter points drilled down to a depth of 10 to 15m bgl yield between 150 to 1500lpm.

The Ground water resources for the state have been assessed watershed-wise and apportioned to mandal-wise. Total Annual Groundwater recharge of the State has been assessed as 13.62bcm and Annual extractable Ground Water resource as12.37bcm. The Annual Ground Water extraction is 8.09bcm and Stage of Groundwater extraction is 65.45%. Out of 584 mandals, 70 mandals have been categorized as ‘Over Exploited’, 67 as ‘Critical’, 169 as ‘Semi-Critical’ and 278 as ‘Safe’. There are no saline Mandals in the state.

As compared to 2013 estimates, Total Annual Groundwater recharge of the State has decreased from 14.74 to 13.62bcm. This is attributed to relatively less rainfall during the assessment year and due to changes in norms of GEC-2015 methodology. The Current

Annual Groundwater Extraction for all uses has increased from 7.77bcm to 8.09bcm due to increase in dependency on ground water because of increasing urbanization and industrialization.

7.27 Tripura

The State of Tripura is occupied by the rocks ranging in age from Upper Tertiary to Quaternary. Mobile trough geosynclinal deposition of Barail group followed by flysch type of Surma & Tipam sediments, overlain by Dupitila formation, is noticed in the state. Most of the longitudinal synclinal valleys of the state are the basins of deposition of recent formation. Recent alluvium occurs along the streams and the flood plains of major rivers.

Ground water occurs under unconfined condition in Dupitila, Recent & in Tipam formations. Besides, it also occurs under confined to semi-confined conditions in Tipam formation at considerable depth. Recharge areas for the deeper aquifer lies in the adjacent anticlinal hills. Wherever a good thickness of impermeable clay beds underlie & overlie the saturated granular zones, auto flow artesian conditions have been found in the valleys, which are the discharge area. The artesian flowing conditions occur in patches both at shallow depth and at deeper depth. The auto discharge of the flowing wells in the State ranges from 100 to 6000 lph, the maximum auto discharge from deep tube well to the extent of 54000 lph has been found in Khowai valley near Khowai town, where the piezometric head rose up to 7m above ground level.

The Ground water resources have been assessed block-wise. Total Annual Groundwater Recharge of the State has been assessed as 1.53bcm and Annual Extractable Ground Water Resource as 1.24bcm. The Annual Ground Water extraction is 0.098bcm and Stage of Ground Water extraction is 7.9%. All the 39 blocks assessed have been categorized as 'Safe'. As compared to 2013 estimate, there is a decrease in the Annual Ground Water Recharge and Annual Ground Water extraction. This is due to inclusion of evaporation and evapotranspiration as natural discharge (5% to 60% and on an average 19%) in the computations. The difference in resource may be attributed to the changes in methodology and rainfall infiltration factor (reduce from 16% to 12%). Extraction of ground water from shallow aquifer decreases and consequently irrigation extraction decreases from 2013 to 2017.

7.28 Uttar Pradesh

The state of Uttar Pradesh is categorized with five distinct hydrogeological units – Bhabar, Terai, Central Ganga Plains, Marginal Alluvial Plain, Southern Peninsular area. Bhabar is mainly the recharge zone having deeper water levels. 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 generally found to be in the range of 40 to 60lps. Terai zone lies between Bhabar in the North and Central Ganga Plain in the South. It is characterized by fine grained sediments with occasional pebbles and boulders. The average yield of tube wells constructed in this zone varies from 30 to 60lps with moderate drawdowns. Central Ganga Plain constitutes the most promising ground water repository characterized by multi-layered aquifer systems. The yield of the open wells and hand pumps constructed in the phreatic aquifer vary from 5 to 10lps. The tube wells in the phreatic aquifer yield between 20 to 28 lps at 6 to 8 m drawdowns. Marginal alluvial plain consists of kankar mixed clay-silt beds intercalated with sand and gravel lenses. The aquifer in this area is capable of yielding 15 to 40lps at moderate drawdowns. Southern Peninsular Region is characterized by sedimentary formations (sandstone, quartzite, limestone, shale). The wells tapping these formations generally recorded yield between 2 and 8lps.The Ground water resources have been assessed block-wise. Total Annual Groundwater Recharge of the state has been assessed as 69.92bcm and Annual Extractable Ground Water Resource as 65.32bcm. The Annual Ground Water extraction is 45.84bcm and Stage of Ground Water extraction is 70%. Out of the 830 assessment units consisting 820 blocks and 10 cities , 91 have been categorized as 'Over-exploited', 48 as 'Critical', 151 as 'Semi-critical' and 540 as 'Safe'. There is no saline block in the State. As compared to 2013 estimate, there is a decrease in the resources and the ground water extraction figures. The stage of ground water extraction has also marginally decreased from 74% to 70%. The reduction in recharge values can be attributed to Changes in rainfall recharge due to changes in methodology and change in parameters as per field observations and reduction in draft is due to revision of well census data on the basis of functional wells & also on the basis of observed unit draft figures.

7.29 Uttarakhand

Uttarakhand State has a distinct geological attribute with wide variety of rock units ranging in age from Archean to Quaternary. About 85% of the geographical area of the state is mountainous and underlain by hard rocks. Ground water in the hard rock area is harnessed through the springs and hand pumps tapping the weathered zone. Discharge of springs in the Lesser Himalaya and Central Himalaya is variable and ranges from 60 to 600lpm. About 15% of the geographical area is underlain by semi-consolidated and unconsolidated formations known as Tarai and Bhabhar. Ground water in this area is developed by open wells, shallow and deep tube wells.

The ground water resources of Uttarakhand State have been assessed block-wise. Total Annual Groundwater Recharge of the State has been assessed as 3.04bcm and Annual Extractable Ground Water Resource as 2.89bcm. The Annual Ground Water extraction is 1.64bcm and Stage of Ground Water extraction is 57%. Out of the 18 assessment units, 5 are 'Semi-Critical' and 13 are 'Safe'. There are no over-exploited, critical and saline blocks in the state. As compared to 2013 estimate, there is an increase in the Total Annual Ground Water Recharge, Annual Extractable Ground Water Resource and annual ground water extraction in the State. The stage of ground water extraction has increased from 50% to 57%. The reason for the increase in recharge can be attributed to improvement in database (recharge from surface water irrigation-included in current assessment) which has resulted in the refinement of assessment and increased draft due to revision of well census data.

7.30 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 tube well. The yield of these wells varies from 1 to5lps.

The Ground water resources have been assessed block-wise. The results of GWRA-2017 indicated a huge variation with respect of previous assessment of resources and the reasons for the changes in West Bengal was not found reasonable and adequate and further, SLC has also not approved the GWRA- 2017 assessment. Hence, CLEG recommended that the results of 2013 assessment in respect of West Bengal may be used in place of GWRA-2017 assessment for national compilation of GWRA-2017 with a rider that after approval of GWRA-2017 by SLC of West Bengal, a corrigendum may be issued separately, incorporating the results of GWRA-2017. As per 2013 assessment, Annual replenishable resources had been assessed as 29.33bcm, Net Groundwater Availability as 26.56bcm andGroundwater draft for all uses as 11.84bcm. The stage of Development was worked out to be 45%.

7.31 Andaman and Nicobar Islands

The Andaman & Nicobar islands comprise an arc-shaped chain of islands in the Bay of Bengal and are characterized by rugged topography, steep slope, low infiltration capacity and close proximity of hills to the sea. Marine sedimentary group of rocks comprising shale, sandstone, grit and conglomerate; extrusive and intrusive igneous rocks (volcanics and ultramafics) and coralline atolls and limestone occupy the entire geographical area. Amongst these, the Sedimentary Group is most pervasive and occupy nearly 70% of the entire area of the islands while the igneous group covers nearly 15% while the rest of 15% goes to the coralline and limestone formations. All these rock formations have been subjected to many tectonic activities, evident from the occurrence of shallow and deep focus earthquakes in the islands.

Because of tectonic activity, the Igneous and Sedimentary group of rocks are highly fractured and fissured. These fracturing in hard rock form conduits for movement of ground water in the deeper horizon. The geology of the islands is highly varied within a small distance. Marine sedimentary rocks are developed only through dug wells having meagre yield of 0.1 to 0.5lps. The igneous Ophiolite suite of rocks in the area although restricted in occurrence, are observed to yield moderate to high both in shallow and deeper locales and they are developed by dug wells and bore wells with yield ranging from 1 to 10lps. The island area which is covered by Coralline Limestones contains appreciable quantity of groundwater with yield ranging from 5 to 25lps.

The Ground water resources have been assessed island-wise. Total Annual Ground Water Recharge of the A&N Islands have been assessed as 0.370bcm and Annual Extractable Ground Water Recharge is 0.330bcm. The Annual Ground Water extraction is 0.009bcm and Stage of Ground Water extraction is 2.7%. Out of 36 islands, 35 are safe and one saline. There is no significant change with respect to 2013 assessment.

7.32 Chandigarh

Chandigarh is underlain by the Quaternary alluvial deposits and comprises layers of fine sand and clay. Coarser sediments occur along the Sukhna Choe and Patialiki Rao, whereas relatively finer sediments underlie the area between these two streams. Fair to good aquifer horizons occur in most part of Chandigarh comprising medium to coarse sand, to a depth of 180mbgl below which they become finer. Ground water in the area occurs under confined as well as semi-confined conditions. In Manimajra, Ground water occurs under unconfined conditions down to about 80m. In other areas, the semi-confined conditions prevail below 20 to30m. The depth of the shallow aquifer system is less than 30mbgl, whereas the depth of the deeper aquifer system ranges from 40 to 450mbgl of explored depth. The transmissivity values for the deeper aquifer system ranges between 74 and 590 m^2/day. The transmissivity values of shallow aquifers up to 100 m depth ranges from 70 to 466 m^2/day. Ground water is found to be fresh and suitable for drinking as well as irrigation purposes.

UT of Chandigarh has very small area and whole UT has been taken as an assessment unit. Total Annual Groundwater Recharge has been assessed as 0.042 bcm and Annual Extractable Ground Water Resources as 0.038bcm. The UT of Chandigarh has been categorized as Semi-critical with stage of ground water extraction at 89%. In comparison to 2013 assessment, Total annual recharge has increased from 0.022 to 0.042bc.mThe current groundwater extraction is 0.03bcm, but the draft figure was not available for 2013 assessment. The groundwater extraction in Chandigarh is completely governed by Government and only Government extracts groundwater for public water supply. The methodology for urban areas given in GEC-2015 has been used in the present assessment and the increase in recharge can be attributed to the changes in the methodology

7.33 Dadra & Nagar Haveli

The entire area of UT of Dadra and Nagar Haveli is underlain by hard rock terrain (Deccan basalts). The thickness of vesicular units, ranges from 2 to 8 m. Ground water is developed by means of dug wells and dug cum bore wells. The sustainable yield of dug wells for 3 to 4 hours of pumping is 30 m^3/day. The transmissivity of shallow aquifer ranges from 5.5 to 305 m^2/day.

The entire D & NH has been considered as a single assessment unit. Total Annual Groundwater Recharge of the UT of DNH has been assessed as 0.069bcm and Annual Extractable Groundwater Resources as 0.065bcm. The Current Annual Groundwater Extraction for all uses is 0.020bcm and Stage of Ground Water Extraction is 31.34%. The entire UT of D&NH has been categorized as ‘Safe‘. As compared to 2013 estimate, there is no significant change.

7.34 Daman & Diu

The entire island area of Diu is about 40 sq.km and is underlain by alluvium and Milliolite softrock formation. The Daman has about 72 sq km area out of which 30% is covered by alluviumand the rest is underlain by Basalt rocks. In UT of Daman & Diu, dug well as well as dug cumbore wells are common for irrigation and domestic use. The yields of open dug wells varies fromless than 1 to 5 m^3/day, whereas that of Dug cum Bore wells ranges from less than 2 to 10m^3/day.

The ground water resources have been assessed district-wise. The total annual groundwater recharge has been assessed as 0.018bcm and Annual Extractable Groundwater resources as 0.017 bcm. The total current annual groundwater extraction has been assessed as 0.010bcm and stage of ground water extraction as 61%. Out of 2 assessment units, Diu has been categorized as ‘ Critical’ and Daman as ‘Safe’. As compared to 2013 assessment, there is an increase in total annual groundwater recharge from 0.015 to 0.018bcm, while the groundwater extraction has remained same. Consequently, the stage of groundwater extraction has decreased from 70 to 61% .. There is simultaneous increase in both recharge and groundwater extraction, which can be attributed to the refinement in the database.

7.35 Lakshadweep

Lakshadweep islands are composed of calcareous sand and materials derived from coral atolls. Alternate layers of loose sand, moderately cemented calc-arenites and well cemented, hard and compact limestone underlie the islands. In these islands, fresh ground water occurs under phreatic conditions as a lens floating over the saline water and is in hydraulic continuity with sea water. Water levels in wells are strongly influenced by tides. Dug wells are the common ground water abstraction structures in the islands. The major draft component of these islands is for the domestic consumption. Irrigation draft is negligible in the islands as almost all the crops are rain fed.

Dynamic ground water resources have been assessed for individual islands. The total annual groundwater recharge in the islands has been estimated as 0.011bcm and Annual Extractable Groundwater resources works out as 0.004bcm. The total current annual groundwater extraction has been assessed as 0.002bcm and the stage of ground water extraction as 66%. Out of the 9 islands, 3 have been categorized as ‘Semi- Critical’ and 6 as ‘Safe’. As compared to 2013 assessment, there is no significant change.

7.36 Puducherry

The UT of Puducherry is underlain by the semi-consolidated and unconsolidated sedimentary formations which mainly sustain dug wells, shallow and deep tube wells. The yield of the wells generally varies between 3 to 15lps. High yielding wells in the range of 10 to 40lps exists in the Tertiary sandstones.

The Dynamic groundwater resources for UT of Puducherry have been assessed Region wise. The Annual Groundwater recharge of the UT of Puducherry has been estimated as 0.226bcm, Annual extractable Ground Water resources is 0.204bcm and the Annual ground water extraction is 0.151 bcm. The overall Stage of Ground Water Extraction of UT of Puducherry is 74.33%. Out of 4 regions, 1 region has been categorized as ‘Over Exploited’, 2 as ‘Safe’ and 1 as ‘Saline’. As compared to 2013 estimate, there is an increase in Annual Groundwater recharge from 0.193 to 0.226bcm and decrease of annual ground water extraction from 0.153 bcm to 0.151 bcm, resulting in decrease of stage of ground water extraction from 88% to 74%. Refinement in database, segregating the wells tapping different aquifers, Groundwater extraction from deeper aquifer contributing as return flow from irrigation in phreatic aquifer are the reasons for bringing in the increase in recharge and decrease in groundwater extraction & stage of groundwater extraction. However, there is no significant change in categorization.

CHAPTER 8

8.0 CONCLUSIONS

The Total Annual Ground Water Recharge of the country (2017) have been assessed as 432 bcm. The ground water resources are replenished through rainfall and other sources like return flow from irrigation, canal seepage, recharge from water bodies, water conservation structures etc. The main source of annual groundwater rechareg is through rainfall, which contributes to nearly 67% of the Total Annual Ground Water Recharge. The Total Annual Extractable Ground Water Recharge of the country has been assessed as 393 bcm after keeping a provision for Natural discharge. The Annual Ground Water Extraction of the country as on March, 2017 is 249 bcm, the largest user being irrigation sector. The Stage of ground water extraction for the entire country, which is the percentage of ground water extraction with respect to Annual Extractable Ground Water Recharge, has been computed as 63%. The extraction pattern of ground water is not uniform across the country resulting in ground water stressed conditions in some parts of the country while in other areas, ground water extraction has been sub-optimal. Out of 6881 numbers of assessment units (Blocks/Taluks/Mandals/Districts/Firkas/Valleys), 1186 has been categorized as 'Over-exploited', 313 as 'Critical', 972 as 'Semi-critical', and 4310 units as 'Safe'. There are 100 assessment units which are completely 'Saline'.

The over-exploitation of ground water resources are caused by various region-specific reasons which are broadly spread over three different parts of the country. The assessment units located in the north-western part of the country in the states of Punjab, Haryana, Himachal Pradesh, Delhi and Uttar Pradesh have plenty of replenishable ground water resources but because of the over extraction beyond the annual ground water recharge, most of these units have become Over-exploited. Over-exploited units are also common in western part of the country particularly in Rajasthan and Gujarat where the arid climate results in less recharge of ground water and hence stress on the resource. In peninsular India, over-exploited units are widespread in the states of Karnataka, Tamil Nadu and parts of Andhra Pradesh and Telangana, which is mainly attributed to the aquifer properties of the hard rock terrains, which is leading to lesser availability of the resource.

The overall estimate of Annual Ground Water Resources for the entire country, 2017 has decreased by 15 bcm as compared to the last assessment i.e. 2013. The Annual Ground water extraction for irrigation, domestic and Industrial uses has also decreased by 4.35 bcm. The main reasons for these variations is attributed to changes in methodology, refinement of parameters for resources estimation, refinement in well census data and changing ground water regime.

It is also pertinent to add that, as it is advisable only to restrict the groundwater development as far as possible to annual replenishable resources, the categorization also works out the relation between the annual replenishment and groundwater development. An area devoid of groundwater potential may not be considered for development and may remain safe and an area with good groundwater potential may be developed owing to its suitability for groundwater development and may become over exploited. Thus water augmentation efforts can be successful in such areas, where the groundwater potential is high and there is scope for augmentation.

GEC-2015 methodology is best suited to Indian conditions, on the basis of terrain conditions and data availability. The constraints in data availability has resulted in realistic assumption based on experience in many States and a conscious effort is required to acquire the requisite data to map the changing groundwater scenario in the country.

The analysis of assessment results indicate following inferences as way forward in the assessment of Ground water resources:

1. Water Balance Studies

Ground water is one of the several components of the Hydrologic Cycle, other important components being rainfall, surface water, soil moisture and evapotranspiration. Holistic water resources management interventions require proper understanding of the interaction between the different components of the hydrosphere. Studies for determining the Base flow and lateral flow in the Water Balance equation need to be taken up to bring more accuracy to the Ground water Resources Estimation.

2. Aquifer Characterization and parameter estimation

One of the key elements in ground water resources assessment is the estimation of the recharge and discharge parameters. It is recommended that more experimental studies may be taken up for refining the norms of RIF, return flow from irrigation based on soil types and agro-climatic zone and determination of variation of specific yield with depth.

3. Case studies linking assessment with management

It is recommended to take up case studies in various assessment units wherein quantitative evaluation of the ground water management interventions and consequent changes in the assessment results could be analysed. Such studies would help in bringing out the efficacy of various management programmes.

4. Temporal Availability of Ground Water Resources

Even though the GEC 2015 methodology advocates season wise resource estimation, the estimation of recharge during monsoon and non-monsoon season may not be sufficient. Temporal variation in groundwater availability particularly in hard rock terrain is not reflected in present practices. Hence, the assessment of temporal availability of ground water resources on the basis of available water column can be attempted by considering the water levels measured frequently using DWLRs.

5. Automation of Ground water resources assessment:

The Automation of Ground water resources assessment need to be done to make the assessment frequent and effective. A GEC dashboard as a final output of automation for the entire India, will be able to show all type of recharges and discharge components reflecting the overall stage of extraction at the selected Level (District, tehsil, block, Mandal ,blocks, etc). This will not only help the Decision makers to make decisions but also empower the stakeholders with knowledge to take part in the decision making process.

6. Aquifer stream interactions:

Additional studies on aquifer stream interactions are required to understand contribution of ground water to streams and maintaining environmental flows for sustainability of water resources and surrounding ecosystem.

7. Ground water modelling and predictive Simulation:

Besides assessment of the dynamic ground water resources using norms prescribed in GEC 2015 methodology through automation, the concept of Ground water modelling must be included where predictive simulation can also be done. This would give an idea of the future availability of Ground water resources with respect to the changing climate and extraction patterns.

ANNEXURE I

STATE-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT (AS IN MARCH 2017)

STATE-WISE GROUND WATER RESOURCES OF INDIA, 2017

(in bcm)

S. No.	States / Union Territories	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resource	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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
	States														
1	**Andhra Pradesh**	9.96	5.62	1.21	4.42	21.22	1.07	20.15	7.85	0.14	0.90	8.90	1.48	12.31	44.15
2	**Arunachal Pradesh**	1.89	0.18	0.95	0.01	3.02	0.36	2.67	0.00	0.00	0.01	0.01	0.03	2.64	0.28
3	**Assam**	20.22	0.43	7.28	0.74	28.67	4.42	24.26	1.97	0.06	0.69	2.73	0.79	21.43	11.25
4	**Bihar**	19.83	3.95	3.14	4.50	31.41	2.43	28.99	10.78	0.66	1.83	13.26	1.83	15.78	45.76
5	**Chhattisgarh**	7.82	1.36	0.76	1.64	11.57	1.00	10.57	3.98	0.05	0.67	4.70	0.79	5.76	44.43
6	**Delhi**	0.13	0.06	0.03	0.11	0.32	0.02	0.30	0.09	0.02	0.24	0.36	0.29	0.02	119.61
7	**Goa**	0.19	0.03	0.01	0.05	0.27	0.11	0.16	0.02	*	0.03	0.05	0.04	0.07	33.50
8	**Gujarat**	15.95	3.40	0.00	3.02	22.37	1.12	21.25	12.84	0.11	0.63	13.58	0.90	7.98	63.89
9	**Haryana**	3.56	2.55	1.03	3.00	10.15	1.01	9.13	11.53	0.34	0.63	12.50	0.72	0.87	136.91
10	**Himachal Pradesh**	0.34	0.02	0.11	0.04	0.51	0.05	0.46	0.20	0.00	0.19	0.39	0.34	0.16	86.37
11	**Jammu & Kashmir**	1.00	0.50	0.88	0.51	2.89	0.29	2.60	0.20	0.07	0.50	0.76	0.50	1.84	29.47
12	**Jharkhand**	5.25	0.13	0.41	0.42	6.21	0.52	5.69	0.80	0.22	0.56	1.58	0.56	4.13	27.73
13	**Karnataka**	6.59	4.36	2.67	3.22	16.84	2.05	14.79	9.39	*	0.95	10.34	1.14	5.41	69.87
14	**Kerala**	3.91	0.04	0.68	1.13	5.77	0.56	5.21	1.22	0.01	1.44	2.67	1.57	2.41	51.27
15	**Madhya Pradesh**	27.10	1.51	0.82	6.99	36.42	1.95	34.47	17.43	0.22	1.24	18.88	1.72	15.84	54.76
16	**Maharashtra**	20.59	2.29	0.53	8.23	31.64	1.74	29.90	15.10	0.003	1.22	16.33	2.28	12.91	54.62
17	**Manipur**	0.23	0.01	0.17	0.02	0.43	0.04	0.39	0.00	0.00	0.00	0.01	0.04	0.34	1.44
18	**Meghalaya**	1.37	0.01	0.43	0.02	1.83	0.19	1.64	0.03	0.00	0.01	0.04	0.02	1.59	2.28
19	**Mizoram**	0.16	0.00	0.05	0.00	0.21	0.02	0.19	0.00	0.00	0.01	0.01	0.01	0.18	3.82
20	**Nagaland**	1.65	0.03	0.52	0.00	2.20	0.22	1.98	0.00	0.00	0.02	0.02	0.02	1.96	0.99
21	**Odisha**	10.53	2.34	1.50	2.37	16.74	1.17	15.57	5.28	0.14	1.15	6.57	1.30	8.85	42.18
22	**Punjab**	5.54	11.83	1.31	5.25	23.93	2.35	21.58	34.56	0.20	1.01	35.78	1.41	1.09	165.77
23	**Rajasthan**	9.74	0.78	0.24	2.44	13.21	1.22	11.99	14.85	0.00	1.92	16.77	2.67	0.88	139.88
24	**Sikkim**	5.20	0.00	0.43	0.00	5.63	4.11	1.52	0.00	0.00	0.00	0.00	0.01	1.51	0.06
25	**Tamil Nadu**	6.67	9.41	1.89	2.26	20.22	2.02	18.20	13.06	0.00	1.67	14.73	1.85	5.66	80.94
26	**Telangana**	7.56	1.42	1.88	2.76	13.62	1.25	12.37	7.09	*	1.00	8.09	1.39	4.26	65.45
27	**Tripura**	0.80	0.06	0.40	0.26	1.53	0.29	1.24	0.02	0.00	0.08	0.10	0.11	1.11	7.88
28	**Uttar Pradesh**	37.73	11.67	1.59	18.93	69.92	4.60	65.32	40.89	*	4.95	45.84	5.96	20.36	70.18
29	**Uttarakhand**	1.15	0.93	0.09	0.87	3.04	0.15	2.89	1.30	0.13	0.22	1.64	0.22	1.25	56.83
30	**West Bengal****	18.71	1.51	5.26	3.85	29.33	2.77	26.56	10.84	*	1.00	11.84	1.53	14.19	44.60
	Total States	**251.36**	**66.41**	**36.30**	**77.06**	**431.13**	**39.09**	**392.04**	**221.33**	**2.38**	**24.77**	**248.47**	**31.52**	**172.82**	**63.38**
	Union Territories														
1	**Andaman & Nicobar**	0.35	0.00	0.02	0.00	0.37	0.04	0.33	0.00	0.00	0.01	0.01	0.01	0.32	2.74
2	**Chandigarh**	0.02	0.01	0.00	0.01	0.04	0.00	0.04	0.00	*	0.03	0.03	0.03	0.00	89.00
3	**Dadra & Nagar Haveli**	0.06	0.00	0.00	0.01	0.07	0.00	0.07	0.01	*	0.01	0.02	0.01	0.04	31.34
4	**Daman & Diu**	0.02	0.00	0.00	0.00	0.02	0.00	0.02	0.01	0.00	0.00	0.01	0.00	0.00	61.40
5	**Lakshdweep**	0.01	0.00	0.00	0.00	0.01	0.01	0.004	0.00	0.00	0.002	0.002	0.00	0.00	65.99
6	**Puducherry**	0.09	0.07	0.02	0.05	0.23	0.02	0.20	0.11	*	0.04	0.15	0.04	0.05	74.33
	Total UTs	**0.54**	**0.08**	**0.05**	**0.07**	**0.73**	**0.08**	**0.66**	**0.13**	**0.00**	**0.10**	**0.23**	**0.10**	**0.43**	**34.51**
	Grand Total	**251.90**	**66.49**	**36.34**	**77.13**	**431.86**	**39.16**	**392.70**	**221.46**	**2.38**	**24.87**	**248.69**	**31.62**	**173.25**	**63.33**

Note:

*Industrial and domestic draft has not been estimated separately in Goa, Himachal Pradesh, Karnataka, Rajasthan, Tamil Nadu, Uttar Pradesh, Chandigarh, Dadra & Nagar Haveli and Puducherry

**The Ground Water resources assessment as on 2013 has been considered for the state of West Bengal

ANNEXURE II

DISTRICT-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT (AS IN MARCH 2017)

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
ANDHRA PRADESH															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resource	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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
	States														
1	**Anantapur**	89200.23	46136.12	1013.97	50415.31	186765.62	9338.31	177427.31	142953.85	612.86	14272.07	157838.79	21623.75	59410.09	88.96
2	**Chittoor**	115718.55	32389.60	1204.19	38028.60	187340.94	9367.06	177973.88	95256.50	838.80	8758.49	104853.79	13528.83	80858.36	58.92
3	**East Godavari**	104140.05	95383.56	3714.55	50847.53	254085.69	12704.33	241381.36	41688.32	6101.44	3316.71	51106.47	4226.85	193656.03	21.17
4	**Guntur**	52942.86	57011.90	2547.96	18800.39	131303.10	6565.15	124737.95	39174.72	119.02	8823.34	48117.07	14159.10	79051.91	38.57
5	**Kadapa**	93311.68	15869.52	2048.53	11177.61	122407.34	6120.40	116286.94	74888.06	1240.70	3733.71	79862.47	6110.25	56568.63	68.68
6	**Krishna**	52891.68	70806.39	21641.60	17375.91	162715.57	8135.80	154579.78	47223.03	3360.60	6412.20	56995.83	7402.78	98790.07	36.87
7	**Kurnool**	90024.09	43892.80	1203.46	26774.23	161894.57	8094.75	153799.81	53291.48	510.30	10498.38	64300.17	16377.90	94278.99	41.81
8	**Nellore**	128089.98	46637.76	5.16	93668.83	268401.73	13420.14	254981.59	90301.92	221.04	6187.09	96710.05	11024.36	159531.34	37.93
9	**Prakasam**	39372.56	26669.85	56344.85	36593.00	158980.26	7949.05	151031.21	54372.39	467.91	9789.35	64629.64	17557.06	94941.54	42.79
10	**Srikakulam**	34847.68	35719.34	17837.37	19681.53	108085.91	5404.34	102681.56	40762.37	302.49	8445.49	49510.36	17007.28	63919.93	48.22
11	**Visakhapatnam**	61906.83	10809.63	6823.31	2690.68	82230.45	4538.54	77691.90	12608.08	201.48	6295.00	19104.57	7980.54	59560.86	24.59
12	**Vizianagaram**	59226.39	21945.67	6795.38	17486.23	105453.67	5272.77	100180.90	20595.54	47.68	463.74	21106.97	4922.00	77587.51	21.07
13	**West Godavari**	74662.56	58478.66	48.11	58931.01	192120.35	9606.03	182514.32	71924.15	381.24	3261.65	75567.04	6028.80	113241.04	41.40
	Total (Ham)	**996335.139**	**561750.790**	**121228.409**	**442470.837**	**2121785.174**	**106516.652**	**2015268.516**	**785040.421**	**14405.56730**	**90257.225**	**889703.213**	**147949.501**	**1231396.289**	**44.15**
	Total (Bcm)	**9.963**	**5.618**	**1.212**	**4.425**	**21.218**	**1.065**	**20.153**	**7.850**	**0.144**	**0.903**	**8.897**	**1.479**	**12.314**	**44.15**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
ARUNACHAL PRADESH															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	**Anjaw**	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area
2	**Changlang**	12375.64	696.00	13629.49	71.16	26772.29	2849.44	23922.85	0.00	0.00	174.00	174.00	571.87	23350.98	0.73
3	**Dibang Valley**	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area
4	**East Kameng**	7281.63	233.00	2413.44	0.00	9928.07	992.81	8935.26	0.00	0.00	25.00	25.00	169.06	8766.20	0.28
5	**East Siang**	56206.01	5327.00	20135.02	670.93	82338.96	13307.12	69031.84	0.00	0.00	65.00	65.00	176.16	68855.68	0.09
6	**Kurung Kumey**	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area
7	**Lohit**	55018.30	2311.00	31078.96	0.00	88408.26	8840.83	79567.43	0.00	0.48	218.00	218.48	666.00	78900.96	0.27
8	**Lower Dibang Valley**	39162.24	1749.00	20240.30	0.00	61151.54	6115.15	55036.39	0.00	0.00	32.00	32.00	62.40	54973.98	0.06
9	**Lower Subansiri**	1358.90	1227.00	729.69	78.74	3394.33	738.65	2655.68	0.00	0.00	18.00	18.00	105.20	2550.48	0.68
10	**Papum Pare**	6076.25	1950.00	3165.94	3.53	11195.72	1449.26	9746.46	0.00	14.40	85.00	99.40	492.34	9239.72	1.02
11	**Tawang**	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area
12	**Tirap**	5204.06	819.00	1866.92	0.00	7889.98	394.50	7495.48	0.00	0.00	63.00	63.00	135.25	7360.23	0.84
13	**Upper Siang**	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area	Hilly area
14	**Upper Subansiri**	103.31	912.00	42.45	0.00	1057.76	105.78	951.98	0.00	0.00	16.00	16.00	107.25	844.74	1.68
15	**West Kameng**	2976.01	318.00	668.99	0.00	3963.00	396.30	3566.70	0.00	0.72	11.00	11.72	30.26	3535.72	0.33
16	**West Siang**	3148.38	2126.00	1125.57	0.00	6399.95	640.00	5759.95	0.00	0.90	21.00	21.90	43.72	5715.34	0.38
	Total (Ham)	**188910.73**	**17668.00**	**95096.77**	**824.36**	**302499.86**	**35829.83**	**266670.03**	**0.00**	**16.50**	**728.00**	**744.50**	**2559.51**	**264094.02**	**0.28**
	Total (Bcm)	**1.89**	**0.18**	**0.95**	**0.01**	**3.02**	**0.36**	**2.67**	**0.00**	**0.0002**	**0.01**	**0.01**	**0.03**	**2.64**	**0.28**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
ASSAM															
S. No	District	Ground Water Recharge				Total Annual Ground Water Recharge	Total Natural Discharges (Ham)	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon season					Irrigation Use	Industrial Use	Domestic Use	Total Extraction			
		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	Baksa	92583.69	1652.06	28843.21	1256.04	124335.00	17309.64	107025.37	2548.56	41.40	2517.40	5107.36	2970.09	101465.32	4.77
2	Barpeta	110295.03	2216.29	26788.85	7861.30	147161.47	8293.48	138867.99	24276.00	12.60	4394.80	28683.40	5158.32	109421.07	20.66
3	Bongaigaon	43080.26	1088.59	14971.04	3252.26	62392.15	3807.16	58584.99	10024.56	37.08	1959.48	12021.11	2286.71	46236.65	20.52
4	Cachar	57788.78	1223.79	36771.75	1418.09	97202.41	40846.83	56355.58	0.00	106.80	4522.14	4628.94	5262.84	50985.94	8.21
5	Chirang	67557.61	1956.57	26339.72	627.49	96481.38	9648.14	86833.24	1522.08	0.00	1170.95	2693.03	1279.67	84031.49	3.10
6	Darrang	44493.56	2048.29	17536.82	5974.18	70052.85	14966.88	55085.97	15469.44	73.73	2291.43	17834.60	2703.49	36839.32	32.38
7	Dhemaji	173356.96	296.11	39037.38	616.18	213306.63	27923.94	185382.68	1631.28	25.20	1593.74	3250.22	1851.97	181874.23	1.75
8	Dhubri	94570.56	2012.96	24694.29	6935.06	128212.87	12821.29	115391.58	23570.40	0.00	4715.35	28285.75	5648.33	86172.85	24.51
9	Dibrugarh	121093.52	513.27	48314.08	1614.29	171535.16	22447.18	149087.98	4890.48	208.70	3254.05	8353.23	3571.33	140417.47	5.60
10	Dima Hasao	1685.89	531.66	2107.09	131.74	4456.37	445.64	4010.74	337.68	6.00	488.70	832.38	543.87	3123.19	20.75
11	Goalpara	69946.47	1721.96	24384.58	3473.62	99526.63	15640.36	83886.27	9866.64	8.00	2284.60	12159.24	2703.66	71307.97	14.49
12	Golaghat	81499.92	1472.98	35673.68	1444.32	120090.90	16479.52	103611.38	3677.52	108.18	1872.80	5658.49	2067.86	97757.82	5.46
13	Hailakandi	17628.82	852.67	12101.28	1407.83	31990.60	11227.67	20762.93	5.04	151.80	868.65	1025.49	1019.71	19586.39	4.94
14	Jorhat	71479.54	698.57	36102.78	1526.48	109807.38	24025.37	85782.00	4215.12	51.60	2227.73	6494.45	2398.33	79116.95	7.57
15	Kamrup	61672.48	2243.34	25759.62	6174.53	95849.96	16039.84	79810.13	20144.88	514.63	3451.44	24110.95	3892.27	55258.35	30.21
16	Kamrup Metro (Rural)	17327.69	487.97	7237.50	944.65	25997.81	3664.46	22333.35	1537.20	1262.63	282.21	3082.04	324.25	19209.27	13.80
17	Kamrup Metro (U)	5076.10	769.75	2120.21	1571.58	9537.64	2958.70	6578.94	0.00	1224.00	1758.74	2982.74	1782.24	3572.70	45.34
18	Karbi Anglong	27629.74	4865.69	10678.30	778.14	43951.87	14506.81	29445.06	342.72	224.40	837.86	1404.98	957.57	27920.37	4.77
19	Karimganj	32091.37	785.15	26112.55	891.83	59880.90	12030.56	47850.34	80.64	20.40	1234.89	1335.93	1454.08	46295.22	2.79
20	Kokrajhar	187662.43	1847.76	46828.25	1905.09	238243.53	40644.34	197599.19	5913.60	0.00	622.33	6535.93	649.54	191036.05	3.31
21	Lakhimpur	90950.92	513.78	27460.03	1292.40	120217.12	6656.32	113560.80	3044.16	36.90	2424.44	5505.50	2763.82	107715.92	4.85
22	Morigaon	42631.34	1102.50	12067.25	3418.57	59219.66	15542.91	43676.75	10777.20	28.93	2500.10	13306.22	2972.72	29897.90	30.47
23	Nagaon	90955.70	3279.08	29182.99	9128.92	132546.69	7715.41	124831.28	26891.76	207.68	7321.24	34420.67	8626.62	89105.22	27.57
24	Nalbari	36992.74	912.51	12882.88	2811.29	53599.41	19686.46	33912.95	7153.44	9.18	1552.55	8715.16	1704.80	25045.54	25.70
25	Sivasagar	69613.93	565.19	27055.33	1004.37	98238.82	43000.40	55238.42	2437.68	129.60	2844.06	5411.34	3064.83	49606.31	9.80
26	Sonitpur	153397.89	1568.99	53380.03	2918.99	211265.91	23537.63	187728.28	8611.68	961.68	5059.36	14632.72	5699.88	172455.05	7.79
27	Tinsukia	121394.33	469.78	51609.72	1538.84	175012.67	6709.39	168303.29	4033.68	155.33	3400.89	7589.89	3829.26	160285.02	4.51
28	Udalguri	37653.44	5576.43	22261.25	1602.76	67093.88	2958.72	64135.16	4467.12	365.70	1914.17	6746.99	2065.36	57236.98	10.52
	Total (Ham)	**2022110.69**	**43273.67**	**728302.48**	**73520.83**	**2867207.67**	**441535.04**	**2425672.64**	**197470.56**	**5972.10**	**69366.08**	**272808.74**	**79253.43**	**2142976.54**	**11.25**
	Total (Bcm)	**20.22**	**0.43**	**7.28**	**0.74**	**28.67**	**4.42**	**24.26**	**1.97**	**0.06**	**0.69**	**2.73**	**0.79**	**21.43**	**11.25**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
BIHAR															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Araria	68115.68	5490.17	23116.63	2253.90	98976.38	7096.03	91880.35	11922.90	925.27	5183.92	18032.08	5183.95	73848.23	19.63
2	Arwal	12851.81	4814.68	1563.54	3241.27	22471.30	1275.82	21195.48	6339.79	407.67	1425.78	8173.23	1425.81	13022.22	38.56
3	Aurangabad	72714.15	10049.92	12734.88	8267.84	103766.79	5188.34	98578.45	20499.58	1294.27	4426.66	26220.51	4426.70	72357.90	26.60
4	Banka	30603.57	8460.49	6122.18	4660.01	49846.25	3010.68	46835.57	11808.54	802.36	3584.30	16195.20	3584.41	30658.22	34.58
5	Begusarai	44390.79	6438.50	4751.70	15894.35	71475.34	7147.53	64327.81	26045.40	1742.00	5862.38	33649.78	5862.49	30677.92	52.31
6	Bhabhua	59233.91	14993.94	3682.25	20846.79	98756.89	8855.56	89901.33	25513.20	1430.16	2893.14	29836.51	2893.20	60064.77	33.19
7	Bhagalpur	60365.06	3006.16	8725.80	3404.01	75501.03	5009.15	70491.88	13838.00	1049.35	4480.48	19367.83	4480.55	51123.98	27.48
8	Bhojpur	55130.76	17566.73	3058.45	17998.66	93754.60	9011.57	84743.03	40226.48	2327.95	4871.15	47425.58	4871.23	37317.37	55.96
9	Buxar	30439.74	17328.23	2182.74	15881.84	65832.55	6583.26	59249.30	26289.00	1471.45	2781.83	30542.28	2781.88	28706.97	51.55
10	Darbhanga	54719.49	13978.60	10699.34	16416.13	95813.56	7831.49	87982.07	20754.30	1568.69	7743.54	30066.53	7743.63	57915.45	34.17
11	East Champaran	92005.72	23656.96	15607.44	14524.88	145795.00	12085.98	133709.02	44138.44	2768.24	9087.55	55994.23	9087.70	77714.64	41.88
12	Gaya	80826.07	8504.10	14017.31	12027.57	115375.05	7534.19	107840.86	59207.33	3566.53	8130.81	70904.67	8130.99	38745.06	65.75
13	Gopalganj	50922.10	15962.57	5863.56	16551.23	89299.46	7474.14	81825.32	52663.20	2899.87	4520.66	60083.74	4520.71	23024.45	73.43
14	Jamui	30260.90	3479.48	2260.92	4315.43	40316.73	3365.30	36951.43	8131.51	600.14	3074.38	11806.02	3074.42	25145.36	31.95
15	Jehanabad	21152.49	3968.81	1805.45	8343.55	35270.30	2903.71	32366.59	27537.99	1497.82	1940.77	30976.58	1940.81	2280.46	95.71
16	Katihar	82157.68	7797.79	11091.52	8793.29	109840.28	9686.62	100153.66	55644.33	3075.42	5102.34	63822.10	5102.41	36331.50	63.72
17	Khagaria	38532.68	5090.31	3974.60	28655.65	76253.24	7625.32	68627.92	18258.48	1075.08	2860.10	22193.66	2860.13	46434.23	32.34
18	Kishanganj	59622.24	1001.98	16093.09	2230.20	78947.51	7894.75	71052.76	11648.70	768.39	2947.43	15364.52	2947.46	55688.20	21.62
19	Lakhisarai	21916.40	5238.04	1686.96	3331.36	32172.76	3217.28	28955.48	6478.48	439.32	1729.10	8646.91	1729.15	20659.00	29.86
20	Madhepura	38398.84	7157.06	8821.12	10202.90	64579.92	4107.62	60472.30	29938.95	1712.07	3586.43	35237.45	3586.48	25234.80	58.27
21	Madhubani	75981.86	17619.79	9595.41	13937.27	117134.33	11216.47	105917.86	29360.70	1895.56	7632.32	38888.58	7632.42	67029.18	36.72
22	Munger	25119.64	5925.68	1741.87	4647.44	37434.63	3239.02	34195.61	8305.80	593.04	2401.16	11300.00	2401.24	22988.52	33.05
23	Muzaffarpur	65578.77	19895.06	9378.41	24801.00	119653.24	9537.66	110115.58	62215.71	3652.00	8516.95	74384.67	8517.04	36390.05	67.55
24	Nalanda	50252.21	11209.91	6604.69	20515.03	88581.84	8325.91	80255.93	47302.64	2726.82	5216.93	55246.39	5217.06	25190.60	68.84
25	Nawada	41340.26	7047.17	3921.06	10570.99	62879.48	4771.66	58107.82	26098.05	1516.04	3150.63	30764.72	3150.74	27342.98	52.94
26	Patna	68567.74	9290.91	9689.58	12754.29	100302.52	7147.66	93154.86	42572.72	3032.70	10340.80	55946.22	10340.92	37411.34	60.06
27	Purnia	80325.57	3941.22	28554.42	4335.13	117156.34	6445.50	110710.84	52635.73	2965.61	5527.61	61128.95	5527.68	49581.82	55.21
28	Rohtas	87894.68	12299.81	10245.26	5240.61	115680.36	10092.11	105588.25	19053.39	1300.95	5296.81	25651.16	5296.95	79936.95	24.29
29	Saharsa	38572.31	4997.73	6107.21	4159.38	53836.63	3340.89	50495.74	16507.20	997.49	3103.00	20607.68	3103.05	29888.01	40.81
30	Samastipur	57602.36	27253.08	12853.22	36126.18	133834.84	7837.77	125997.07	49445.70	2868.35	7225.78	59539.83	7225.88	66457.14	47.25
31	Saran	59443.26	10320.09	6265.22	11768.10	87796.67	5840.87	81955.80	42716.70	2551.74	6929.39	52197.83	6929.46	29757.90	63.69
32	Sheihkpura	14400.81	2865.05	1937.21	4133.93	23337.00	1618.18	21718.82	6720.90	420.78	1188.84	8330.52	1188.88	13388.26	38.36
33	Sheohar	12124.72	1311.34	109.15	895.03	14440.24	1338.04	13102.20	6048.00	371.90	1172.84	7592.74	1172.87	5509.43	57.95
34	Sitamarhi	55703.50	7025.21	2533.52	4967.33	70229.56	4806.39	65423.17	22680.86	1473.42	5876.02	30030.30	5876.09	35392.79	45.90
35	Siwan	45698.33	23943.23	4768.49	19838.17	94248.22	5959.42	88288.80	42117.26	2418.84	5617.72	50153.82	5617.81	38134.89	56.81
36	Supaul	53625.57	11013.31	18893.06	8670.44	92202.38	6509.85	85692.53	25006.95	1463.10	3790.70	30260.74	3790.76	55431.73	35.31
37	Vaishali	47520.05	12004.78	6996.69	10363.93	76885.45	6951.47	69933.98	35099.18	2120.11	6338.34	43557.63	6338.43	26764.35	62.28
38	West Champaran	98972.51	22636.52	16150.10	33960.02	171719.15	10723.12	160996.03	27144.20	1794.02	7358.97	36297.19	7359.06	124698.75	22.55
	Total (Ham)	**1983084.23**	**394584.41**	**314204.05**	**449525.13**	**3141397.82**	**242606.32**	**2898791.50**	**1077916.29**	**65584.53**	**182917.55**	**1326418.37**	**182920.45**	**1578245.43**	**45.76**
	Total (Bcm)	**19.83**	**3.95**	**3.14**	**4.50**	**31.41**	**2.43**	**28.99**	**10.78**	**0.66**	**1.83**	**13.26**	**1.83**	**15.78**	**45.76**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
CHHATTISGARH															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Balod	17178.84	7717.07	0.00	9938.71	34834.62	2713.76	32120.86	18571.03	200.77	2037.74	20809.54	2290.93	11090.46	64.79
2	Baloda Bazar	35270.94	15185.95	3199.33	6853.85	60510.07	6051.02	54459.05	17672.41	10.54	4130.98	21813.93	5427.57	31348.53	40.06
3	Balrampur	47125.34	1471.44	4687.57	3158.93	56443.28	5176.26	51267.02	14188.27	0.00	1825.95	16014.22	2110.62	34968.13	31.24
4	Bastar	25306.64	725.98	4795.70	1639.88	32468.20	2840.24	29627.96	5618.18	40.68	2075.36	7734.22	2347.48	21621.62	26.10
5	Bemetara	16646.26	12525.56	0.00	13977.93	43149.75	4314.97	38834.78	28286.77	44.59	1983.43	30314.79	2533.94	7969.48	78.06
6	Bijapur	34518.65	188.02	4178.56	562.23	39447.46	3944.74	35502.72	1874.06	0.86	619.77	2494.70	689.28	32938.55	7.03
7	Bilaspur	30466.89	7457.13	4692.02	7166.40	49782.44	4104.52	45677.92	17798.32	523.82	5595.50	23917.64	7028.27	20327.51	52.36
8	Dantewara	17272.01	139.37	2803.05	931.39	21145.82	1229.05	19916.77	2138.23	0.31	694.00	2832.54	758.40	17019.83	14.22
9	Dhamtari	22019.95	9720.00	0.00	11625.92	43365.87	4336.60	39029.27	22854.81	89.72	1948.92	24893.45	2139.50	13945.24	63.78
10	Durg	13509.67	8420.75	0.00	9118.98	31049.40	3104.95	27944.45	17603.39	926.95	4538.10	23068.44	5023.17	5250.29	82.55
11	Gariaband	23545.16	5157.24	0.00	5176.90	33879.30	2515.75	31363.55	14842.44	3.06	1508.72	16354.22	1761.03	14757.02	52.14
12	Janjgir-Champa	20152.44	12117.48	3371.19	8242.38	43883.49	3812.24	40071.25	14528.66	224.50	4170.81	18923.97	4892.86	20425.23	47.23
13	Jashpur	29183.09	1767.82	4870.86	3611.92	39433.69	3756.96	35676.73	11849.74	40.22	2055.01	13944.96	2271.17	21515.61	39.09
14	Kanker	54666.14	2496.52	6636.56	7856.15	71655.37	5354.70	66300.67	19918.75	3.45	1847.72	21769.92	2086.98	44291.49	32.84
15	Kawardha	30865.93	4509.37	3942.86	7713.21	47031.37	3980.18	43051.19	25294.34	47.03	2176.14	27517.51	2633.37	15076.45	63.92
16	Kondagaon	27838.80	737.34	4654.50	2180.35	35410.99	2827.77	32583.22	11238.13	1.98	1426.65	12666.76	1610.41	19732.70	38.88
17	Korba	31116.19	922.18	4089.97	2007.90	38136.24	3156.15	34980.09	8159.85	1185.74	3193.33	12538.91	3710.71	21923.80	35.85
18	Koriya	40415.70	4134.58	3332.60	2360.19	50243.07	4453.16	45789.91	7799.24	28.00	1631.71	9458.95	1783.71	36178.96	20.66
19	Mahasamund	46341.27	6775.73	1267.56	11414.38	65798.94	5666.58	60132.36	33144.40	33.21	2588.05	35765.66	2964.64	23990.11	59.48
20	Mungeli	10758.94	2915.44	0.00	3051.80	16726.18	1599.61	15126.57	6591.88	1.44	1628.11	8221.43	2415.75	6117.50	54.35
21	Narayanpur	22556.28	264.34	3730.18	483.08	27033.88	1779.69	25254.19	643.20	0.00	343.97	987.17	383.57	24227.42	3.91
22	Raigarh	31007.68	3601.55	5198.26	4941.12	44748.61	3581.88	41166.73	16093.58	426.87	3771.90	20292.35	4318.72	20327.56	49.29
23	Raipur	20050.78	10717.93	626.47	11424.75	42819.93	4108.58	38711.35	17410.21	632.26	6207.25	24249.72	7555.95	13657.07	62.64
24	Rajnandgaon	38627.31	11790.79	4412.10	15313.75	70143.95	6200.37	63943.58	32625.00	107.56	4197.00	36929.55	5171.94	26039.09	57.75
25	Sukma	31231.09	321.43	0.00	433.56	31986.08	2861.89	29124.19	890.28	0.00	587.34	1477.62	627.30	27606.61	5.07
26	Surajpur	27781.65	2491.15	2184.18	8362.53	40819.51	3253.73	37565.78	18359.70	5.09	1952.04	20316.82	2221.79	16979.21	54.08
27	Surguja	36072.42	1530.27	3522.68	4168.22	45293.59	3756.23	41537.36	12120.05	4.78	2093.60	14218.42	2364.64	27047.90	34.23
	Total (Ham)	**781526.06**	**135802.43**	**76196.20**	**163716.41**	**1157241.10**	**100481.58**	**1056759.52**	**398114.91**	**4583.40**	**66829.10**	**469527.41**	**79123.70**	**576373.36**	**44.43**
	Total (Bcm)	**7.82**	**1.36**	**0.76**	**1.64**	**11.57**	**1.00**	**10.57**	**3.98**	**0.05**	**0.67**	**4.70**	**0.79**	**5.76**	**44.43**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017

DELHI

S. No.	District	Ground Water Recharge: Monsoon Season: Recharge from rainfall	Ground Water Recharge: Monsoon Season: Recharge from other sources	Ground Water Recharge: Non-monsoon Season: Recharge from rainfall	Ground Water Recharge: Non-monsoon Season: Recharge from other sources	Ground Water Recharge: Total Annual Ground Water Recharge	Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction: Irrigation	Current Annual Ground Water Extraction: Industrial	Current Annual Ground Water Extraction: Domestic	Current Annual Ground Water Extraction: Total	Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	**Central Delhi**	711.25	1291.95	129.85	407.58	2540.62	164.39	2376.23	189.51	50.69	1680.81	1921.01	1984.84	292.40	80.84
2	**East Delhi**	147.76	182.52	34.44	1133.10	1497.83	113.37	1384.46	690.00	119.11	692.39	1501.50	817.63	4.34	108.45
3	**New Delhi**	1852.76	191.09	371.00	1014.21	3429.06	212.43	3216.63	955.13	746.58	3426.30	5128.02	4046.05	0.00	159.42
4	**North Delhi**	3431.32	1113.28	750.20	4304.94	9599.74	479.99	9119.76	1868.23	93.44	5698.77	7660.44	6729.57	913.93	84.00
5	**North East Delhi**	284.26	366.58	60.97	355.43	1067.24	89.56	977.68	329.01	4.34	817.04	1150.39	964.82	0.00	117.66
6	**North West Delhi**	1475.87	1159.92	260.26	1275.96	4172.01	208.60	3963.41	711.59	147.64	1901.22	2760.45	2245.11	978.15	69.65
7	**Shahdara**	274.56	64.06	58.80	225.04	622.47	58.61	563.86	57.36	96.57	787.68	941.60	930.15	0.00	166.99
8	**South Delhi**	1454.80	31.39	303.24	129.05	1918.48	111.89	1806.59	466.71	653.02	3484.78	4604.51	4115.11	0.00	254.87
9	**South East Delhi**	841.64	367.97	190.59	307.09	1707.29	142.42	1564.87	1426.64	121.70	1730.76	3279.10	2043.82	0.00	209.54
10	**South West Delhi**	1435.54	173.17	299.49	472.10	2380.29	238.03	2142.27	2075.54	305.53	2101.58	4482.64	2481.72	0.00	209.25
11	**West Delhi**	887.29	380.75	189.89	1068.20	2526.14	126.31	2399.83	283.79	141.50	1735.33	2160.63	2049.22	8.00	90.03
12	**Non Revenue Unit**	45.16	516.16	77.52	0.00	638.85	63.88	574.96	0.00	0.00	400.00	400.00	472.35	102.61	69.57
	Total (Ham)	**12842.22**	**5838.84**	**2726.25**	**10692.71**	**32100.02**	**2009.48**	**30090.54**	**9053.51**	**2480.12**	**24456.66**	**35990.30**	**28880.39**	**2299.44**	**119.61**
	Total (Bcm)	**0.13**	**0.06**	**0.03**	**0.11**	**0.32**	**0.02**	**0.30**	**0.09**	**0.02**	**0.24**	**0.36**	**0.29**	**0.02**	**119.61**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017														
GOA														
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction			Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial & Domestic	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	9981.48	2401.94	0.00	3654.35	16037.77	6415.11	9622.66	1009.71	1847.14	2856.85	2037.45	4728.36	29.69
2	South Goa	9014.06	130.41	644.26	895.84	10684.57	4273.83	6410.74	1048.14	1466.37	2514.51	1631.79	2264.45	39.22
	Total (ham)	**18995.54**	**2532.36**	**644.26**	**4550.18**	**26722.34**	**10688.94**	**16033.40**	**2057.85**	**3313.51**	**5371.36**	**3669.23**	**6992.81**	**33.50**
	Total (Bcm)	**0.19**	**0.03**	**0.01**	**0.05**	**0.27**	**0.11**	**0.16**	**0.02**	**0.03**	**0.05**	**0.04**	**0.07**	**33.50**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017

GUJARAT

S. No.	District	Ground Water Recharge: Monsoon Season: Recharge from rainfall	Ground Water Recharge: Monsoon Season: Recharge from other sources	Ground Water Recharge: Non-monsoon Season: Recharge from rainfall	Ground Water Recharge: Non-monsoon Season: Recharge from other sources	Total Annual Ground Water Recharge	Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction: Irrigation	Current Annual Ground Water Extraction: Industrial	Current Annual Ground Water Extraction: Domestic	Current Annual Ground Water Extraction: Total	Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Ahmedabad	39237.37	8763.67	0.00	9845.43	57846.47	2892.32	54954.15	35902.20	550.56	3121.41	39574.17	3974.00	14527.39	72.01
2	Amreli	104008.67	11261.72	0.00	10873.04	126143.43	6307.17	119836.26	70915.60	351.63	1992.56	73259.78	2600.00	45969.04	61.13
3	Anand	31573.68	16408.41	0.00	19793.63	67775.72	3388.79	64386.93	24645.90	511.28	2899.43	28056.60	3774.00	35455.75	43.57
4	Arvalli	54198.00	6755.21	0.00	5954.55	66907.76	3345.39	63562.37	34789.50	254.94	1444.68	36489.12	1935.00	26582.93	57.41
5	Banaskantha	108741.52	25708.07	0.00	13117.87	147567.45	7378.37	140189.08	153015.90	671.46	3804.92	157492.27	4842.00	11310.77	112.34
6	Bharuch	38578.52	4518.91	0.00	10364.94	53462.37	2673.12	50789.25	15136.70	260.43	1478.09	16875.23	2813.00	32579.11	33.23
7	Bhavnagar	60632.36	12108.87	0.00	9220.02	81961.26	4098.06	77863.20	43098.30	488.03	2765.50	46351.83	4659.00	29617.87	59.53
8	Botad	30879.16	3699.19	0.00	2892.38	37470.73	1873.54	35597.20	21385.10	149.30	846.01	22380.41	1237.00	12825.80	62.87
9	Chhota udepur	19160.21	7323.50	0.00	9142.76	35626.48	1781.32	33845.15	14573.40	253.28	1435.25	16261.93	1991.00	17027.47	48.05
10	Dahod	22691.52	11277.61	0.00	7515.52	41484.65	2074.23	39410.42	14643.20	514.72	2914.28	18072.20	4232.00	20020.50	45.86
11	Dang	5165.87	3371.00	0.00	37.00	8573.87	429.00	8144.87	610.00	58.10	328.70	996.80	455.00	7021.77	12.24
12	Devbhumi Dwarka	25540.11	3310.52	0.00	1593.56	30444.19	1522.71	28921.48	17533.80	159.26	902.46	18595.51	1370.00	9858.42	64.30
13	Gandhinagar	40861.21	5888.93	0.00	2731.67	49481.81	2474.09	47007.72	51114.00	339.56	1924.15	53377.70	2498.00	0.00	113.55
14	Gir Somnath	42519.05	4047.36	0.00	5192.14	51758.55	2587.93	49170.62	28808.80	197.22	1117.57	30123.58	3512.00	16652.61	61.26
15	Jamnagar	65638.79	10361.18	0.00	3283.57	79283.53	3964.18	75319.35	45686.90	295.57	1674.90	47657.37	2561.00	26775.88	63.27
16	Junagadh	87552.00	8136.66	0.00	8463.15	104151.81	5207.59	98944.22	61232.55	350.15	1984.17	63566.86	2733.00	34628.52	64.25
17	Kachchh	58705.32	16242.90	0.00	13220.84	88169.06	4408.46	83760.60	68013.50	335.32	1900.16	70248.98	3918.00	13896.67	83.87
18	Kheda	36371.57	16751.15	0.00	17054.67	70177.39	3508.91	66668.48	29286.40	491.05	2779.09	32556.54	3714.00	33177.03	48.83
19	Mahesana	88305.48	14832.34	0.00	11801.91	114939.73	5746.99	109192.75	122279.10	467.58	2649.81	125396.49	3383.00	900.70	114.84
20	Mahisagar	22394.94	6526.39	0.00	8122.51	37043.84	1852.19	35191.65	11979.50	246.70	1405.00	13631.20	1879.00	21086.45	38.73
21	Morbi	48353.66	4433.05	0.00	5808.70	58595.41	2929.77	55665.64	32588.80	170.35	965.31	33724.46	1713.00	21193.49	60.58
22	Narmada	11503.50	6541.31	0.00	7131.91	25176.72	1258.84	23917.88	3660.70	144.97	826.11	4631.77	1092.00	19020.22	19.37
23	Navsari	42109.58	6218.27	0.00	11908.61	60236.46	3011.82	57224.63	18422.50	318.20	1803.10	20543.80	2272.00	36211.93	35.90
24	Panchmahal	19945.37	11806.93	0.00	10516.55	42268.85	2113.45	40155.39	11934.50	412.30	2330.62	14677.42	3148.00	24660.59	36.55
25	Patan	21368.79	12197.66	0.00	6706.27	40272.71	2013.64	38259.07	37697.50	130.37	738.76	38566.63	968.00	611.05	100.80
26	Porbandar	18217.60	2421.58	0.00	1110.83	21750.01	1087.50	20662.51	14175.00	61.15	501.99	14738.14	1013.00	5413.36	71.33
27	Rajkot	115745.68	23899.65	0.00	16908.43	156553.76	7827.69	148726.07	93071.30	433.12	2451.34	95955.75	3444.00	51777.66	64.52
28	Sabarkantha	64747.17	15500.67	0.00	9100.10	89347.95	4467.40	84880.55	57122.90	349.86	1982.55	59455.31	2655.00	24752.79	70.05
29	Surat	77719.11	22063.19	0.00	26612.30	126394.60	6319.73	120074.87	28865.20	595.00	3381.00	32841.20	4572.00	86042.67	27.35
30	Surendranagar	58510.53	9432.18	0.00	3791.58	71734.29	3586.71	68147.58	38159.00	212.54	1204.86	39576.40	2808.00	26968.04	58.07
31	Tapi	30889.34	6821.91	0.00	6458.35	44169.60	2208.48	41961.12	16672.90	197.56	1115.68	17986.14	1449.00	23641.66	42.86
32	Vadodara	68427.99	12374.88	0.00	21135.10	101937.97	5096.90	96841.08	52570.00	525.91	2980.84	56076.76	2530.00	41215.16	57.91
33	Valsad	35142.63	8833.86	0.00	4173.55	48150.03	2407.97	45742.06	14504.40	523.12	2958.50	17986.02	4491.00	26223.54	39.32
	Total (Ham)	**1595436.30**	**339838.74**	**0.00**	**301583.43**	**2236858.47**	**111844.26**	**2125014.21**	**1284095.05**	**11020.58**	**62608.78**	**1357724.40**	**90235.00**	**797646.84**	**63.89**
	Total (Bcm)	**15.95**	**3.40**	**0.00**	**3.02**	**22.37**	**1.12**	**21.25**	**12.84**	**0.11**	**0.63**	**13.58**	**0.90**	**7.98**	**63.89**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
HARYANA															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Ambala	29740.00	10435.00	9196.00	7133.00	56504.00	5650.00	50854.00	36060.44	4965.00	10110.00	51135.44	10110.00	7487.45	100.55
2	Bhiwani	17014.41	12614.35	3154.56	12526.21	45309.53	4530.90	40778.63	45012.00	305.00	2400.00	47717.00	2796.00	3604.59	117.01
3	Charki Dadri	9974.60	2981.02	2234.87	3378.89	18569.38	1856.94	16712.44	25307.00	68.20	1300.00	26675.20	1398.00	2274.50	159.61
4	Faridabad	5403.00	3317.00	3036.00	4621.00	16377.00	1638.00	14739.00	12691.00	3872.00	1988.00	18551.00	1995.00	0.00	125.86
5	Fatehabad	14233.31	23523.82	3127.34	23102.09	63986.56	6398.60	57587.96	92158.00	164.00	642.00	92964.00	1253.00	123.84	161.43
6	Gurugram	11805.00	1671.00	4468.00	3252.00	21196.00	2119.00	19077.00	21920.00	15967.00	4235.00	42122.00	4676.00	0.00	220.80
7	Hisar	21269.77	17978.51	4834.70	26968.46	71051.44	7105.15	63946.29	65218.00	275.00	777.00	66270.00	974.00	7248.29	103.63
8	Jhajjar	11539.54	10634.94	3321.68	12606.10	38102.26	3810.23	34292.03	20620.00	79.00	473.00	21172.00	701.00	12892.03	61.74
9	Jind	17583.72	27872.43	9836.80	32166.17	87459.12	8745.90	78713.22	99849.00	469.00	1719.00	102037.00	2804.00	6927.32	129.63
10	Kaithal	16113.00	18821.00	5204.00	10949.00	51087.00	5109.00	45978.00	101969.00	536.00	2270.00	104775.00	2319.00	0.00	227.88
11	Karnal	28421.00	18858.00	5117.00	25226.00	77622.00	7763.00	69859.00	113464.00	2024.00	3208.00	118696.00	3264.00	2463.00	169.91
12	Kurukshetra	15003.80	8190.31	5030.20	5022.79	33247.10	3324.31	29922.79	66729.00	3134.00	3145.00	73008.00	3145.00	0.00	243.99
13	Mahendragarh	16708.00	2978.00	5214.00	6247.00	31147.00	3115.00	28032.00	23266.00	85.00	2948.00	26299.00	3496.00	6124.00	93.82
14	Mewat	8318.00	3709.00	4039.00	4779.00	20845.00	2085.00	18760.00	17595.00	33.00	1097.00	18725.00	1759.00	2746.00	99.81
15	Palwal	11362.00	15970.00	2393.00	22364.00	52089.00	5209.00	46880.00	47822.00	153.00	2167.00	50142.00	2167.00	0.00	106.96
16	Panchkula	9406.00	933.00	2569.00	672.00	13580.00	1357.00	12223.00	7199.00	78.00	1038.00	8315.00	1038.00	3909.00	68.03
17	Panipat	13030.00	7616.00	2589.00	9943.00	33178.00	3317.00	29861.00	54100.00	592.00	1380.00	56072.00	1904.00	0.00	187.78
18	Rewari	18174.00	5005.00	4334.00	15187.00	42700.00	4270.00	38430.00	29559.00	364.00	5156.00	35079.00	5507.00	5597.00	91.28
19	Rohtak	12743.28	9556.30	4746.80	10252.75	37299.13	3729.92	33569.21	18495.00	155.00	405.00	19055.00	2407.00	12624.89	56.76
20	Sirsa	26332.52	15090.78	3951.93	27095.55	72470.78	7247.08	65223.70	128027.00	0.00	856.00	128883.00	1775.00	0.00	197.60
21	Sonipat	17662.75	25961.60	6135.36	27497.04	77256.75	7725.67	69531.08	63622.00	707.00	2525.00	66854.00	3203.00	11710.00	96.15
22	Yamunanagar	24142.00	11624.00	8352.00	9305.00	53423.00	5342.00	48081.00	62427.00	90.00	12975.00	75492.00	12975.00	1636.00	157.01
	Total (Ham)	**355979.70**	**255341.06**	**102885.24**	**300294.05**	**1014500.05**	**101448.70**	**913051.35**	**1153109.44**	**34115.20**	**62814.00**	**1250038.64**	**71666.00**	**87367.91**	**136.91**
	Total (Bcm)	**3.56**	**2.55**	**1.03**	**3.00**	**10.15**	**1.01**	**9.13**	**11.53**	**0.34**	**0.63**	**12.50**	**0.72**	**0.87**	**137.00**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017														
HIMACHAL PRADESH														
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction			Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use*	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial & Domestic	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	Indora	7635.97	519.10	2556.12	1038.19	11749.38	1174.94	10574.44	6228.99	6994.67	13223.66	6994.67	481.54	125.05
2	Nurpur	9852.88	206.19	2289.39	412.38	12760.84	1276.08	11484.76	2474.22	1594.01	4068.23	2464.00	7150.58	35.42
3	Balh	1828.17	21.87	864.22	43.74	2758.00	277.92	2480.08	262.42	627.41	889.83	627.41	4709.11	35.88
4	Paonta	5464.68	40.60	1009.72	81.19	6596.19	659.62	5936.57	486.65	837.30	1323.95	4758.60	1143.51	22.30
5	Kala Amb	87.42	5.06	16.15	10.13	118.76	11.88	106.88	60.61	351.00	411.61	10194.80	0.00	385.11
6	Nalagarh	5565.52	209.82	1920.85	419.65	8115.84	811.58	7304.26	2509.96	6005.11	8515.07	6005.11	389.80	116.58
7	Una	2679.93	657.17	2689.81	1863.02	7889.93	788.99	7100.94	7885.88	2594.23	10480.11	2594.30	2569.71	147.59
8	Hum	417.55	5.44	120.03	44.87	587.89	58.79	529.10	326.09	73.38	399.47	326.09	0.00	75.50
	Total (Ham)	**33532.12**	**1665.25**	**11466.29**	**3913.17**	**50576.83**	**5059.80**	**45517.03**	**20234.82**	**19077.11**	**39311.93**	**33964.98**	**16444.25**	**86.37**
	Total (Bcm)	**0.34**	**0.02**	**0.11**	**0.04**	**0.51**	**0.05**	**0.46**	**0.20**	**0.19**	**0.39**	**0.34**	**0.16**	**86.37**

* Net Ground Water Availability for future use also includes the additional potential recharge

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017

JAMMU & KASHMIR

S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Anantnag	9864.26	2186.24	10852.62	1417.71	24320.83	2432.08	21888.74	420.80	37.80	3626.64	4085.24	3626.64	17803.50	18.66
2	Kulgam	586.37	3115.84	643.68	1688.08	6033.96	603.40	5430.57	147.28	29.16	1650.38	1826.82	1650.38	3603.74	33.64
3	Pulwama	4094.65	3037.61	5602.13	1738.18	14472.58	1447.26	13025.32	252.29	15.12	3195.65	3463.06	3195.65	9562.27	26.59
4	Shopian	1176.36	1653.74	1609.45	1141.71	5581.26	558.13	5023.14	100.80	27.00	1336.04	1463.84	1336.04	3559.30	29.14
5	Srinagar	4603.95	2334.44	4958.58	1707.89	13604.86	1360.49	12244.37	662.26	136.66	3122.06	3920.98	3122.06	8323.40	32.02
6	Ganderbal	343.14	1241.96	369.58	1567.93	3522.61	352.26	3170.35	420.48	20.85	336.38	777.72	336.38	2392.63	24.53
7	Budgam	4459.39	3521.72	5429.76	4716.56	18127.42	1812.74	16314.68	662.26	78.88	4036.61	4777.74	4036.61	11536.94	29.28
8	Baramulla	18092.10	1781.47	11360.50	2381.86	33615.94	3361.59	30254.34	2112.91	927.50	5918.26	8958.67	5918.26	21295.68	29.61
9	Bandipora	806.20	1470.64	506.24	1869.59	4652.68	465.27	4187.41	367.92	66.50	1671.41	2105.83	1671.41	2081.58	50.29
10	Kupwara	6184.32	2828.72	4898.40	3678.86	17590.30	1759.03	15831.27	388.94	35.00	3132.58	3556.52	3132.58	12274.75	22.47
11	Leh	3305.79	16.12	6769.84	19.70	10111.46	1011.15	9100.31	89.86	20.70	1587.31	1697.87	1587.31	7402.45	18.66
12	Kargil	109.44	4.34	583.20	5.31	702.29	70.23	632.06	24.19	4.14	58.75	87.08	58.75	544.97	13.78
13	Jammu	21456.28	18681.78	12119.88	18729.59	70987.52	7098.75	63888.77	8201.16	2428.27	9513.36	20142.79	9513.36	43745.98	31.53
14	Samba	5816.84	1032.10	3285.72	1405.12	11539.78	1153.98	10385.80	1419.12	126.12	1566.29	3111.53	1566.29	7274.27	29.96
15	Udhampur	412.82	331.31	3046.78	496.18	4287.09	428.71	3858.38	336.38	141.24	1019.66	1497.29	1019.66	2361.09	38.81
16	Reasi	66.14	294.78	488.11	450.25	1299.27	129.93	1169.34	178.70	52.56	494.06	725.33	494.06	444.02	62.03
17	Kathua	12143.32	6231.10	5756.70	7598.56	31729.68	3172.97	28556.71	2611.47	1019.66	5350.61	8981.74	5350.61	19574.96	31.45
18	Doda	504.82	18.86	1880.21	23.05	2426.94	242.69	2184.25	105.12	17.61	557.14	679.86	557.14	1504.39	31.13
19	Kishtwar	428.33	5.65	1452.70	6.91	1893.59	189.36	1704.23	31.50	0.00	147.17	178.67	147.17	1525.56	10.48
20	Ramban	295.75	5.65	1101.54	6.91	1409.85	140.98	1268.86	31.50	17.50	94.50	143.50	94.50	1125.36	11.31
21	Rajouri	1819.72	307.42	1229.90	454.89	3811.94	381.19	3430.74	304.50	17.50	1103.76	1425.76	1103.76	2004.98	41.56
22	Poonch	2948.92	128.74	4051.75	157.34	7286.75	728.67	6558.07	717.50	1331.50	17.50	2066.50	17.50	4491.57	31.51
	Total (Ham)	**99518.93**	**50230.23**	**87997.26**	**51262.17**	**289008.58**	**28900.86**	**260107.73**	**19586.94**	**6551.26**	**49536.12**	**75674.33**	**49536.12**	**184433.40**	**29.47**
	Total (Bcm)	**0.995**	**0.502**	**0.880**	**0.513**	**2.890**	**0.289**	**2.601**	**0.196**	**0.066**	**0.495**	**0.757**	**0.495**	**1.844**	**29.47**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
JHARKHAND															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Bokaro	23143.61	626.87	1690.79	1502.56	26963.83	2358.64	24605.19	2200.25	3773.07	6031.56	12004.88	6031.60	13516.96	48.79
2	Chatra	25140.17	753.86	1554.12	2670.89	30119.04	2532.65	27586.39	5917.00	708.58	1705.92	8331.50	1705.99	19254.81	30.20
3	Deoghar	15252.19	415.31	1019.55	1557.77	18244.82	1402.73	16842.09	4859.63	200.00	2055.88	7115.50	2055.95	9726.51	42.25
4	Dhanbad	16082.13	2032.64	1284.17	3474.36	22873.30	1509.08	21364.22	2414.50	10100.93	3784.73	16300.15	3784.78	5732.10	76.30
5	Dumka	22916.01	459.81	1357.58	1823.19	26556.59	2221.28	24335.31	3690.75	17.34	2195.06	5903.15	2195.08	18432.14	24.26
6	East Singhbhum	21843.62	245.93	2294.08	976.04	25359.67	2368.18	22991.49	1301.00	543.77	2731.01	4575.78	2731.07	18415.65	19.90
7	Garhwa	25544.86	673.23	2144.45	2669.65	31032.19	2414.63	28617.56	5157.63	3.48	2117.81	7278.91	2117.91	21338.55	25.44
8	Giridih	41825.69	649.04	2293.74	2487.58	47256.05	3770.48	43485.57	6578.63	754.53	4254.34	11587.50	4254.41	31898.00	26.65
9	Godda	19014.46	258.68	1854.20	882.37	22009.71	1933.29	20076.42	1698.50	311.03	2171.22	4180.75	2171.27	15895.62	20.82
10	Gumla	42961.41	261.41	4712.07	1028.07	48962.96	4667.56	44295.40	3589.50	8.73	1677.69	5275.92	1677.75	39019.42	11.91
11	Hazaribagh	27943.34	838.42	2532.37	3049.52	34363.65	2783.94	31579.71	7238.25	688.30	3178.61	11105.16	3178.68	20474.48	35.17
12	Jamtara	8074.83	577.17	568.12	2302.74	11522.86	906.00	10616.86	2060.25	4.09	1224.98	3289.33	1225.01	7327.51	30.98
13	Khunti	12976.92	169.18	997.74	664.75	14808.59	1268.43	13540.16	2265.00	6.87	859.71	3131.58	859.74	10408.55	23.13
14	Koderma	7660.66	186.34	203.09	744.01	8794.10	745.72	8048.38	1947.38	19.00	1119.88	3086.26	1119.92	4962.08	38.35
15	Latehar	19579.37	546.62	1292.83	2114.29	23533.11	1789.93	21743.18	4948.50	117.35	1264.94	6330.79	1264.98	15412.35	29.12
16	Lohardaga	17146.98	147.31	1845.92	580.30	19720.51	1756.56	17963.95	1793.50	0.00	673.87	2467.37	673.91	15496.54	13.74
17	Pakur	11628.02	388.86	756.09	1546.81	14319.78	975.94	13343.84	1131.50	20.82	1509.86	2662.18	1509.90	10681.62	19.95
18	Palamau	30212.86	963.28	1523.56	3789.80	36489.50	2883.52	33605.98	6210.00	146.81	3280.31	9637.12	3280.41	23968.77	28.68
19	Ramgarh	9360.67	581.11	517.79	991.51	11451.08	1110.85	10340.23	1405.25	3146.77	2740.96	7292.98	2741.00	3047.21	70.53
20	Ranchi	36519.48	670.10	2661.27	2420.04	42270.89	3448.89	38822.00	7897.88	1470.99	3574.21	12943.07	3574.30	25878.83	33.34
21	Sahebganj	20486.40	377.01	1503.51	1495.73	23862.65	2357.72	21504.93	1147.00	40.55	2422.62	3610.17	2422.66	17894.72	16.79
22	Saraikela - Kharsawan	12283.03	363.38	968.91	1443.75	15059.07	1505.91	13553.16	739.50	196.50	1738.12	2674.12	1738.16	10879.01	19.73
23	Simdega	29535.04	102.44	2565.09	395.94	32598.51	2609.95	29988.56	1807.00	0.00	927.59	2734.59	927.65	27253.91	9.12
24	West Singhbhum	28105.00	390.68	3131.00	1543.73	33170.41	3030.68	30139.73	1527.50	69.76	2657.27	4254.53	2657.34	25885.13	14.12
	Total (Ham)	**525236.75**	**12678.68**	**41272.04**	**42155.40**	**621342.87**	**52352.56**	**568990.31**	**79525.88**	**22349.28**	**55898.13**	**157773.29**	**55899.47**	**412800.48**	**27.73**
	Total (Bcm)	**5.25**	**0.13**	**0.41**	**0.42**	**6.21**	**0.52**	**5.69**	**0.80**	**0.22**	**0.56**	**1.58**	**0.56**	**4.13**	**27.73**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
KARNATAKA															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Bagalkote	10477.24	21996.09	5949.99	15172.94	53596.26	4490.83	49105.42	43221.71	0.00	3190.55	46412.27	3939.92	8581.31	94.52
2	Ballari	20038.42	17031.85	13407.76	11495.30	61973.33	5740.20	56233.13	27270.44	0.00	2925.91	30196.35	3932.84	25555.72	53.70
3	Belagavi	24203.17	36407.35	10925.76	21458.54	92994.83	7194.77	85800.06	57186.82	0.00	8116.67	65303.50	10408.98	22234.42	76.11
4	Bengaluru Rural	10030.93	3217.15	4998.61	3266.05	21512.75	1592.11	19920.63	23137.08	0.00	1419.40	24556.48	1425.05	0.00	123.27
5	Bengaluru Urban	5636.04	2009.56	3623.57	2335.78	13604.94	840.18	12764.76	16997.34	0.00	1360.20	18357.55	1360.20	0.00	143.81
6	Bidar	28734.10	2149.88	3874.19	3696.44	38454.60	2342.54	36112.06	14144.38	0.00	1147.42	15291.80	1238.36	20729.31	42.35
7	Chamrajnagara	22352.92	7909.49	6062.49	4853.70	41178.59	2347.31	38831.29	29633.13	0.00	2467.16	32100.29	3414.34	7761.34	82.67
8	Chikballapur	12920.76	9415.14	7900.98	5591.41	35828.29	2950.87	32877.41	50906.69	0.00	3048.64	53955.34	3070.45	0.00	164.11
9	Chikkamagaluru	35855.69	12370.05	12862.31	8964.15	70052.19	12634.92	57417.27	26667.19	0.00	2348.65	29015.84	2601.71	29623.61	50.54
10	Chitradurga	17804.11	7332.88	15463.17	8238.35	48838.51	3487.69	45350.82	47969.25	0.00	4197.82	52167.07	4371.99	3971.29	115.03
11	Dakshin Kannada	37400.72	1763.57	7174.05	3108.93	49447.27	19715.44	29731.83	16068.17	0.00	2542.83	18611.01	2722.64	10941.01	62.60
12	Davangere	18077.32	15762.44	13696.62	23940.01	71476.39	5417.66	66058.73	58179.35	0.00	3244.98	61424.33	3867.82	8358.28	92.98
13	Dharwad	10790.50	4140.64	6235.62	3877.10	25043.85	4347.27	20696.58	11596.84	0.00	1097.57	12694.41	1584.83	7514.91	61.34
14	Gadag	6049.26	7504.44	6011.61	8600.05	28165.35	1770.87	26394.49	22175.82	0.00	1685.03	23860.85	2006.36	3397.35	90.40
15	Hassan	21453.38	27587.43	13069.44	18157.57	80267.82	8905.75	71362.06	42034.71	0.00	3197.52	45232.23	3809.85	27053.42	63.38
16	Haveri	12629.17	22914.69	9235.47	15745.02	60524.35	4781.69	55742.66	29402.17	0.00	2275.61	31677.78	2848.98	23491.50	56.83
17	Kalaburagi	37689.57	3108.96	9048.70	5122.77	54970.00	4201.28	50768.72	16805.85	0.00	3773.44	20579.29	4198.17	29764.70	40.54
18	Kodagu	22710.98	2532.31	9156.02	2454.16	36853.46	5517.76	31335.71	8829.55	0.00	1679.76	10509.30	2156.62	20349.54	33.54
19	Kolar	15936.03	8918.46	7515.11	9278.49	41648.09	2108.84	39539.25	78747.74	0.00	4793.06	83540.80	4793.06	0.00	211.29
20	Koppal	10628.83	18930.66	7018.00	22523.88	59101.37	4121.14	54980.23	29268.00	0.00	1850.02	31118.02	2342.43	23369.80	56.60
21	Mandya	11155.86	54173.08	7481.59	15549.24	88359.76	5690.33	82669.43	46594.47	0.00	2415.29	49009.75	4201.14	31873.82	59.28
22	Mysuru	27551.67	28487.71	12551.05	10004.29	78594.72	5471.10	73123.62	26747.49	0.00	10747.82	37495.31	13184.79	33191.34	51.28
23	Raichur	15046.91	19693.90	9152.18	31843.88	75736.86	5774.27	69962.60	27692.29	0.00	3025.89	30718.17	4779.57	37490.74	43.91
24	Ramanagara	6892.90	10549.34	7003.89	6668.95	31115.08	1425.34	29689.74	26876.22	0.00	1791.87	28668.09	1913.45	1384.74	96.56
25	Shivamogga	43623.92	28103.19	11424.19	18773.26	101924.56	13978.91	87945.65	27770.39	0.00	3033.88	30804.28	3693.71	56481.55	35.03
26	Tumakuru	22351.35	21430.05	20112.00	12412.30	76305.69	4773.92	71531.77	59684.29	0.00	5163.30	64847.59	5567.43	12049.52	90.66
27	Udupi	42595.58	1633.25	5995.48	1710.56	51934.87	20525.66	31409.21	9441.83	0.00	3706.56	13148.38	3962.10	18005.27	41.86
28	Uttar kannada	62185.34	22783.03	5611.27	6296.24	96875.89	35165.13	61710.76	21200.73	0.00	3598.95	24799.68	3865.27	36644.77	40.19
29	Vijayapura	29466.66	5399.38	9209.48	8791.73	52867.25	3958.55	48908.70	30057.84	0.00	3468.86	33526.70	4078.24	14772.62	68.55
30	Yadgir	16407.06	10756.21	5425.01	12015.25	44603.53	3260.46	41343.06	12366.11	0.00	1663.79	14029.90	2397.36	26579.59	33.94
	Total (Ham)	**658696.36**	**436012.17**	**267195.59**	**321946.32**	**1683850.44**	**204532.79**	**1479317.65**	**938673.91**	**0.00**	**94978.45**	**1033652.35**	**113737.67**	**541171.50**	**69.87**
	Total (Bcm)	**6.59**	**4.36**	**2.67**	**3.22**	**16.84**	**2.05**	**14.79**	**9.39**	**0.00**	**0.95**	**10.34**	**1.14**	**5.41**	**69.87**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
KERALA															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	**Alappuzha**	25864.83	95.99	7090.63	10869.00	43920.45	3463.11	40457.33	3982.61	258.29	9423.86	13664.76	9505.93	26891.33	33.78
2	**Ernakulam**	34333.66	359.69	7264.20	13545.26	55502.81	5550.28	49952.53	8862.61	184.65	12847.63	21894.88	14348.58	26741.34	43.83
3	**Idukki**	15343.49	208.49	3275.63	1854.21	20681.82	2068.18	18613.64	6295.75	12.68	4557.61	10866.04	4557.61	7747.60	58.38
4	**Kannur**	38938.74	0.00	0.00	6899.83	45838.56	4583.85	41254.71	8888.11	20.34	9876.92	18785.37	10553.89	21812.71	45.54
5	**Kasargod**	26319.15	772.81	0.00	4658.31	31750.27	3175.03	28575.25	16450.76	13.90	6292.92	22757.58	6998.24	5176.30	79.64
6	**Kollam**	23868.19	149.12	8949.21	3880.61	36847.12	3553.56	33293.56	5351.11	17.50	11097.67	16466.28	12810.14	15132.31	49.46
7	**Kottayam**	27883.63	116.03	6607.36	7008.47	41615.49	4161.55	37453.94	5243.10	0.00	8360.61	13603.71	9246.09	22964.75	36.32
8	**Kozhikode**	28333.75	168.91	4020.81	1489.48	34012.94	3401.29	30611.65	5078.46	1.03	12750.09	17761.63	14217.51	11315.67	58.02
9	**Malappuram**	37390.30	355.78	5982.19	8553.02	52281.29	5228.13	47053.16	10113.27	0.00	21514.11	31627.38	25499.12	11440.78	67.22
10	**Palakkad**	28693.26	770.96	6097.53	30153.58	65715.33	6571.55	59143.78	19420.79	572.10	13389.54	33238.72	14432.82	25106.52	56.20
11	**Pathanamthitta**	18298.81	132.19	6343.97	3533.64	28308.61	2725.38	25583.23	3927.38	0.00	5521.15	9448.53	5521.15	16134.70	36.93
12	**Thiruvananthapuram**	19598.91	246.64	6602.58	3037.03	29485.17	2514.70	26970.47	5429.26	2.30	11784.24	17215.80	12174.05	9367.15	63.83
13	**Thrissur**	41301.19	923.56	5888.42	17113.35	65226.52	6178.17	59048.35	21348.86	38.93	12668.30	34056.10	13456.22	24243.27	57.67
14	**Wayanad**	25034.74	31.29	0.00	670.79	25736.83	2573.68	23163.14	1665.46	316.80	3695.35	5677.61	3806.21	17374.67	24.51
	Total (Ham)	**391202.67**	**4331.45**	**68122.53**	**113266.55**	**576923.20**	**55748.46**	**521174.74**	**122057.53**	**1438.52**	**143780.00**	**267064.38**	**157127.56**	**241449.09**	**51.24**
	Total (Bcm)	**3.91**	**0.04**	**0.68**	**1.13**	**5.77**	**0.56**	**5.21**	**1.22**	**0.01**	**1.44**	**2.67**	**1.57**	**2.41**	**51.36**

S. No.	District	Ground Water Recharge: Monsoon Season: Recharge from rainfall	Ground Water Recharge: Monsoon Season: Recharge from other sources	Ground Water Recharge: Non-monsoon Season: Recharge from rainfall	Ground Water Recharge: Non-monsoon Season: Recharge from other sources	Total Annual Ground Water Recharge	Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction: Irrigation	Current Annual Ground Water Extraction: Industrial	Current Annual Ground Water Extraction: Domestic	Current Annual Ground Water Extraction: Total	Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
	DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017 — MADHYA PRADESH														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Agar	33210.85	2451.57	0.00	8723.77	44386.19	2219.31	42166.88	37652.02	224.63	1272.88	39149.53	1746.16	5474.79	92.84
2	Alirajpur	17303.91	761.64	0.00	1599.22	19664.77	1385.62	18279.15	5781.41	366.92	2079.22	8227.55	2374.84	9755.98	45.01
3	Anuppur	30420.00	101.00	5577.47	269.00	36367.47	1818.00	34549.47	1307.00	217.05	1229.95	2754.00	1469.00	31556.42	7.97
4	Ashoknagar	31436.36	2198.44	0.00	8283.15	41917.95	2095.96	39821.99	20075.63	268.55	1521.76	21865.93	1907.83	17569.99	54.91
5	Balaghat	79825.00	4033.00	8005.11	2732.00	94595.11	5077.00	89518.11	11760.05	529.34	2999.61	15289.00	3986.00	73242.72	17.08
6	Barwani	43282.48	2592.54	0.00	28779.87	74654.89	3879.36	70775.53	35659.06	500.13	2834.07	38993.26	3620.90	31065.73	55.09
7	Betul	87832.29	4914.79	15543.34	17950.96	126241.38	6569.60	119671.78	65907.71	461.83	2617.11	68986.65	3380.83	49921.41	57.65
8	Bhind	58262.08	1354.22	2332.83	14175.95	76125.08	3806.22	72318.86	23214.79	421.79	2390.16	26026.74	3480.21	45202.07	35.99
9	Bhopal	28779.00	4565.00	0.00	5604.00	38948.00	1947.00	37001.00	23462.00	373.95	2119.05	25955.00	2493.00	10672.05	70.15
10	Burhanpur	31137.27	1167.14	0.00	5827.37	38131.78	2118.41	36013.37	22765.41	215.58	1221.61	24202.60	1590.32	11442.06	67.20
11	Chhatarpur	80722.05	4192.27	0.00	18549.74	103464.06	4971.03	98493.03	57599.96	476.09	2697.87	60773.92	3499.38	36917.60	61.70
12	Chhindwara	90989.00	3878.00	11903.79	12802.00	119572.79	6221.00	113351.79	58651.00	588.60	3335.40	62575.00	4272.00	49840.19	55.20
13	Damoh	29884.61	2032.92	0.00	8963.43	40880.96	2597.49	38283.47	19581.66	404.65	2293.01	22279.32	3113.47	15183.69	58.20
14	Datia	29126.08	755.83	0.00	6694.67	36576.58	1828.82	34747.76	12584.03	205.66	1165.41	13955.10	1454.96	20503.11	40.16
15	Dewas	65191.87	3163.86	0.00	14705.92	83061.65	4316.48	78745.17	62446.51	581.86	3297.23	66325.60	4119.22	14017.33	84.23
16	Dhar	82177.00	5498.00	0.00	32342.00	120017.00	6799.36	113217.64	73000.19	748.26	4240.12	77988.57	5934.85	40215.09	68.88
17	Dindori	33793.00	122.00	4682.05	417.00	39014.05	2606.00	36408.05	2076.00	244.95	1388.05	3709.00	1908.00	32179.10	10.19
18	Guna	69841.94	4281.77	0.00	13680.39	87804.10	4390.33	83413.77	43898.77	333.90	1892.12	46124.79	2672.30	36508.80	55.30
19	Gwalior	51556.00	8152.00	1359.00	17709.00	78776.00	3939.00	74837.00	18890.59	518.64	2938.95	22348.18	4202.00	51225.77	29.86
20	Harda	32120.00	2853.00	0.00	15692.00	50665.00	2533.00	48132.00	13795.00	166.05	940.95	14902.00	1199.00	32971.95	30.96
21	Hoshangabad	124441.00	11000.00	0.00	61145.00	196586.00	9804.00	186782.00	39817.00	279.45	1583.55	41680.00	2277.00	144408.55	22.31
22	Indore	37608.00	7091.00	0.00	13193.00	57892.00	2895.00	54997.00	57544.00	989.55	5607.45	64141.00	7098.00	3143.90	116.63
23	Jabalpur	58987.00	3628.00	1070.00	6659.00	70344.00	3521.00	66823.00	25607.00	415.95	2357.05	28380.00	2980.00	37820.05	42.47
24	Jhabua	20865.68	792.98	0.00	2383.08	24041.74	1810.78	22230.96	10039.47	402.42	2280.37	12722.26	2870.10	8918.97	57.23
25	Katni	30701.00	1768.00	0.00	4767.00	37236.00	1851.00	35385.00	13957.00	376.05	2130.95	16464.00	3318.00	17733.95	46.53
26	Khandwa	52810.08	2736.45	0.00	51211.66	106758.19	5692.66	101065.53	40713.16	397.56	2253.10	43364.22	3334.75	56620.06	42.91
27	Khargone	63680.41	3341.48	0.00	66590.74	133612.63	6908.60	126704.03	42281.12	574.58	3329.55	46185.25	4547.41	79300.92	36.45
28	Mandla	44442.50	863.23	6575.45	3858.74	55739.92	5830.00	49909.92	6430.00	365.57	2071.73	8867.30	2835.51	40278.84	17.77
29	Mandsaur	46559.88	2784.63	0.00	12095.16	61439.67	3071.98	58367.69	57087.86	473.47	2683.37	60244.70	3660.06	1695.81	103.22
30	Morena	49923.96	970.00	0.00	20804.00	71697.96	3584.00	68113.96	19604.00	693.00	3927.00	24224.00	9536.00	38280.96	35.56
31	Narsinghpur	104397.95	3255.17	0.00	16195.49	123848.61	6235.34	117613.27	72389.65	316.80	1795.32	74501.77	2232.21	42674.61	63.34
32	Neemuch	30833.06	4035.45	0.00	8165.63	43034.14	2151.70	40882.44	34006.48	261.20	1480.84	35748.52	1876.26	4738.50	87.44
33	Panna	41228.77	1014.41	0.00	5383.68	47626.86	2661.47	44965.39	14259.89	322.62	1828.35	16410.86	2721.22	27661.66	36.50
34	Raisen	76591.69	3257.56	0.00	9480.92	89330.17	4466.46	84863.71	40757.16	545.81	3093.31	44396.28	3835.69	39725.05	52.31
35	Rajgarh	71944.38	4439.74	0.00	12575.05	88959.17	4447.96	84511.21	66974.15	534.65	3030.88	70539.68	3666.63	13335.78	83.47
36	Ratlam	58567.66	5881.47	0.00	20690.64	85139.77	4257.00	80882.77	99287.20	461.37	2674.60	102423.17	4613.04	2764.17	126.63
37	Rewa	46107.20	2699.16	1439.82	12228.54	62474.72	3431.58	59043.14	21734.56	727.20	4120.86	26582.62	4663.29	31918.09	45.02
38	Sagar	91016.00	3616.30	0.00	14760.87	109393.17	5946.90	103446.27	56953.05	504.35	2858.34	60315.74	4987.42	41001.45	58.31
39	Satna	45101.95	3168.33	3467.63	12970.38	64708.29	3289.04	61419.25	37639.10	633.08	3587.99	41860.17	4676.97	18470.10	68.15
40	Sehore	58466.39	3656.46	0.00	12451.74	74574.59	3729.73	70844.86	41495.49	355.44	2014.25	43865.18	2813.85	26180.08	61.92
41	Seoni	67485.00	1761.00	3520.70	5865.00	78631.70	4240.00	74391.70	25682.00	448.05	2538.95	28669.00	3195.00	45066.65	38.54
42	Shahdol	47145.50	245.02	7371.51	1030.88	55792.91	3064.50	52728.41	2681.56	312.19	1769.25	4763.00	2182.44	47552.22	9.03
43	Shajapur	46005.31	2920.61	0.00	9661.50	58587.42	2929.38	55658.04	55071.97	298.76	1690.30	57061.03	2117.11	3557.82	102.52
44	Sheopur	33569.28	781.99	0.00	18725.86	53077.13	4755.28	48321.85	15637.03	260.86	1478.45	17376.34	1654.47	30769.49	35.96
45	Shivpuri	60904.53	3342.85	0.00	13694.96	77942.34	4491.02	73451.32	47078.63	552.58	3200.42	50831.63	4097.81	21722.30	69.20
46	Sidhi	27743.10	838.69	3545.53	1960.96	34088.28	1828.80	32259.48	6948.30	377.28	2138.42	9464.00	2632.73	22301.17	29.34
47	Singrauli	36463.69	722.85	0.00	2228.05	39414.59	2182.55	37232.04	8283.15	328.32	1861.43	10472.90	2052.44	26568.13	28.13
48	Tikamgarh	39812.81	3058.72	0.00	11114.48	53986.01	2699.30	51286.71	33793.39	542.87	3077.09	37413.35	5606.97	11343.48	72.95
49	Ujjain	71197.30	4816.38	0.00	18792.33	94806.01	4740.31	90065.70	85334.30	486.21	2755.37	88575.88	6368.19	9098.42	98.35
50	Umaria	40067.00	377.00	5916.66	948.40	47309.06	2498.50	44810.56	4059.10	205.00	1161.70	5425.80	1426.40	39120.06	12.11
51	Vidisha	78864.50	2598.18	0.00	11755.17	93217.85	4660.90	88556.95	49331.56	471.29	2661.82	52464.67	3803.35	34950.75	59.24
	Total (Ham)	**2710423.37**	**150532.10**	**82310.89**	**698889.35**	**3642155.71**	**194795.73**	**3447359.98**	**1742587.12**	**21761.96**	**123516.58**	**1887866.06**	**172104.59**	**1584187.83**	**54.76**
	Total (Bcm)	**27.10**	**1.51**	**0.82**	**6.99**	**36.42**	**1.95**	**34.47**	**17.43**	**0.22**	**1.24**	**18.88**	**1.72**	**15.84**	**54.76**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017

MAHARASHTRA

S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Ahmednagar	86779.79	13218.21	14556.76	45839.90	160394.66	8638.80	151755.85	114971.91	0.00	5602.46	120574.37	6267.86	38775.64	79.45
2	Akola	32077.00	1388.27	300.60	8648.42	42414.28	2958.76	39455.52	21286.27	0.00	2347.50	23633.76	3180.88	12853.20	59.90
3	Amravati	61081.30	4616.65	1574.71	27139.38	94412.04	6484.89	87927.15	75242.92	0.00	2404.90	77647.82	2860.54	18434.15	88.31
4	Aurangabad	65441.68	6707.02	334.38	30575.06	103058.14	5185.70	97872.44	68437.74	0.00	3479.85	71917.59	13706.17	15728.53	73.48
5	Beed	78387.68	7881.46	6240.28	33102.83	125612.25	6287.39	119324.86	67596.39	0.00	4177.29	71773.68	12137.51	39590.95	60.15
6	Bhandara	31142.09	45350.23	417.80	15413.63	92323.75	6784.11	85539.63	20990.98	37.89	3483.41	24512.27	3817.34	60731.32	28.66
7	Buldhana	64156.86	4768.16	275.87	19519.09	88719.98	5127.67	83592.31	58983.50	0.00	3106.29	62089.78	3817.05	23043.24	74.28
8	Chandrapur	97204.67	4834.16	1471.94	10306.92	113817.69	5908.87	107908.82	10637.00	0.00	10228.01	20865.01	11247.56	86024.26	19.34
9	Dhule	44091.26	7170.15	0.00	20694.25	71955.66	4176.84	67778.81	34545.18	3.25	1783.36	36331.79	6129.71	27103.92	53.60
10	Gadchiroli	94138.79	2040.86	0.00	10389.57	106569.21	5970.25	100598.96	19177.22	0.00	3643.47	22820.69	4187.79	77233.95	22.68
11	Gondia	42884.11	6619.76	645.56	15779.95	65929.38	3924.61	62004.77	9398.54	297.06	5688.05	15383.64	6538.20	46068.04	24.81
12	Hingoli	46490.02	1492.73	1340.56	28431.41	77754.73	3937.89	73816.84	37052.52	2.53	2160.50	39215.55	7408.27	29356.05	53.13
13	Jalgaon	86052.15	6375.98	574.14	44902.36	137904.63	6974.15	130930.48	100695.03	0.00	4880.25	105575.29	15343.12	20161.03	80.63
14	Jalna	57320.69	2522.77	115.46	24898.25	84857.16	4621.78	80235.38	42433.06	0.00	1360.75	43793.81	3919.76	33882.56	54.58
15	Kolhapur	52822.22	9290.17	753.39	66060.06	128925.84	6841.70	122084.14	49557.12	0.00	1751.76	51308.88	1997.01	70530.02	42.03
16	Latur	45726.03	6929.64	0.00	16210.55	68866.23	3453.20	65413.03	34270.64	0.00	2142.34	36412.97	4126.61	27018.98	55.67
17	Nagpur	66817.65	6221.47	2587.51	19143.00	94769.63	5165.10	89604.53	35642.88	0.00	10318.95	45961.83	10660.92	43300.72	51.29
18	Nanded	98215.34	843.03	3504.27	17403.10	119965.73	6002.56	113963.17	34916.94	1.21	3268.86	38187.00	9328.19	69718.04	33.51
19	Nandurbar	39060.71	2624.03	0.00	8939.55	50624.30	3201.39	47422.91	17590.86	0.00	3064.69	20655.56	11934.88	17941.71	43.56
20	Nashik	133827.97	14203.47	0.00	48347.66	196379.10	10743.78	185635.32	104572.27	0.00	3518.53	108090.80	8578.07	76211.00	58.23
21	Osmanabad	60460.58	6503.68	2583.66	15676.73	85224.64	4261.23	80963.41	48461.89	0.00	2305.61	50767.51	6232.84	26268.67	62.70
22	Palghar	19011.80	241.69	0.00	3425.04	22678.53	1361.94	21316.58	3703.08	0.00	885.36	4588.44	4301.93	13311.58	21.53
23	Parbhani	56000.04	1487.22	645.42	25891.57	84024.26	4310.15	79714.11	35761.68	0.00	1984.28	37745.96	9619.29	34333.14	47.35
24	Pune	96075.81	18178.58	1263.73	69875.02	185393.14	10014.54	175378.60	118190.27	0.00	8249.73	126440.00	10714.46	52295.08	72.10
25	Raigad	33614.36	382.59	0.00	5438.27	39435.22	2003.86	37431.36	4205.89	0.00	2156.34	6362.23	5749.76	27475.71	17.00
26	Ratnagiri	41118.99	118.20	0.00	2025.51	43262.70	2160.67	41102.03	5064.58	0.00	1261.81	6326.39	1599.94	34388.30	15.39
27	Sangli	51956.77	18938.07	0.61	61752.24	132647.69	8960.02	123687.67	69493.03	0.00	3338.34	72831.37	6938.32	50768.50	58.88
28	Satara	53177.54	10002.24	3762.79	32613.32	99555.89	5134.75	94421.14	57746.57	0.00	4829.80	62576.37	5505.90	31168.68	66.27
29	Sindhudurg	22398.94	176.99	0.00	2133.28	24709.22	1266.77	23442.45	7030.04	0.00	2232.75	9262.78	2411.36	14001.05	39.51
30	Solapur	90200.57	10809.87	2954.07	40676.66	144641.17	7373.97	137267.20	102711.83	0.00	4862.70	107574.53	5642.17	34029.08	78.37
31	Thane	15200.67	283.85	0.00	2214.31	17698.83	1047.69	16651.14	2348.32	0.00	706.24	3054.56	1404.17	12898.65	18.34
32	Wardha	60064.39	1128.37	1229.63	21008.25	83430.64	4362.55	79068.08	39911.98	0.00	3472.72	43384.70	3698.33	35457.78	54.87
33	Washim	40996.75	2586.44	68.86	12236.61	55888.66	2989.37	52899.29	29499.37	0.00	2005.30	31504.67	2473.89	20926.03	59.56
34	Yawatmal	94994.19	2676.32	5793.54	16403.96	119868.02	6316.01	113552.00	28111.93	0.00	5752.54	33864.46	15018.53	70167.01	29.82
	Total (Ham)	**2058989.40**	**228612.31**	**52995.53**	**823115.72**	**3163712.96**	**173952.96**	**2989760.00**	**1510239.40**	**341.94**	**122454.73**	**1633036.07**	**228498.32**	**1291196.56**	**54.62**
	Total (Bcm)	**20.59**	**2.29**	**0.53**	**8.23**	**31.64**	**1.74**	**29.90**	**15.10**	**0.00**	**1.22**	**16.33**	**2.28**	**12.91**	**54.62**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
MANIPUR															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Bishnupur	4485.43	129.87	3287.35	259.80	8162.50	816.25	7346.20	57.19	0.00	23.95	81.14	695.87	6593.14	1.10
2	Chandel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	Churachandpur	2902.87	157.36	2127.50	314.71	5502.40	550.24	4952.19	75.25	0.00	19.96	95.21	407.46	4469.48	1.92
4	Imphal East	2106.16	77.04	1543.60	155.26	3882.10	388.21	3493.85	6.02	18.00	9.98	34.00	812.55	2657.28	0.97
5	Jiribam	4305.47	87.65	3155.46	174.95	7723.50	772.35	6951.18	27.09	0.00	26.95	54.04	254.69	6669.40	0.78
6	Imphal West	4693.42	198.12	3439.79	397.88	8729.20	872.92	7856.30	105.35	6.00	54.89	166.24	1212.03	6532.92	2.12
7	Senapati	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	Tamenglong	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	Thoubal	4648.21	311.92	3406.65	625.03	8991.80	899.18	8092.63	90.30	0.00	35.93	126.23	634.02	7368.31	1.56
10	Ukhrul	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total(Ham)	**23141.56**	**961.96**	**16960.35**	**1927.63**	**42991.50**	**4299.15**	**38692.35**	**361.20**	**24.00**	**171.66**	**556.86**	**4016.62**	**34290.53**	**1.44**
	Total (Bcm)	**0.23**	**0.01**	**0.17**	**0.02**	**0.43**	**0.04**	**0.39**	**0.00**	**0.00**	**0.00**	**0.01**	**0.04**	**0.34**	**1.44**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
MEGHALAYA															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	**East Garo Hills**	2745.11	57.85	2014.64	15.53	4833.13	483.31	4349.81	0.00	0.00	20.42	20.42	40.84	4308.97	0.47
2	**East Jaintia Hills**	12990.73	26.27	5023.89	6.78	18047.68	1804.77	16242.91	0.00	4.00	50.01	54.01	108.02	16130.89	0.33
3	**East Khasi Hills**	7128.22	166.14	3297.08	40.78	10632.22	1063.22	9569.00	0.00	10.00	224.61	234.61	469.22	9089.78	2.45
4	**North Garo Hills**	12073.67	75.88	3773.95	20.61	15944.11	1594.41	14349.70	51.00	0.00	24.30	75.30	48.60	14250.10	0.52
5	**Ri-Bhoi**	10475.63	175.76	2099.16	155.12	12905.68	1290.57	11615.11	0.00	10.00	55.55	65.55	131.10	11474.01	0.56
6	**South Garo Hills**	7386.53	69.60	2678.24	17.68	10152.06	1015.21	9136.85	0.00	0.00	9.32	9.32	18.65	9118.20	0.10
7	**South West Garo Hills**	9928.03	106.39	3058.68	1330.07	14423.17	1875.07	12548.10	2655.40	0.00	127.82	2783.22	255.64	9637.06	22.18
8	**South West Khasi Hills**	10174.64	24.39	2642.25	5.90	12847.18	1284.72	11562.46	0.00	0.00	9.01	9.01	18.02	11544.44	0.08
9	**West Garo Hills**	23157.23	186.91	9411.18	534.70	33290.02	3924.12	29365.91	102.00	0.00	312.77	414.77	625.54	28638.37	1.41
10	**West Jaintia Hills**	11829.53	169.78	4571.08	46.50	16616.90	1661.69	14955.21	5.00	5.00	49.33	59.33	108.66	14836.55	0.40
11	**West Khasi Hills**	28913.66	122.90	4374.25	29.63	33440.44	3344.04	30096.40	0.00	0.00	14.00	14.00	28.00	30068.40	0.05
	Total (Ham)	**136802.99**	**1181.88**	**42944.40**	**2203.32**	**183132.59**	**19341.13**	**163791.46**	**2813.40**	**29.00**	**897.14**	**3739.54**	**1852.28**	**159096.78**	**2.28**
	Total (Bcm)	**1.37**	**0.01**	**0.43**	**0.02**	**1.83**	**0.19**	**1.64**	**0.03**	**0.00**	**0.01**	**0.04**	**0.02**	**1.59**	**2.28**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
MIZORAM															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Aizawl	1035.99	0.00	518.14	0.00	1554.13	155.41	1398.71	0.00	0.00	192.94	192.94	272.27	1126.44	13.79
2	Champhai	1129.77	0.00	396.83	0.00	1526.61	152.66	1373.95	0.00	0.00	43.89	43.89	63.44	1310.51	3.19
3	Kolasib	1306.08	0.00	674.92	0.00	1981.00	198.10	1782.90	0.00	0.00	29.66	29.66	42.46	1740.44	1.66
4	Lawngtlai	3433.55	0.00	545.75	0.00	3979.30	397.93	3581.37	0.00	0.00	94.59	94.59	144.98	3436.38	2.64
5	Lunglei	4793.93	0.00	932.58	0.00	5726.50	572.65	5153.85	0.00	0.00	192.64	192.64	247.82	4906.03	3.74
6	Mamit	3080.15	0.00	1624.59	0.00	4704.75	470.47	4234.27	0.00	0.00	92.39	92.39	159.87	4074.40	2.18
7	Saiha	658.16	0.00	159.47	0.00	817.63	81.76	735.87	0.00	0.00	39.05	39.05	59.69	676.18	5.31
8	Serchhip	784.56	0.00	206.28	0.00	990.84	99.08	891.76	0.00	0.00	46.72	46.72	69.22	822.53	5.24
	Total (Ham)	**16222.20**	**0.00**	**5058.56**	**0.00**	**21280.75**	**2128.08**	**19152.68**	**0.00**	**0.00**	**731.87**	**731.87**	**1059.76**	**18092.92**	**3.82**
	Total (Bcm)	**0.16**	**0.00**	**0.05**	**0.00**	**0.21**	**0.02**	**0.19**	**0.00**	**0.00**	**0.01**	**0.01**	**0.01**	**0.18**	**3.82**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
NAGALAND															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Dimapur	8294.88	1363.00	3392.78	134.00	13184.66	1318.47	11866.19	208.84	0.57	753.97	963.38	893.85	10762.93	8.12
2	Kiphire	5222.34	0.00	1623.61	0.00	6845.95	684.60	6161.36	0.00	0.00	13.62	13.62	9.93	6151.43	0.22
3	Kohima	15455.23	1708.00	4425.95	196.00	21785.18	2178.52	19606.66	0.00	0.00	203.84	203.84	237.15	19369.51	1.04
4	Longleng	4541.74	0.00	1484.21	0.00	6025.95	602.60	5423.36	0.00	0.00	27.69	27.69	8.37	5414.99	0.51
5	Mokokchung	20948.89	0.00	6569.46	0.00	27518.35	2751.84	24766.52	0.00	0.55	77.82	78.37	65.73	24700.24	0.32
6	Mon	19250.55	0.00	7107.02	0.00	26357.57	2635.76	23721.81	0.00	0.00	204.59	204.59	195.43	23526.38	0.86
7	Peren	16439.43	0.00	5198.16	0.00	21637.59	2163.76	19473.83	0.00	0.00	88.15	88.15	90.58	19383.25	0.45
8	Phek	18276.01	0.00	7239.70	0.00	25515.71	2551.57	22964.14	0.00	0.00	38.42	38.42	40.15	22923.99	0.17
9	Tuenchung	22382.03	0.00	6568.55	0.00	28950.58	2895.06	26055.52	0.00	0.00	88.78	88.78	91.99	25963.53	0.34
10	Wokha	24753.67	0.00	6257.08	0.00	31010.75	3101.08	27909.68	0.00	0.00	182.16	182.16	181.48	27728.20	0.65
11	Zunheboto	9045.90	0.00	2564.99	0.00	11610.89	1161.09	10449.80	0.00	2.25	68.87	71.12	63.73	10383.82	0.68
	Total (Ham)	**164610.67**	**3071.00**	**52431.51**	**330.00**	**220443.18**	**22044.32**	**198398.86**	**208.84**	**3.37**	**1747.91**	**1960.12**	**1878.39**	**196308.26**	**0.99**
	Total (Bcm)	**1.65**	**0.03**	**0.52**	**0.00**	**2.20**	**0.22**	**1.98**	**0.00**	**0.00**	**0.02**	**0.02**	**0.02**	**1.96**	**0.99**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
ODISHA															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Angul	40918.06	8016.18	3962.33	5068.60	57965.17	3266.29	54698.88	19842.55	938.60	4043.87	24825.02	4697.20	29220.51	45.38
2	Balasore	63946.34	13973.34	17134.27	25217.46	120271.41	8690.38	111581.03	60553.21	892.90	5843.53	67289.64	6581.45	43553.47	60.31
3	Bargarh	41040.64	12215.16	136.38	11941.23	65333.41	3266.68	62066.73	25229.32	297.58	4362.30	29889.20	4761.11	31778.72	48.16
4	Bhadrak	17577.53	11087.14	4308.39	15763.32	48736.38	4110.93	44625.45	24476.62	315.20	2541.68	27333.50	2812.17	17021.46	61.25
5	Bolangir	46705.54	5498.65	898.73	6580.74	59683.66	3592.30	56091.36	19884.28	218.32	4946.78	25049.38	5860.02	30128.74	44.66
6	Boudh	15719.95	3213.73	446.28	4048.53	23428.49	1335.09	22093.40	8556.26	42.04	1281.43	9879.73	1448.91	12046.19	44.72
7	Cuttack	45333.07	10664.44	9049.08	7932.29	72978.88	4751.59	68227.29	20894.68	559.57	7385.56	28839.81	8172.34	38600.70	42.27
8	Deogarh	22635.47	4325.72	1223.69	2910.58	31095.46	2295.53	28799.93	13300.93	111.60	910.62	14323.15	1016.85	14370.55	49.73
9	Dhenkanal	29674.70	8179.48	5442.07	2994.38	46290.63	3328.61	42962.02	12266.54	290.67	3511.56	16068.77	3844.81	26560.00	37.40
10	Gajapati	12426.51	2564.56	4946.34	2536.35	22473.76	1681.69	20792.07	4790.63	108.41	1609.40	6508.44	1747.94	14145.09	31.30
11	Ganjam	38130.93	25987.19	17236.11	12320.64	93674.87	7631.72	86043.15	22434.96	1444.91	10151.78	34031.65	11638.12	50525.16	39.55
12	Jagatsinghpur	17447.28	12952.80	4359.43	11033.97	45793.48	3911.28	41882.20	21174.49	474.30	2321.06	23969.85	2665.69	17567.72	57.23
13	Jajpur	33259.35	9369.34	7250.92	6174.69	56054.30	3752.79	52301.51	27047.91	285.15	4538.53	31871.59	4957.19	20011.26	60.94
14	Jharsuguda	17492.03	1543.19	221.66	1977.96	21234.84	1227.29	20007.55	5616.27	823.05	2217.02	8656.34	2555.33	11012.90	43.27
15	Kalahandi	47562.29	10366.60	1803.22	9442.98	69175.09	4746.50	64428.59	17276.44	722.19	4516.83	22515.46	5180.35	41249.61	34.95
16	Kandhamal	27069.53	3082.84	4436.16	3742.10	38330.63	3062.63	35268.00	6731.75	224.85	2151.99	9108.59	2382.33	25929.07	25.83
17	Kendrapara	6440.35	4884.93	1731.64	4420.82	17477.74	1489.13	15988.61	9202.83	145.40	1090.17	10438.40	1195.19	5445.19	65.29
18	Keonjhar	63236.55	6628.07	11512.66	8773.49	90150.77	6281.88	83868.89	27433.48	436.60	5638.61	33508.69	6421.27	49577.54	39.95
19	Khurda	24954.24	8150.04	6000.27	8696.86	47801.41	3665.18	44136.23	15210.85	0.00	6594.56	21805.41	8087.01	20838.37	49.40
20	Koraput	39704.020	2824.340	4155.740	4642.300	51326.400	3717.980	47608.420	5783.310	760.000	4101.890	10645.200	4701.620	36363.490	22.36
21	Malkangiri	24116.190	3376.970	1152.110	3868.620	32513.890	2295.050	30218.840	2986.820	0.000	1862.760	4849.580	2184.190	25047.830	16.05
22	Mayurbhanj	88553.020	20433.950	18391.080	23645.410	151023.460	9470.290	141553.170	46923.160	805.980	7267.930	54997.07	8111.550	85712.480	38.85
23	Nabarangapur	49146.54	2796.85	3944.29	3499.66	59387.34	3654.62	55732.72	12771.40	139.50	3524.38	16435.28	4042.69	38779.13	29.49
24	Nayagarh	25399.220	4104.080	5223.690	5504.780	40231.770	3257.120	36974.650	10536.220	0.0000	2962.900	13499.120	3527.700	22910.730	36.51
25	Nuapada	22582.220	4454.100	706.770	4115.250	31858.340	1612.080	30246.260	14266.040	102.21	1520.140	15888.390	1984.670	13893.340	52.53
26	Puri	30272.340	11901.030	7360.840	16809.440	66343.650	5225.870	61117.780	25029.950	0.000	4683.790	29713.740	5179.070	30908.760	48.62
27	Rayagada	22195.600	2677.710	4429.710	2074.600	31377.620	2462.880	28914.740	5235.670	658.000000	2785.740	8679.410	3139.090	19881.980	30.02
28	Sambalpur	47820.48	6958.94	311.18	10624.63	65715.23	4913.32	60801.91	12173.90	883.62	3023.36	16080.88	3313.07	44431.32	26.45
29	Subarnapur	19918.530	3809.210	155.570	4316.710	28200.020	1728.900	26471.120	9548.800	56.960	1777.740	11383.500	1958.180	14907.180	43.00
30	Sundargarh	71232.900	7828.770	2479.810	6338.090	87879.570	6293.270	81586.300	21044.280	2050.650	5586.780	28681.710	6259.930	52231.440	35.16
	Total (Ham)	**1052511.42**	**233869.35**	**150410.42**	**237016.48**	**1673807.67**	**116718.87**	**1557088.80**	**528223.55**	**13788.26**	**114754.69**	**656766.50**	**130427.04**	**884649.93**	**42.18**
	Total (Bcm)	**10.525**	**2.339**	**1.504**	**2.370**	**16.738**	**1.167**	**15.571**	**5.282**	**0.138**	**1.148**	**6.568**	**1.304**	**8.846**	**42.18**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
PUNJAB															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	**Amritsar**	30913.10	88382.03	8132.26	44164.69	171592.07	17159.21	154432.86	217950.26	305.44	9708.42	227964.11	13357.08	0.00	147.61
2	**Barnala**	11860.00	36439.26	2291.59	13763.61	64354.46	6435.45	57919.01	119753.01	0.00	2339.71	122092.72	3217.10	0.00	210.80
3	**Bathinda**	23526.00	65211.90	5103.14	59572.76	153413.80	12316.06	141097.73	132148.50	34.66	5449.42	137632.57	7492.95	21994.43	97.54
4	**Faridkot**	12240.19	38379.86	2201.59	14398.61	67220.25	6722.03	60498.23	96432.07	2321.53	2424.91	101178.51	3334.25	0.00	167.24
5	**Fatehgarh Sahib**	15745.54	32821.82	3589.65	9542.56	61699.56	6169.96	55529.60	112087.21	842.59	2319.84	115249.64	3189.78	0.00	207.55
6	**Fazilka**	19944.33	45812.26	3258.04	33673.97	102688.60	10268.86	92419.74	87076.15	158.46	4452.14	91686.75	6121.70	24647.38	99.21
7	**Ferozepur**	19819.23	88613.36	5254.15	23748.79	137435.53	13743.55	123691.98	199649.69	118.78	3056.76	202825.23	4203.04	0.00	163.98
8	**Gurdaspur**	39037.45	95338.96	10704.47	27671.21	172752.10	16655.94	156096.16	202477.32	1045.98	6017.93	209541.23	8274.65	738.04	134.24
9	**Hoshiarpur**	45196.93	25468.49	12140.76	12163.96	94970.13	9039.22	85930.92	84889.62	1333.87	5896.62	92120.11	9442.17	10553.30	107.20
10	**Jalandhar**	35348.91	62312.87	8193.00	24552.87	130407.64	13040.76	117366.88	268432.93	397.10	11866.84	280696.87	16316.90	0.00	239.16
11	**Kapurthala**	21156.29	41573.51	5779.78	9413.89	77923.47	7792.37	70131.10	151500.35	2389.88	3029.26	156919.49	4165.23	0.00	223.75
12	**Ludhiana**	47045.00	114523.44	9961.70	43906.64	215436.78	21543.75	193893.03	338377.09	3407.06	12922.73	354706.89	17768.76	0.00	182.94
13	**Mansa**	17519.23	56289.78	3536.20	36870.81	114216.02	11421.60	102794.42	145381.42	16.01	0.00	145397.43	0.00	145.77	141.44
14	**Moga**	21395.41	76757.79	4251.41	17243.52	119648.13	11964.81	107683.31	243449.70	0.00	3651.08	247100.78	5020.23	0.00	229.47
15	**Mohali**	17874.30	4132.63	4255.94	2134.52	28397.39	2565.15	25832.24	23692.53	3523.22	3653.43	30869.18	5023.46	2048.07	119.50
16	**Muktsar**	18477.76	29431.84	3813.63	29942.86	81666.10	8166.61	73499.49	51943.88	2704.84	0.00	54648.72	0.00	19645.96	74.35
17	**Nawanshahar**	20468.27	29885.80	4890.58	15062.14	70306.79	7030.68	63276.11	71052.69	126.19	2276.06	73454.94	3129.58	6616.50	116.09
18	**Pathankot**	11575.76	8791.60	4284.07	6587.94	31239.36	2773.95	28465.41	18741.52	400.92	2499.39	21641.83	3436.66	14633.61	76.03
19	**Patiala**	42500.59	72474.60	9144.31	28317.21	152436.72	15243.67	137193.04	290318.74	128.70	7010.43	297457.87	9639.34	0.00	216.82
20	**Ropar**	16966.22	13807.89	4270.61	10033.90	45078.62	4507.86	40570.76	44000.27	1093.78	2531.64	47625.69	3481.00	7896.77	117.39
21	**Sangrur**	39219.62	81155.14	8857.52	30865.59	160097.86	16009.79	144088.08	368502.31	0.00	6128.98	374631.29	8427.35	0.00	260.00
22	**Tarn Taran**	26388.23	75249.29	7099.81	31359.75	140097.09	14009.71	126087.38	188607.13	37.16	4149.62	192793.91	5705.72	0.00	152.91
	Total (Ham)	**554218.34**	**1182854.12**	**131014.21**	**524991.78**	**2393078.45**	**234580.98**	**2158497.47**	**3456464.39**	**20386.19**	**101385.18**	**3578235.76**	**140746.95**	**108919.84**	**165.77**
	Total (Bcm)	**5.54**	**11.83**	**1.31**	**5.25**	**23.93**	**2.35**	**21.58**	**34.56**	**0.20**	**1.01**	**35.78**	**1.41**	**1.09**	**165.77**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
RAJASTHAN															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Ajmer	31499.64	1909.99	0.00	6165.97	39575.60	3642.12	35933.48	48623.83		4978.53	53602.36	6721.01	0.00	149.17
2	Alwar	67625.60	2334.06	7670.86	6876.18	84506.70	7250.58	77256.12	133272.65	0.00	15523.23	148795.88	20801.13	0.00	192.60
3	Banswara	11442.43	671.59	0.00	8804.14	20918.16	1963.99	18954.16	8478.74	0.00	2047.09	10525.83	2776.19	7699.23	55.53
4	Baran	36016.40	3343.56	0.00	14570.65	53930.61	5096.20	48834.41	52215.36	0.00	5754.77	57970.13	10087.08	5458.80	118.71
5	Barmer	26062.15	848.48	1095.32	2337.67	30343.62	2752.42	27591.20	29153.67	0.00	5130.98	34284.65	6926.82	1111.73	124.26
6	Bharatpur	35548.66	2103.91	1707.37	6165.18	45525.13	3891.52	41633.61	42957.44	0.00	6946.86	49904.30	9164.32	0.00	119.87
7	Bhilwara	46128.14	3370.82	0.00	10712.12	60211.07	5848.11	54362.96	71234.43	0.00	4140.45	75374.88	5589.60	0.00	138.65
8	Bikaner	25309.35	238.29	0.00	1056.16	26603.80	2505.27	24098.53	33254.17	0.00	7780.14	41034.31	10097.11	3056.66	170.28
9	Bundi	25607.90	3117.63	0.00	23490.04	52215.57	4842.20	47373.38	37377.47	0.00	2621.85	39999.33	3539.50	11977.46	84.43
10	Chittaurgarh	44079.09	2881.40	0.00	10838.87	57799.35	5321.41	52477.94	71489.31	0.00	1557.33	73046.64	2102.40	0.00	139.19
11	Churu	12074.34	35.25	402.37	105.74	12617.69	1048.81	11568.89	10251.14	0.00	2507.38	12758.51	3359.88	1700.28	110.28
12	Dausa	22053.97	1096.58	339.45	2170.75	25660.74	2538.02	23122.73	38362.34	0.00	2442.62	40804.96	3586.91	0.00	176.47
13	Dhaulpur	19953.14	1250.76	507.45	5118.52	26829.87	2470.97	24358.90	27560.32	0.00	2977.89	30538.21	4020.15	915.27	125.37
14	Dungarpur	8885.85	850.45	0.00	5171.62	14907.91	1441.49	13466.43	8043.55	0.00	803.94	8847.49	1085.32	4337.56	65.70
15	Ganganagar	2210.84	19189.90	675.73	23394.56	45471.02	4547.10	40923.91	15048.98		701.40	15750.38	946.89	24928.04	38.49
16	Hanumangarh	2558.60	7812.14	644.97	10004.22	21019.92	1972.46	19047.46	11596.72	0.00	804.30	12401.02	1092.42	6364.93	65.11
17	Jaipur	67725.26	2528.05	2717.35	6459.00	79429.66	7460.03	71969.62	127627.58	0.00	30581.96	158209.54	41285.64	0.00	219.83
18	Jaisalmer	6675.67	20.93	0.00	67.65	6764.24	676.42	6087.82	15320.95	0.00	2507.25	17828.21	3384.79	0.00	292.85
19	Jalor	41635.13	1163.35	0.00	10449.12	53247.59	5215.00	48032.59	80857.75	0.00	4419.60	85277.35	5966.46	1226.27	177.54
20	Jhalawar	42154.25	2887.02	0.00	10237.03	55278.30	4142.54	51135.76	48876.38	0.00	2379.16	51255.53	3211.86	3106.90	100.23
21	Jhunjhunun	19229.72	399.90	1797.73	1605.89	23033.23	2248.00	20785.24	36766.57	0.00	8484.85	45251.41	11454.55	0.00	217.71
22	Jodhpur	41757.40	455.46	343.58	1398.79	43955.22	4245.17	39710.05	71755.44	0.00	15050.92	86806.36	20318.74	2908.99	218.60
23	Karauli	35541.37	1124.88	0.00	3034.51	39700.76	3852.35	35848.41	51625.62	0.00	5115.96	56741.58	6855.39	202.68	158.28
24	Kota	28567.82	5750.88	704.84	22295.64	57319.18	5582.10	51737.08	46949.05	0.00	6564.63	53513.68	8862.25	3723.78	103.43
25	Nagaur	51135.16	304.20	4927.39	987.86	57354.61	5212.12	52142.49	86573.31	0.00	14578.75	101152.06	19681.32	631.27	193.99
26	Pali	42904.89	1150.86	0.00	5741.24	49796.99	4240.12	45556.86	54088.68	0.00	3093.54	57182.22	4176.28	1022.26	125.52
27	Pratapgarh	14691.60	1405.81	0.00	4566.11	20663.52	1490.84	19172.68	22976.94	0.00	519.51	23496.45	701.34	886.18	122.55
28	Rajsamand	8162.25	681.32	126.20	2268.41	11238.18	1123.82	10114.36	10550.75	0.00	1727.95	12278.70	2332.73	0.00	121.40
29	Sawai Madhopur	40235.26	1850.13	0.00	6918.79	49004.17	4021.59	44982.58	49878.33	0.00	10646.89	60525.22	14266.83	0.00	134.55
30	Sikar	27738.92	859.39	802.04	1591.48	30991.84	3099.18	27892.65	41094.91	0.00	8435.53	49530.44	17380.95	342.71	177.58
31	Sirohi	30948.50	938.03	0.00	2837.73	34724.26	3062.64	31661.61	31618.65	0.00	1387.52	33006.17	1873.15	1618.03	104.25
32	Tonk	31072.29	3525.37	0.00	11588.52	46186.17	4440.55	41745.62	31884.16		7598.61	39482.76	10258.12	2833.47	94.58
33	Udaipur	26718.64	2380.40	0.00	14613.91	43712.96	4371.30	39341.66	37258.03	0.00	2616.28	39874.31	3531.98	1960.28	101.35
	Total (Ham)	**973950.21**	**78480.77**	**24462.65**	**243644.04**	**1320537.67**	**121616.44**	**1198921.22**	**1484623.21**	**0.00**	**192427.64**	**1677050.85**	**267439.09**	**88012.77**	**139.88**
	Total (Bcm)	**9.74**	**0.78**	**0.24**	**2.44**	**13.21**	**1.22**	**11.99**	**14.85**	**0.00**	**1.92**	**16.77**	**2.67**	**0.88**	**139.88**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
SIKKIM															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	**East District**	71313.41	0.00	4524.55	0.00	75837.96	30790.93	45047.03	0.00	45.74	0.00	45.74	653.35	44347.94	0.10
2	**South District**	45058.07	0.00	1682.41	0.00	46740.48	39378.77	7361.71	0.00	41.66	0.00	41.66	340.83	6979.22	0.57
3	**North District**	331775.32	0.00	34351.31	0.00	366126.63	287162.64	78963.99	0.00	0.00	0.00	0.00	100.70	78863.29	0.00
4	**West District**	72113.99	0.00	2397.69	0.00	74511.68	53657.27	20854.41	0.00	0.00	0.00	0.00	316.58	20537.83	0.00
	Total (Ham)	**520260.79**	**0.00**	**42955.96**	**0.00**	**563216.75**	**410989.61**	**152227.14**	**0.00**	**87.40**	**0.00**	**87.40**	**1411.46**	**150728.28**	**0.06**
	Total (Bcm)	**5.20**	**0.00**	**0.43**	**0.00**	**5.63**	**4.11**	**1.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**1.51**	**0.06**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017														
TAMIL NADU														
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction			Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial & Domestic 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	Ariyalur	21412.45	14301.91	3331.68	3348.16	42394.20	4239.42	38154.78	14306.59	2217.80	16524.39	2301.58	21546.61	43.31
2	Chennai	1273.77	0.00	88.28	478.26	1840.30	184.03	1656.27	0.00	2846.77	2846.77	3045.47	0.00	171.88
3	Coimbatore	15816.23	8600.94	6099.50	10118.32	40634.99	4063.50	36571.49	39432.61	5130.64	44563.24	5695.00	1818.67	121.85
4	Cuddalore	35024.19	97664.60	23046.50	5592.14	161327.42	16132.72	145194.70	55604.58	34020.92	89625.49	34392.54	60231.30	61.73
5	Dharmapuri	15368.45	15549.58	3890.10	6721.86	41529.99	4153.00	37376.99	43580.17	3476.56	47056.73	3951.46	3028.70	125.90
6	Dindigul	33754.04	9327.61	6748.23	14171.97	64001.84	6400.18	57601.66	61201.69	2490.36	63692.05	3004.35	10121.92	110.57
7	Erode	17300.28	40945.99	5017.08	6502.14	69765.49	6976.55	62788.94	56158.22	6029.53	62187.75	6446.14	8914.94	99.04
8	Kancheepuram	30288.74	55675.46	3524.15	12997.15	102485.50	10248.55	92236.95	56417.67	5083.98	61501.65	7080.30	31540.05	66.68
9	Kanyakumari	6682.62	12810.25	3047.84	3672.53	26213.24	2621.32	23591.92	3915.99	2098.06	6014.04	2668.04	17007.89	25.49
10	Karur	13721.53	10111.86	4133.44	3057.12	31023.95	3102.40	27921.56	27539.31	1040.44	28579.75	1197.13	4896.65	102.36
11	Krishnagiri	18201.41	13828.39	4656.50	5092.15	41778.46	4177.85	37600.61	32871.87	11426.85	44298.71	12989.94	5320.71	117.81
12	Madurai	20879.13	31368.31	4475.96	9738.96	66462.36	6646.24	59816.12	37941.26	3751.80	41693.06	4469.30	19842.05	69.70
13	Nagapattinam	5545.46	4985.93	802.51	1258.72	12592.62	1259.26	11333.36	14444.18	959.81	15403.98	1042.72	754.01	135.92
14	Namakkal	16501.84	14044.08	3687.04	5304.19	39537.15	3953.71	35583.43	45909.19	2194.58	48103.77	2394.94	3343.65	135.19
15	Nilgiris	7297.01	396.10	1787.14	133.70	9613.95	961.39	8652.55	572.00	533.38	1105.38	599.48	7481.07	12.78
16	Peramabalur	11153.76	7937.70	2012.68	2836.08	23940.22	2394.02	21546.19	24784.28	1166.93	25951.21	1266.50	2442.55	120.44
17	Pudukottai	38901.85	39725.65	8591.77	15230.75	102450.02	10245.00	92205.01	41329.75	1842.09	43171.84	2029.05	48846.22	46.82
18	Ramanathapuram	18818.43	30060.23	4557.26	8083.32	61519.25	6151.92	55367.32	5741.16	1403.53	7144.69	1671.89	47954.27	12.90
19	Salem	25606.71	14413.06	4957.48	9810.88	54788.13	5478.81	49309.32	67012.62	4858.81	71871.43	6533.46	4144.87	145.76
20	Sivagangai	26822.90	50315.45	4798.92	17586.28	99523.56	9952.36	89571.20	14856.57	1415.74	16272.31	1701.49	73013.15	18.17
21	Thanjavur	32171.27	35411.26	5325.10	9286.96	82194.59	8219.46	73975.13	78884.05	2407.42	81291.47	2642.72	6711.20	109.89
22	Theni	13005.96	14074.61	8006.47	8202.44	43289.49	4328.94	38960.55	28293.80	754.21	29048.01	898.47	10145.94	74.56
23	Thiruppur	19872.46	11392.70	6161.40	9803.14	47229.70	4722.97	42506.73	47882.48	3326.15	51208.63	3612.97	1886.65	120.49
24	Thiruvallur	23141.54	63181.84	2168.28	2429.30	90920.97	9092.10	81828.87	32107.97	24935.31	57043.28	25825.33	27100.09	69.71
25	Thoothukudi	20284.35	22351.34	5735.75	6654.35	55025.79	5502.58	49523.21	19781.45	1528.97	21310.42	1878.34	28938.53	43.03
26	Tirunelveli	29814.35	57379.94	9243.99	7563.91	104002.19	10400.22	93601.97	58482.78	2005.54	60488.31	2384.02	40445.45	64.62
27	Tiruvannamalai	36683.60	66936.05	4754.19	4419.76	112793.60	11279.36	101514.24	102551.85	10053.18	112605.02	11426.44	3654.01	110.93
28	Tiruvarur	9135.19	12168.10	1219.51	5641.15	28163.95	2816.39	25347.55	21088.85	1283.63	22372.48	1376.07	5801.64	88.26
29	Trichy	24011.32	34460.28	4465.68	5802.74	68740.03	6874.00	61866.02	48016.29	7393.62	55409.92	7636.94	17031.14	89.56
30	Vellore	24609.67	25744.61	7427.74	4897.06	62679.08	6267.91	56411.17	53587.85	12860.05	66447.90	14528.10	5438.81	117.79
31	Villupuram	29872.61	106907.54	28146.37	10725.46	175651.98	17565.20	158086.78	139172.92	5012.25	144185.17	5690.54	26278.65	91.21
32	Viruthunagar	23544.70	18698.96	6935.56	9119.20	58298.42	5829.84	52468.58	32267.95	1893.62	34161.57	2372.19	20007.23	65.11
	Total (Ham)	**666517.80**	**940770.37**	**188844.08**	**226280.18**	**2022412.43**	**202241.22**	**1820171.21**	**1305737.92**	**167442.51**	**1473180.43**	**184752.88**	**565688.59**	**80.94**
	Total (Bcm)	**6.67**	**9.41**	**1.89**	**2.26**	**20.22**	**2.02**	**18.20**	**13.06**	**1.67**	**14.73**	**1.85**	**5.66**	**80.94**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017														
TELANGANA														
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction			Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial & Domestic 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	Adilabad	19190.11	1727.33	4064.27	3940.11	28921.82	2649.94	26271.88	13717.99	2896.41	16614.32	3761.00	9151.28	63.24
2	Bhadradri Kothagudem	57693.51	2365.17	16717.87	4993.12	81769.67	7711.91	74057.76	16405.40	3529.38	19934.44	4199.98	53451.64	26.92
3	Hyderabad	911.96	1672.36	352.13	1672.36	4608.79	460.88	4147.91	0.00	14164.39	14164.39	25834.22	0.00	341.48
4	Jagtial	20699.16	7780.69	4835.11	13689.23	47004.19	4630.36	42373.83	26861.89	4360.86	31222.75	5525.35	12204.45	73.68
5	Jangaon	18871.46	2499.81	4994.81	6614.92	32980.99	2886.10	30094.90	25735.52	2052.77	27792.83	2053.15	2586.98	92.35
6	Jayashankar Bhupalapally	37709.62	7514.73	6131.88	13431.64	64787.87	5757.04	59030.83	29076.75	2014.56	31091.30	2825.46	27418.25	52.67
7	Jogulamba Gadwal	12506.76	1804.72	4126.24	2435.65	20873.38	2086.63	18786.74	8141.88	527.12	8669.00	1211.40	9433.47	46.14
8	Kamareddy	26524.00	6584.00	7155.00	10673.00	50936.00	4300.00	46636.00	34151.00	1842.00	35993.00	3316.00	9169.00	77.18
9	Karimnagar	16981.22	3248.98	3756.82	12725.44	36712.47	3552.07	33160.40	22993.35	1972.42	24965.77	3374.54	7124.14	75.29
10	Khammam	38183.81	4736.40	10959.93	10349.66	64229.79	5343.77	58886.02	34172.06	3942.95	38115.01	5015.00	21943.88	64.73
11	Komarambhem Asifabad	31819.00	703.00	1596.00	1261.00	35379.00	3027.00	32352.00	5321.00	2016.00	7337.00	2337.00	24694.00	22.68
12	Mahabubabad	22106.49	5422.60	6112.54	9853.63	43495.26	3412.90	40081.36	26071.31	2814.34	28885.65	3409.35	11062.07	72.07
13	Mahabubnagar	28664.00	5198.00	9113.00	9060.00	52035.00	4727.00	47307.00	28684.00	3633.00	32317.00	4214.00	14472.00	68.31
14	Mancherial	38003.60	6021.23	6086.12	8819.81	58930.76	5350.18	53580.95	20352.31	1629.29	21981.60	2622.65	30605.99	41.03
15	Medak	24610.00	4758.00	3688.00	9799.00	42855.00	4284.00	38571.00	23699.00	909.00	24608.00	2791.00	12078.00	63.80
16	Medchal Malkajgiri	5263.44	487.64	1814.98	1048.73	8614.78	861.00	7753.01	2772.21	4514.07	7286.00	4968.00	882.52	93.98
17	Nagarkurnool	32450.00	2887.51	12322.79	5996.66	53656.96	5365.70	48291.26	27430.42	4394.34	31824.76	5098.42	15762.08	65.90
18	Nalgonda	38917.00	8964.00	11369.00	23833.00	83083.00	7759.00	75324.00	49929.00	5991.00	55920.00	7981.00	19150.00	74.24
19	Nirmal	33194.00	7171.00	5800.00	9517.00	55682.00	5213.00	50469.00	16670.00	2048.00	18718.00	2273.00	31524.00	37.09
20	Nizamabad	34984.00	13276.00	8087.00	26037.00	82384.00	7492.00	74892.00	51289.00	5207.00	56495.00	6039.00	18336.00	75.44
21	Peddapalli	19081.14	5680.07	3848.87	15341.78	43951.86	4002.66	39949.20	19149.09	1715.06	20864.15	2863.19	17936.80	52.23
22	Rajanna Sircilla	14713.49	2454.05	3796.08	5348.50	26312.12	1987.90	24324.21	18435.91	1561.93	19997.84	1880.77	4584.19	82.21
23	Rangareddy	24084.67	3480.65	8830.46	5512.78	41908.57	3920.97	37987.60	25165.12	5715.91	30881.04	6601.16	6309.26	81.29
24	Sangareddy	27589.54	3488.21	5755.72	5366.92	42200.39	4129.27	38071.12	23411.78	3464.26	26876.41	5886.81	10038.84	70.60
25	Siddipet	24946.64	7302.23	6758.71	12670.00	51677.58	5167.56	46510.02	39812.83	3795.41	43608.24	4271.95	3291.51	93.76
26	Suryapet	21026.47	9794.01	7303.85	16665.05	54789.38	4893.00	49896.38	27842.01	2726.72	30568.73	4321.70	17901.49	61.26
27	Vikarabad	23528.00	2169.00	5951.00	4624.00	36272.00	3203.00	33069.00	15629.00	2995.00	18624.00	3745.00	13695.00	56.32
28	Wanaparthy	10459.02	2539.45	2335.44	3549.01	18882.92	1682.49	17200.43	10013.16	1522.52	11535.68	2063.24	5123.99	67.07
29	Warangal Rural	16327.79	4593.01	4491.13	10125.37	35537.30	3519.79	32017.51	25537.90	2046.24	27584.14	2884.13	4849.78	86.15
30	Warangal Urban	12206.00	2615.00	2666.00	4802.00	22289.00	2122.00	20167.00	17145.00	1195.00	18340.00	2276.00	3373.00	90.94
31	Yadadri Bhongiri	22949.72	2663.52	7044.47	6477.54	39135.24	3685.00	35450.24	23742.00	2838.00	26580.00	3801.00	7907.24	74.98
	Total (Ham)	**756195.62**	**141602.36**	**187865.22**	**276233.89**	**1361897.09**	**125184.12**	**1236710.57**	**709357.88**	**100034.94**	**809396.03**	**139444.47**	**426060.85**	**65.45**
	Total (Bcm)	**7.56**	**1.42**	**1.88**	**2.76**	**13.62**	**1.25**	**12.37**	**7.09**	**1.00**	**8.09**	**1.39**	**4.26**	**65.45**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
TRIPURA															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Dhalai	11265.37	656.58	8257.26	3331.22	23510.43	5925.81	17584.62	40.80	0.00	847.78	888.58	1307.60	16236.22	5.05
2	Gomati	11739.85	1072.32	5836.87	4345.33	22994.37	2846.00	20148.37	84.61	0.06	828.92	913.59	1172.97	18890.73	4.53
3	Khowai	7584.64	789.87	2548.52	2894.72	13817.75	3003.28	10814.47	306.60	0.00	611.84	918.44	819.27	9688.60	8.49
4	North Tripura	6316.06	561.53	4871.52	2380.68	14129.79	3310.93	10818.86	32.40	0.06	909.44	941.90	1339.77	9446.63	8.71
5	Sepahijala	11043.65	872.91	5144.18	3548.44	20609.18	3817.43	16791.75	704.05	0.00	950.89	1654.94	1296.91	14790.79	9.86
6	South Tripura	12231.78	889.75	5538.72	3604.37	22264.62	4165.75	18098.87	172.07	0.00	876.34	1048.41	1202.16	16724.65	5.79
7	Unakoti	6787.36	629.70	4257.61	2520.58	14195.25	1526.87	12668.38	4.81	0.00	606.38	611.19	887.30	11776.27	4.82
8	West Tripura	13198.11	861.61	3559.33	3427.93	21046.98	4081.06	16965.92	624.28	0.48	2157.43	2782.19	2645.70	13695.47	16.40
	Total (Ham)	**80166.82**	**6334.27**	**40014.01**	**26053.27**	**152568.37**	**28677.13**	**123891.24**	**1969.61**	**0.60**	**7789.03**	**9759.24**	**10671.68**	**111249.35**	**7.88**
	Total (Bcm)	**0.802**	**0.063**	**0.400**	**0.261**	**1.526**	**0.287**	**1.239**	**0.020**	**0.000006**	**0.078**	**0.098**	**0.107**	**1.112**	**7.88**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017														
UTTAR PRADESH														
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction			Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic & Industrial	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**	54040.98	13500.60	809.86	22875.05	91226.49	6467.99	84758.50	83464.26	7654.20	91118.45	8902.22	8384.66	107.50
2	**Aligarh**	49646.35	12936.07	3085.12	29753.61	95421.14	6396.63	89024.52	51082.36	10220.91	61303.27	13875.03	29381.42	68.86
3	**Ambedkar Nagar**	48480.20	12412.10	387.88	18042.08	79322.26	4619.93	74702.33	50783.94	5534.13	56318.07	7389.75	16528.64	75.39
4	**Amethi**	29779.26	20034.79	891.89	29588.60	80294.55	5204.18	75090.37	43561.74	4437.78	47999.52	5194.13	26334.50	63.92
5	**Amroha**	30025.02	6680.28	2016.91	11091.14	49813.35	2776.32	47037.04	44832.01	4357.04	49189.05	5114.79	2671.09	104.58
6	**Auraiya**	32681.61	11385.11	1414.93	23369.73	68851.38	5566.88	63284.49	28326.20	3224.37	31550.57	3546.75	31411.54	49.86
7	**Ayodhya**	43945.30	16505.28	715.75	30284.05	91450.38	5150.42	86299.96	50701.60	6328.90	57030.50	7661.81	27936.56	66.08
8	**Azamgarh**	74575.42	22270.91	0.00	31798.42	128644.75	6934.91	121709.84	66875.61	12123.66	78999.27	14560.07	40274.16	64.91
9	**Bagpat**	16241.39	7858.98	1222.67	14685.75	40008.80	2235.25	37773.55	32572.10	2495.67	35067.77	3131.67	3767.36	92.84
10	**Bahraich**	80478.62	14509.37	3863.07	21937.47	120788.53	6343.65	114444.88	51267.29	8747.66	60014.95	10318.62	52858.97	52.44
11	**Ballia**	56154.46	12408.07	547.50	19042.18	88152.21	4729.25	83422.96	45675.11	7339.63	53014.74	8646.49	29101.36	63.55
12	**Balrampur**	59960.60	14533.09	6223.69	19507.38	100224.75	9685.95	90538.81	40778.51	5488.45	46266.96	6617.41	43142.89	51.10
13	**Banda**	48688.53	5720.51	519.79	8403.06	63331.90	3723.39	59608.51	36116.28	4037.47	40153.75	6187.92	17304.30	67.36
14	**Barabanki**	65704.92	37408.10	1657.39	73843.30	178613.71	13230.14	165383.56	101396.20	8130.32	109526.52	9530.21	54457.15	66.23
15	**Bareilly**	85842.96	16070.04	3116.14	30261.75	135290.89	7770.41	127520.48	71803.57	13565.18	85368.75	15900.71	43777.07	66.95
16	**Basti**	60193.08	5353.54	829.30	9014.97	75390.88	3769.54	71621.34	41045.45	5990.56	47036.01	6821.05	23754.84	65.67
17	**Bijnor**	86091.85	18620.56	6117.09	33226.83	144056.32	7705.56	136350.76	86514.45	7299.21	93813.66	8279.00	42652.39	68.80
18	**Budaun**	61235.00	5039.39	967.46	11959.10	79200.95	5245.54	73955.42	52041.70	7754.47	59796.17	9007.92	14540.14	80.85
19	**Bulandshahar**	48917.70	40862.05	2414.01	76782.00	168975.76	10663.29	158312.47	135089.69	6574.67	141664.36	8780.00	21867.06	89.48
20	**Chandauli**	32876.62	11624.68	0.00	14344.80	58846.10	5765.05	53081.05	22462.29	4283.15	26745.44	4856.29	25762.47	50.39
21	**Chitrakoot**	29037.47	3969.77	305.35	5832.29	39144.88	2492.10	36652.78	27475.14	2502.40	29977.54	3974.90	5202.74	81.79
22	**Deoria**	50234.50	10512.42	1529.91	14509.80	76786.62	4107.09	72679.53	39430.31	7668.38	47098.68	9055.26	24193.96	64.80
23	**Etah**	32988.78	9078.99	1477.22	17169.87	60714.87	3525.41	57189.46	41770.55	4283.97	46054.52	4814.22	10604.68	80.53
24	**Etawah**	40920.99	16268.42	985.43	29692.86	87867.70	8786.77	79080.93	27552.56	3215.51	30768.07	3679.42	47848.95	38.91
25	**Farrukhabad**	37290.70	5536.22	1221.68	10814.67	54863.27	4253.80	50609.47	34226.52	3809.61	38036.13	4410.24	11972.71	75.16
26	**Fatehpur**	92381.39	32131.29	3736.63	32809.47	161058.78	12554.02	148504.76	97567.50	6615.37	104182.87	7821.05	43823.48	70.15
27	**Firozabad**	38143.78	11166.01	4737.44	21617.06	75664.29	5033.31	70630.98	72524.96	6154.17	78679.13	7084.82	9227.10	111.39
28	**G.B.Nagar**	18927.78	16996.04	3062.92	26117.45	65104.18	4557.63	60546.55	62501.84	3893.42	66395.26	4455.13	1646.99	109.66
29	**Ghaziabad**	15248.13	9630.54	1078.71	15185.93	41143.30	4114.33	37028.97	35693.32	11837.44	47530.76	17469.88	1339.60	128.36
30	**Ghazipur**	65387.57	15562.32	959.92	16217.30	98127.11	6985.21	91141.91	50062.00	8272.48	58334.48	9550.87	31529.04	64.00
31	**Gonda**	61820.53	12589.33	2545.99	18645.26	95601.11	5270.70	90330.41	47157.64	8722.89	55880.53	10452.51	32720.27	61.86
32	**Gorakhpur**	85839.68	9482.40	2119.44	14705.26	112146.78	7430.63	104716.15	56120.27	10870.09	66990.36	12468.71	36127.16	63.97
33	**Hamirpur**	34762.18	4275.54	0.00	6166.73	45204.45	2260.22	42944.22	28369.07	2571.54	30940.61	3056.95	11518.21	72.05
34	**Hapur**	15797.11	10369.85	1372.92	20650.31	48190.18	2409.51	45780.67	45976.10	3165.06	49141.16	4189.00	1300.77	107.34
35	**Hardoi**	103582.92	28853.47	5035.70	47625.88	185097.97	13817.64	171280.33	95005.91	8745.11	103751.02	10082.00	66192.41	60.57
36	**Hathras**	25389.59	11542.18	579.04	21193.24	58704.04	3593.87	55110.17	52158.42	3773.39	55931.81	4236.67	6492.45	101.49
37	**Jalaun**	75624.25	11964.17	949.24	24573.13	113110.78	7027.97	106082.82	48282.60	4039.72	52322.32	5440.99	52359.23	49.32
38	**Jaunpur**	80060.78	25142.16	0.00	56046.01	161248.95	15679.17	145569.78	99366.93	12067.34	111434.27	14055.40	35310.72	76.55
39	**Jhansi**	47087.90	18944.73	0.00	23355.00	89387.63	4479.33	84908.30	39230.56	2926.59	42157.15	3462.67	42215.07	49.65
40	**Kannauj**	36390.39	10045.28	1667.91	22843.22	70946.80	5138.59	65808.21	39762.58	4021.25	43783.83	4637.87	26764.71	66.53
41	**Kanpur Dehat**	56928.14	14283.85	461.52	24834.55	96508.06	7425.01	89083.05	58668.52	3995.08	62663.60	4372.33	26042.20	70.34
42	**Kanpur Nagar**	48539.34	13425.34	2018.08	27006.71	90989.47	5973.91	85015.55	59126.97	8238.31	67365.28	8984.33	18108.75	79.24

UTTAR PRADESH														
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction			Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic & Industrial	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
43	Kasganj	30332.49	11877.15	1631.70	17712.82	61554.16	3077.71	58476.45	38406.88	3611.03	42017.91	4261.66	15807.90	71.85
44	Kaushambi	37628.32	8930.82	5491.85	12541.28	64592.28	5445.63	59146.64	38065.54	4033.64	42099.18	4891.06	16554.35	71.18
45	Kushi Nagar	69847.29	29979.00	2246.95	38474.33	140547.58	9438.99	131108.59	60855.26	16997.71	77852.97	20279.44	49973.88	59.38
46	Lakhimpur Kheri	139297.98	25337.79	22814.20	53109.61	240559.58	16632.83	223926.75	115738.38	10605.16	126343.54	13291.22	94897.16	56.42
47	Lalitpur	20245.42	4333.01	0.00	17547.65	42126.08	2106.30	40019.77	28703.37	2645.49	31348.86	5020.88	6295.53	78.33
48	Lucknow	35678.01	16942.95	1198.57	26052.81	79872.34	4296.48	75575.86	35690.03	13691.67	49381.70	16863.07	29458.24	65.34
49	Mahoba	10378.64	5221.63	0.00	7286.19	22886.46	1144.32	21742.14	17674.50	1409.29	19083.79	1916.53	2934.78	87.77
50	Mahrajganj	56512.35	19830.46	1979.00	23500.74	101822.55	5091.13	96731.42	53160.56	6069.70	59230.26	7219.85	36351.01	61.23
51	Mainpuri	37500.81	18600.70	1109.04	33584.54	90795.09	4539.75	86255.34	55983.23	4191.23	60174.46	4724.41	27738.59	69.76
52	Mathura	43531.96	25865.59	769.69	41557.73	111724.97	6572.33	105152.63	75651.09	5911.71	81562.80	6892.32	26381.65	77.57
53	Maunath Bhanjan	33104.83	7683.02	6223.69	11449.11	58460.65	5477.55	52983.09	27563.71	5657.89	33221.60	6881.18	18538.21	62.70
54	Meerut	39395.08	12913.37	2877.38	21237.38	76423.22	4494.87	71928.34	49980.17	10448.40	60428.57	11895.54	15185.07	84.01
55	Mirzapur	27948.05	11501.73	58.07	14951.43	54459.28	4403.71	50055.58	24703.63	6083.17	30786.80	7051.49	18300.46	61.51
56	Moradabad	40768.81	10703.75	1858.61	16881.30	70212.48	4595.32	65617.15	48160.81	10462.85	58623.66	14277.47	8496.81	89.34
57	Muzaffarnagar	42952.08	25623.77	3128.12	41464.84	113168.80	5658.44	107510.36	70542.00	6353.51	76895.51	7184.12	30817.63	71.52
58	Pilibhit	86262.48	16574.21	4326.60	26957.77	134121.06	7211.35	126909.71	57893.86	4952.60	62846.46	5642.25	63373.60	49.52
59	Pratapgarh	71211.58	30365.59	0.00	38369.33	139946.50	11253.06	128693.44	95709.82	7554.16	103263.98	8610.04	29417.57	80.24
60	Prayagraj	68331.06	37977.88	1666.59	47373.70	155349.22	9246.46	146102.76	86809.93	15266.54	102076.47	17557.60	43692.61	69.87
61	Raibareli	65473.62	20982.23	1502.33	31971.25	119929.44	7188.30	112741.13	60950.30	6415.82	67366.13	7568.83	44222.00	59.75
62	Rampur	43927.85	11981.93	1837.13	19183.34	76930.24	5555.05	71375.19	48930.24	4711.65	53641.89	5508.35	19063.37	75.15
63	Saharanpur	62214.78	23996.48	5802.52	36712.56	128726.34	8230.50	120495.84	137850.68	6727.41	144578.09	7637.30	6992.94	119.99
64	Sambhal	33845.47	3295.99	2039.10	5272.63	44453.19	2453.85	41999.33	33338.43	5121.15	38459.58	5989.36	3596.46	91.57
65	Sant Kabir Nagar	36822.68	3826.46	320.31	7634.51	48603.96	2430.20	46173.76	23768.03	7443.55	31211.58	11252.39	11153.35	67.60
66	Sant Ravidas Nagar	19703.47	7363.59	0.00	9621.43	36688.49	3442.83	33245.66	24716.29	3737.09	28453.38	4172.98	4356.39	85.59
67	Shahjahanpur	81647.73	14921.22	5091.85	25264.40	126925.20	6346.26	120578.94	65481.86	7660.66	73142.52	9201.28	45895.79	60.66
68	Shamli	19784.03	8115.55	1544.69	13071.07	42515.34	2125.77	40389.58	40899.32	3229.34	44128.66	3622.42	2146.67	109.26
69	Shrawasti	35364.72	5368.75	3827.78	8103.08	52664.33	4804.92	47859.41	24258.46	2860.64	27119.10	3461.23	20139.71	56.66
70	Siddharth Nagar	63433.13	10634.50	1352.15	16432.15	91851.94	4592.60	87259.34	47404.43	6559.72	53964.15	7920.20	31934.71	61.84
71	Sitapur	105889.00	36408.38	4825.94	63271.66	210394.98	13480.70	196914.28	107818.20	10106.98	117925.18	12058.26	77037.82	59.89
72	Sonbhadra	13555.99	6893.95	0.00	4101.13	24551.07	1353.88	23197.19	9190.83	3768.39	12959.22	4545.89	9460.48	55.87
73	Sultanpur	33267.92	37695.56	499.33	50863.87	122326.68	10468.13	111858.56	49392.88	5736.97	55129.85	6597.58	55868.10	49.29
74	Unnao	76364.20	40341.81	0.00	70428.46	187134.46	10440.71	176693.76	100951.63	7760.66	108712.29	9223.46	66518.66	61.53
75	Varanasi	32551.95	7722.67	342.17	13545.34	54162.12	5416.21	48745.91	38544.60	10075.51	48620.11	11156.49	5198.09	99.74
	Total (Ham)	**3772717.56**	**1167315.33**	**159010.82**	**1892952.69**	**6991996.40**	**459916.69**	**6532079.71**	**4089209.58**	**494837.81**	**4584047.39**	**596453.20**	**2036249.37**	**70.18**
	Total (Bcm)	**37.73**	**11.67**	**1.59**	**18.93**	**69.92**	**4.60**	**65.32**	**40.89**	**4.95**	**45.84**	**5.96**	**20.36**	**70.18**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
UTTARAKHAND															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Dehradun	46898.40	4662.73	1655.00	3143.27	56359.40	2818.00	53541.40	7588.50	424.00	6731.00	14743.50	6731.00	38797.90	27.54
2	Haridwar	25973.20	31267.84	4735.00	38362.17	100338.21	5016.00	95322.21	49696.86	6774.04	6828.76	63299.66	6828.76	32022.55	66.41
3	Nainital	5835.00	6026.36	288.00	3310.96	15460.32	773.00	14687.32	4820.00	390.62	3114.36	8324.98	3114.36	6362.34	56.68
4	Udham Singh Nagar	36321.80	51134.86	2339.00	42542.33	132337.99	6616.01	125721.98	68127.42	4957.62	4929.28	78014.32	4929.28	47707.66	62.05
	Total (Ham)	**115028.40**	**93091.79**	**9017.00**	**87358.73**	**304495.92**	**15223.01**	**289272.91**	**130232.78**	**12546.28**	**21603.40**	**164382.46**	**21603.40**	**124890.45**	**56.83**
	Total (Bcm)	**1.15**	**0.93**	**0.09**	**0.87**	**3.04**	**0.15**	**2.89**	**1.30**	**0.13**	**0.22**	**1.64**	**0.22**	**1.25**	**56.83**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2013														
WEST BENGAL														
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction			Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic & Industrial	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	Coochbehar	185334.09	5143.37	60379.13	12100.71	262957.30	26295.71	236661.59	42261.50	4447.27	46708.77	5988.25	188411.84	20
2	Jalpaiguri	228086.62	3939.51	65301.46	12078.29	309405.88	30940.59	278465.29	8241.20	4395.75	12636.95	5908.97	264315.12	5
3	Darjeeling	39186.21	0.00	13052.71	0.00	52238.92	5223.89	47015.03	1169.10	1478.05	2647.15	2012.74	43833.19	6
4	Uttar Dinajpur	91467.43	7541.41	22166.67	24353.83	145529.34	12014.51	133514.83	78133.60	4811.27	82944.87	7569.33	47811.90	62
5	Dakshin Dinajpur	65504.74	6432.72	17257.72	18756.55	107951.73	9115.64	98836.09	50706.00	2618.71	53324.71	3349.33	44780.76	54
6	Malda	96263.27	9181.20	21992.81	23347.70	150784.98	14697.37	136087.61	59108.60	6392.43	65501.03	9828.37	67150.64	48
7	Murshidabad	137803.88	19693.42	38349.83	53252.88	249100.01	23373.65	225726.36	186187.00	10286.71	196473.71	17323.82	22215.54	87
8	Nadia	113617.65	18299.88	43916.37	47699.21	223533.10	18795.48	204737.62	179222.20	8117.25	187339.45	10601.16	14914.26	92
9	North 24-Parganas	105327.29	8147.66	27207.49	25564.50	166246.93	16307.62	149939.31	84524.60	14404.77	98929.37	19035.91	46378.80	66
10	Howrah	18922.39	1114.80	5987.95	6932.33	32957.47	3295.74	29661.73	4970.00	2356.32	7326.32	6038.57	18653.16	25
11	Hooghly	87499.21	6344.07	24032.23	21148.49	139024.00	13902.41	125121.59	54601.80	7171.42	61773.22	10669.27	59850.52	49
12	Burdwan	170643.19	13283.39	42504.98	35214.86	261646.42	24768.66	236877.76	94059.60	9608.01	103667.61	15762.29	127055.87	44
13	Birbhum	83998.75	7628.72	20743.15	16112.27	128482.89	11908.95	116573.94	36191.80	3948.14	40139.94	7780.42	72601.72	34
14	Bankura	98905.53	21562.59	24886.50	32647.44	178002.06	16232.96	161769.10	69980.27	4702.22	74682.48	7362.46	84426.38	46
15	Purulia	53190.45	8011.53	14077.33	4806.45	80085.76	7361.68	72724.08	2232.80	4627.09	6859.89	6411.97	64079.31	9
16	Purba Medinipore	53800.58	1957.01	15434.60	10220.33	81412.52	8141.26	73271.26	21562.40	3047.88	24610.28	4341.44	47367.42	34
17	Paschim Medinipore	241691.73	12698.55	68840.05	40624.33	363854.66	34991.16	328863.50	110919.60	7943.15	118862.75	12907.78	205036.12	36
	Total (ham)	**1871243.01**	**150979.82**	**526130.98**	**384860.18**	**2933213.98**	**277367.28**	**2655846.70**	**1084072.07**	**100356.44**	**1184428.50**	**152892.08**	**1418882.56**	**45**
	Total (bcm)	**18.71**	**1.51**	**5.26**	**3.85**	**29.33**	**2.77**	**26.56**	**10.84**	**1.00**	**11.84**	**1.53**	**14.19**	**45**

***Note**

The Ground water Resources Estimation 2013 (calculated using GEC 1997 Methodology) has been considered in case of West Bengal

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
ANDAMAN & NICOBAR ISLANDS															
S. No.	Islands	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	North & Middle Andaman	9776.60	9.51	110.31	2.38	9898.80	989.88	8908.92	0.80	83.04	229.86	313.70	275.56	8549.52	3.52
2	Nicobar	16851.09	0.65	1500.12	0.16	18352.03	1835.20	16516.83	0.44	28.88	80.20	109.52	96.15	16391.36	0.66
3	South Andaman	8365.75	9.39	213.51	2.35	8591.00	859.10	7731.90	13.54	188.23	283.18	484.95	339.49	7190.64	6.27
	Total (Ham)	**34993.45**	**19.56**	**1823.94**	**4.89**	**36841.83**	**3684.18**	**33157.65**	**14.79**	**300.14**	**593.25**	**908.18**	**711.20**	**32131.52**	**2.74**
	Total (Bcm)	**0.350**	**0.000**	**0.018**	**0.000**	**0.368**	**0.037**	**0.332**	**0.000**	**0.003**	**0.006**	**0.009**	**0.007**	**0.321**	**2.739**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
UT OF CHANDIGARH															
S. No.	Union Territory	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	UT of Chandigarh	1631	687	488	1410	4216	422	3794	58	0	3320	3378	3320	416	89
	Total (Ham)	**1631**	**687**	**488**	**1410**	**4216**	**422**	**3794**	**58**	**0**	**3320**	**3378**	**3320**	**416**	**89**
	Total (Bcm)	**0.01631**	**0.00687**	**0.00488**	**0.0141**	**0.04216**	**0.00422**	**0.03794**	**0.00058**	**0**	**0.0332**	**0.03378**	**0.0332**	**0.00416**	**89**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
UT OF DADRA & NAGAR HAVELI															
S. No.	Union Territory	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Dadra & Nagar Haveli	5737.20	137.57	330.00	656.82	6861.59	343.00	6518.59	750.46	0.00	1292.40	2042.86	1292.40	4475.73	31.34
	Total (Ham)	**5737.20**	**137.57**	**330.00**	**656.82**	**6861.59**	**343.00**	**6518.59**	**750.46**	**0.00**	**1292.40**	**2042.86**	**1292.40**	**4475.73**	**31.34**
	Total (Bcm)	**0.057**	**0.001**	**0.003**	**0.007**	**0.069**	**0.003**	**0.065**	**0.008**	**0.000**	**0.013**	**0.020**	**0.013**	**0.045**	**31.34**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
UT OF DAMAN & DIU															
S. No.	District	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Daman	1172.00	38.00	0.00	94.00	1304.00	65.00	1239.00	402.00	35.00	198.00	635.00	322.00	480.00	51.25
2	Diu	412.00	20.00	0.00	39.00	471.00	47.00	424.00	327.00	9.00	50.00	386.00	82.00	6.00	91.04
	Total (Ham)	**1584.00**	**58.00**	**0.00**	**133.00**	**1775.00**	**112.00**	**1663.00**	**729.00**	**44.00**	**248.00**	**1021.00**	**404.00**	**486.00**	**61.40**
	Total (Bcm)	**0.01584**	**0.00058**	**0**	**0.00133**	**0.01775**	**0.00112**	**0.01663**	**0.00729**	**0.00044**	**0.00248**	**0.01021**	**0.00404**	**0.00486**	**61.40**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017															
LAKSHADWEEP															
S. No.	Islands	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction				Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Industrial	Domestic	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	Agatti	93.30	0.00	16.90	0.00	110.20	73.40	36.80	0.00	0.00	27.10	27.10	27.10	9.70	73.64
2	Amini	89.10	0.00	16.20	0.00	105.30	69.90	35.40	0.00	0.00	28.70	28.70	28.70	6.80	81.07
3	Androth	166.50	0.00	30.20	0.00	196.70	131.90	64.80	0.00	0.00	41.90	41.90	41.90	22.90	64.66
4	Chetlat	35.80	0.00	6.50	0.00	42.30	28.20	14.10	0.00	0.00	8.70	8.70	8.70	5.40	61.70
5	Kadmat	107.30	0.00	19.50	0.00	126.80	84.50	42.30	0.00	0.00	19.80	19.80	19.80	22.60	46.81
6	Kalpeni	78.50	0.00	14.20	0.00	92.70	61.80	30.90	0.00	0.00	16.40	16.40	16.40	14.50	53.07
7	Kiltan	56.10	0.00	10.20	0.00	66.30	43.80	22.50	0.00	0.00	15.10	15.10	15.10	7.40	67.11
8	Kavaratti	124.90	0.00	22.70	0.00	147.60	97.30	50.30	0.00	0.00	41.80	41.80	41.80	8.50	83.10
9	Minicoy	157.60	0.00	27.30	0.00	184.90	121.20	63.70	0.00	0.00	38.60	38.60	38.60	25.01	60.60
	Total (Ham)	**909.10**	**0.00**	**163.70**	**0.00**	**1072.80**	**712.00**	**360.80**	**0.00**	**0.00**	**238.10**	**238.10**	**238.10**	**122.81**	**65.99**
	Total (Bcm)	**0.00909**	**0.00000**	**0.00164**	**0.00000**	**0.01073**	**0.00712**	**0.00361**	**0.00000**	**0.00000**	**0.00238**	**0.00238**	**0.00238**	**0.00123**	**65.99**

DYNAMIC GROUND WATER RESOURCES OF INDIA, 2017														
UT OF PUDUCHERRY														
S. No.	Region	Ground Water Recharge					Total Natural Discharges	Annual Extractable Ground Water Resources	Current Annual Ground Water Extraction			Annual GW Allocation for for Domestic Use as on 2025	Net Ground Water Availability for future use	Stage of Ground Water Extraction (%)
		Monsoon Season		Non-monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic & Industrial	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	Puducherry	7035.00	2738.37	1775.58	3671.63	15220.58	1522.06	13698.52	10338.00	3632.50	13970.50	3652.00	Nil	101.99
2	Karaikal	1973.73	4080.47	209.22	880.62	7144.04	714.40	6429.64	616.65	387.67	1004.32	404.52	5408.47	15.62
3	Mahe	245.45	0.00	23.11	0.00	268.56	26.85	241.71	0.00	166.00	166.00	176.34	65.37	68.68
	Total (Ham)	**9254.18**	**6818.84**	**2007.91**	**4552.25**	**22633.18**	**2263.31**	**20369.87**	**10954.65**	**4186.17**	**15140.82**	**4232.86**	**5473.84**	**74.33**
	Total (Bcm)	**0.093**	**0.068**	**0.020**	**0.046**	**0.226**	**0.023**	**0.204**	**0.110**	**0.042**	**0.151**	**0.042**	**0.055**	**74.33**

Annexure-III
Categorization of Blocks/ Mandals/ Taluks in India
(as in March 2017)

CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKAS IN INDIA (2017)

S.No.	States / Union Territories	Total No. of Assessed	Safe		Semi-Critical		Critical		Over-Exploited		Saline	
			Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%
	States											
1	Andhra Pradesh	670	501	75	60	9	24	4	45	7	40	6
2	Arunachal Pradesh	11	11	100	0	0	0	0	0	0	0	0
3	Assam	28	28	100	0	0	0	0	0	0	0	0
4	Bihar	534	432	81	72	13	18	3	12	2	0	0
5	Chattisgarh	146	122	84	22	15	2	1	0	0	0	0
6	Delhi	34	3	9	7	21	2	6	22	65	0	0
7	Goa	12	12	100	0	0	0	0	0	0	0	0
8	Gujarat	248	194	78	11	4	5	2	25	10	13	5
9	Haryana	128	26	20	21	16	3	2	78	61	0	0
10	Himachal Pradesh	8	3	38	1	13	0	0	4	50	0	0
11	Jammu & Kashmir	22	22	100	0	0	0	0	0	0	0	0
12	Jharkhand	260	245	94	10	4	2	1	3	1	0	0
13	Karnataka	176	97	55	26	15	8	5	45	26	0	0
14	Kerala	152	119	78	30	20	2	1	1	1	0	0
15	Madhya Pradesh	313	240	77	44	14	7	2	22	7	0	0
16	Maharashtra	353	271	77	61	17	9	3	11	3	1	0
17	Manipur	9	9	100	0	0	0	0	0	0	0	0
18	Meghalaya	11	11	100	0	0	0	0	0	0	0	0
19	Mizoram	26	26	100	0	0	0	0	0	0	0	0
20	Nagaland	11	11	100	0	0	0	0	0	0	0	0
21	Odisha	314	303	96	5	2	0	0	0	0	6	2
22	Punjab	138	22	16	5	4	2	1	109	79	0	0
23	Rajasthan	295	45	15	29	10	33	11	185	63	3	1
24	Sikkim	4	4	100	0	0	0	0	0	0	0	0
25	Tamil Nadu	1166	427	37	163	14	79	7	462	40	35	3
26	Telangana	584	278	48	169	29	67	11	70	12	0	0
27	Tripura	59	59	100	0	0	0	0	0	0	0	0
28	Uttar Pradesh*	830	540	65	151	18	48	6	91	11	0	0
29	Uttarakhand	18	13	72	5	28	0	0	0	0	0	0
30	West Bengal **	268	191	71	76	28	1	0	0	0	0	0
	Total States	**6828**	**4265**	**62**	**968**	**14**	**312**	**5**	**1185**	**17**	**98**	**1**
	Union Territories											
1	Andaman & Nicobar	36	35	97	0	0	0	0	0	0	1	3
2	Chandigarh	1	0	0	1	100	0	0	0	0	0	0
3	Dadra & Nagar Have	1	1	100	0	0	0	0	0	0	0	0
4	Daman & Diu	2	1	50	0	0	1	50	0	0	0	0
5	Lakshdweep	9	6	67	3	33	0	0	0	0	0	0
6	Puducherry	4	2	50	0	0	0	0	1	25	1	25
	Total UTs	**53**	**45**	85	**4**	8	**1**	2	**1**	2	**2**	4
	Grand Total	**6881**	**4310**	**63**	**972**	**14**	**313**	**5**	**1186**	**17**	**100**	**1**

Note

Blocks- Bihar, Chattisgarh, Haryana, Jharkhand, Kerala, M.P., Manipur, Mizoram, Orissa, Punjab, Rajasthan, Tripura, Uttar Pradesh,

Taluks -Karnataka, Goa, Gujarat, Maharashtra

Mandals - Andhra Pradesh, Telangana

Districts/Valley- Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Meghalaya, Mizoram, Nagaland

Islands - Lakshdweep, Andaman & Nicobar Islands

Firka-Tamil Nadu

Region - Puducherry

UT - Chandigarh, Dadar & Nagar Haveli, Daman & Diu

Tehsil-NCT Delhi

***Uttar Pradesh:** There are total 820 block and 10 Cities

**The Ground Water resources assessment as on 2013 has been considered for the state of West Bengal

Annexure-IV (A)
State-wise Categorization of Blocks/ Mandals/ Taluks in India
(as in March 2017)

CATEGORIZATION of ASSESSMENT UNITS, 2017							
ANDHRA PRADESH							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over-Exploited**
1	**Anantapur**	1	Kudair	1	Puttaparthi	1	Tadpatri
		2	Kundurpi	2	Brahmasamudram	2	Kothacheruvu
		3	Somandepalle	3	Obuladevaracheruvu	3	Roddam
		4	Lepakshi	4	Nallacheruvu	4	Hindupur
		5	Tadimarri	5	Kambadur	5	Gudibanda
		6	Mudigubba			6	Amadagur
		7	Atmakur			7	Chilamathur
						8	Talupula
						9	Agali
						10	Tanakal
						11	Yadiki
						12	Putlur
						13	Yellanur
						14	Gandlapenta
						15	Rolla
						16	Madakasira
						17	Parigi
						18	Amarapuram
						19	Gorantla
						20	Nallamada
						21	Settur
2	**Chittoor**	1	Vadamalapeta	1	Pakala	1	Puthalapattu
		2	Chittoor Mandal	2	Pulicherla	2	Ramasamudram
		3	Kalikiri	3	Ramachandrapuram-17	3	Tirupati
		4	Gurramkonda	4	Santhi Puram	4	Nindra
		5	Palasamudram	5	Srirangarajapuram	5	Gudi Palle
		6	Baireddi Palle	6	Venkatagiri Kota		
		7	Karvetinagar	7	Thavanampalle		
		8	Pileru	8	Penumuru		
		9	Gangadhara Nellore	9	Pedda Panjani		
		10	Chinnagottigallu	10	Rama Kuppam		
		11	Punganur				
3	**East Godavari**	1	Yeleswaram				
		2	Rangampeta				
4	**Guntur**	1	Karempudi			1	Bollapalle
						2	Veldurthi
5	**Kadapa**	1	Thandur	1	Simhadripuram	1	Lingala
		2	Veerapunayunipalle	2	Porumamilla	2	Obulavaripalle
		3	Sidhout	3	Penagaluru	3	Kodur
		4	Gopavaram	4	Rajampet	4	Sambepalle
		5	Chapad			5	Kamalapuram
		6	B Kodur			6	Chinnamandem
		7	Royachoti			7	Vempalle
		8	Vallur			8	Vemula
		9	Duvvur			9	Pullampeta
		10	Jammalamadugu				
		11	Lakkireddipalle				
		12	Chintha Kommadinne				
		13	Chitvel				
		14	Ramapuram				
		15	Sri Avadhutha Kasinayana				
		16	Brahmamgarimattam				
6	**Krishna**	1	Nuzvid			1	Musunuru
7	**Kurnool**	1	Peapally	1	Chagalamarri		
		2	Nandi Kotkur				
		3	Kodumur				
		4	Bethamcherla				
		5	Gonegandla				
		6	Orvakal				
8	**Nellore**	1	Naidupeta				

CATEGORIZATION of ASSESSMENT UNITS, 2017							
ANDHRA PRADESH							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over-Exploited
9	**Prakasam**	1	Dornala			1	Markapur
		2	Yerragondapalem			2	Giddaluru
		3	Tarlapadu			3	Pedaaraveedu
		4	Komarolu			4	Racherla
		5	Cumbum			5	Bestavaripeta
10	**Srikakulam**	1	Rajam	1	Ganguvari Singadam	1	Laveru
		2	Kaviti			2	Ranastalam
		3	Ponduru				
		4	Kotabommal				
11	**Visakhapatnam**	1	Munagapaka				
12	**West Godavari**	1	Dwaraka Tirumala	1	Jangareddigudem		
		2	T Narasapuram	2	Padavegi		
		3	Chintalapudi	3	Lingapalem		
		4	Tadepalligudem				
		5	Koyyalagudem				

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
670	**60**	**24**	**45**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
BIHAR							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
1	**Begusarai**	1	Khudabandpur	1	Bhagwanpur		
				2	Naokothi		
2	**Bhojpur**	1	Arrah	1	Behea		
		2	Jagdishpur	2	Koilbar		
		3	Piro				
		4	Shahpur				
3	**Buxar**	1	Chaungai				
		2	Simari				
4	**East Champaran**	1	Madhuban				
5	**Gaya**	1	Belaganj	1	Dumaria	1	Imamganj
		2	Bodhgaya			2	Manpur
		3	Gaya Sadar				
		4	Khizirsarai				
		5	Konch				
		6	Tekari				
6	**Gopalganj**	1	Barauli			1	Bijaipur
		2	Bhore			2	Thawe
		3	Hathwa			3	Uchkagaon
		4	Kateyan				
		5	Manjha				
		6	Panchdeori				
7	**Jehanabad**	1	Hulasganj	1	Ghosi	1	Ratni Faridpur
		2	Makhdumpur	2	Jehanabad		
		3	Modanganj	3	Kako		
8	**Katihar**	1	Azamnagar	1	Dandkhora		
		2	Balrampur				
		3	Barsoi				
		4	Kadwa				
		5	Korha				
		6	Mansahi				
		7	Pranpur				
9	**Madhepura**	1	Bihariganj				
		2	Gamharia				
		3	Gwalpara				
		4	Sankarpur				
		5	Singheswar				
		6	Uda Kishanganj				
10	**Muzaffarpur**	1	Bochaha			1	Mushari
		2	Kurahni			2	Sakra
		3	Minapur				
		4	Moraul (Dholi)				
11	**Nalanda**	1	Ben	1	Asthawan	1	Giriak
		2	Harnaut	2	Bind		
		3	Islampur	3	Karai parsauni		
		4	Noorsarai	4	Rajgir		
		5	Parwalpur				
		6	Rahui				
12	**Nawada**	1	Nawada	1	Meskaur		
		2	Roh				
13	**Patna**	1	Belchi	1	Patna Sadar	1	Athmalgola
		2	Khusrupur	2	Punpun	2	Phulwarisarif
			Masuarhi	3	Sampatchak		
14	**Purnia**	1	Amaur				
		2	Baisi				
		3	Dagarua				
15	**Samastipur**	1	Ujiarpur				

CATEGORIZATION of ASSESSMENT UNITS, 2017							
BIHAR							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
16	**Saran**	1	Garakha	1	Nagra		
		2	Lahladpur				
		3	Manjhi				
17	**Sitamarhi**	1	Bajpatti				
18	**Siwan**	1	Basantpur				
		2	Daraunda				
		3	Guthani				
		4	Hussainganj				
		5	Jeradei				
		6	Siswan				
19	**Vaishali**	1	Bhagwanpur			1	Patepur
		2	Chehra kala				
		3	Hazipur				
		4	Jandaha				
		5	Lalganj				
		6	Premraj/ Desri				
		7	Rajapakar				

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
534	**72**	**18**	**12**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
CHHATTISGARH							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
1	**Balod**	1	Balod	1	Gurur		
2	**Bemetara**	1	Bemetara				
		2	Berla				
		3	Nawagarh				
3	**Bilaspur**	1	Belha				
		2	Takhatpur				
4	**Dhamtari**	1	Dhamtari				
		2	Kurud				
5	**Durg**	1	Dhamdha				
		2	Durg				
		3	Patan				
6	**Gariaband**	1	Rajim				
7	**Janjgir-Champa**	1	Malkharoda				
8	**Kawardha**	1	Kawardha				
		2	Pandariya				
9	**Mahasamund**	1	Basna				
		2	Pithora				
10	**Raigarh**	1	Baramkela				
		2	Pussore				
11	**Raipur**			1	Dharsiwa		
12	**Rajnandgaon**	1	Dongargaon				
		2	Rajnandgaon				

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
146	**21**	**2**	**Nil**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
DELHI							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
1	**Central Delhi**	1	Civil Lines			1	Karol Bagh
		2	Kotwali				
2	**East Delhi**	1	Gandhi Nagar	1	Preet Vihar	1	Mayur Vihar
3	**New Delhi**					1	Chanakyapuri
						2	Delhi Cantonment
						3	Vasant Vihar
4	**North Delhi**	1	Alipur				
		2	Model Town				
		3	Narela				
5	**North East Delhi**					1	Karawal Nagar
						2	Seelampur
						3	Yamuna Vihar
6	**North West Delhi**					1	Saraswati Vihar
7	**Shahdara**					1	Seemapuri
						2	Shahdara
						3	Vivek Vihar
8	**South Delhi**					1	Hauz Khas
						2	Mehrauli
						3	Saket
9	**South East Delhi**					1	Defence Colony
						2	Kalkaji
						3	Sarita Vihar
10	**South West Delhi**					1	Dwarka
						2	Kapashera
						3	Najafgarh
11	**West Delhi**	1	Patel Nagar	1	Punjabi Bagh	1	Rajouri Garden

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
34	**7**	**2**	**22**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
GUJARAT							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
1	**Ahmedabad**	1	Ahmedabad City & Daskroi				
		2	Detroj-rampura				
		3	Dholka				
		4	Viramgam				
2	**Banaskantha**			1	Palanpur	1	Deesa
						2	Deodar
						3	Dhanera
						4	Kankrej
						5	Lakhani
						6	Tharad
						7	Vadgam
3	**Gandhinagar**					1	Dehgam
						2	Gandhinagar
						3	Kalol
						4	Mansa
4	**Kachchh**	1	Nakhatrana	1	Anjar	1	Bhachau
				2	Bhuj	2	Mandvi
5	**Mahesana**			1	Vadnagar	1	Becharaji
						2	Jotana
						3	Kadi
						4	Kheralu
						5	Mahesana
						6	Satlasana
						7	Unjha
						8	Vijapur
						9	Visnagar
7	**Patan**			1	Sarsvati (Patan)	1	Chanasma
						2	Patan
						3	Sidhpur
8	**Porbandar**	1	Porbandar				
9	**Sabarkantha**	1	Idar				
		2	Prantij				
		3	Talod				
		4	Vadali				
11	**Vadodara**	1	Vadodara				

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
248	**11**	**5**	**25**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
HARYANA							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over Exploited
1	**Ambala**	1	Ambala-I	1	Shahzadpur	1	Barara
						2	Naraingarh
						3	Saha
2	**Bhiwani**	1	Bhiwani			1	Behal
						2	Kairu
						3	Loharu
						4	Tosham
3	**Charki Dadri**	1	Charkhi dadri			1	Badhra
						2	Jhojhu
4	**Faridabad**					1	Ballabgarh
						2	Faridabad
5	**Fatehabad**			1	Bhuna	1	Bhattu kalan
						2	Fatehabad
						3	Jakhal
						4	Ratia
						5	Tohana
6	**Gurugram**					1	Farrukh nagar
						2	Gurgaon
						3	Pataudi
						4	Sohna
7	**Hisar**	1	Bass	1	Barwala	1	Adampur
		2	Hisar-I			2	Narnaund
		3	Hisar-Ii			3	Agroha
		4	Uklana				
8	**Jind**	1	Pillukhera			1	Alewa
						2	Jind
						3	Safidon
						4	Uchana
						5	Ujhana
9	**Kaithal**					1	Dhand
						2	Guhla
						3	Kaithal
						4	Kalayat
						5	Pundri
						6	Rajound
						7	Siwan
10	**Karnal**	1	Indri			1	Assandh
						2	Gharaunda (part)
						3	Karnal
						4	Nilokheri
						5	Nissing at chirao
11	**Kurukshetra**					1	Babain
						2	Ismailabad
						3	Ladwa
						4	Pehowa
						5	Pipli
						6	Shahbad
						7	Thanesar
12	**Mahendragarh**	1	Ateli Nangal			1	Kanina
		2	Nangal Chaudhry			2	Mahendragarh
		3	Satnali				
		4	Sihma				
13	**Mewat**	1	Ferozepur Jhirka			1	Punahana
		2	Nuh			2	Taoru
14	**Palwal**					1	Hassanpur
						2	Palwal
						3	Hathin
						4	Hodal
15	**Panchkula**	1	Raipur Rani				

CATEGORIZATION of ASSESSMENT UNITS, 2017							
HARYANA							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
16	**Panipat**					1	Bapoli
						2	Israna
						3	Madlauda
						4	Panipat
						5	Samalkha
17	**Rewari**	1	Dahina			1	Khol at rewari
		2	Jatusana			2	Nahar
						3	Rewari
18	**Sirsa**					1	Baragudha
						2	Dabwali
						3	Ellenabad
						4	Nathusari Chopta
						5	Odhan
						6	Rania
						7	Sirsa
19	**Sonipat**	1	Mundlana			1	Ganaur
						2	Rai
						3	Sonipat
20	**Yamunanagar**	1	Sadaura (Part)			1	Chhachhrauli
		2	Bilaspur			2	Jagadhri
						3	Khizrabad
						4	Mustafabad
						5	Radaur

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
128	**21**	**3**	**78**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
HIMACHAL PRADESH							
S. No		**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
1	**Kangra**					1	Indora
2	**Sirmour**					1	Kala Amb
3	**Solan**					1	Nalagarh
4	**Una**	1	Hum			1	Una
ABSTRACT							
Total No. of Assessed Units			**Semicritical**		**Critical**		**Over Exploited**
8			**1**		**Nil**		**4**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
JHARKHAND							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over Exploited
1	**Bokaro**	1	Chandrapura			1	Bermo
		2	Chas				
2	**Dhanbad**	1	Baliapur	1	Baghmara	1	Dhanbad
				2	Topchanchi	2	Jharia
3	**East Singhbhum**	1	Golmuri cum Jugsalai				
4	**Ramgarh**	1	Mandu				
		2	Patratu				
		3	Ramgarh				
5	**Ranchi**	1	Kanke				
		2	Khelari				
		3	Silli				

ABSTRACT			
Total No. of Assessed Units	Semicritical	Critical	Over Exploited
260	10	2	3

CATEGORIZATION of ASSESSMENT UNITS, 2017							
KARNATAKA							
S. No	District	S. No	Semicritical	S. No	Critical	S. No	Over Exploited
1	**Bagalkote**	1	Jamkhandi	1	Mudhol	1	Badami
						2	Bagalkote
2	**Ballari**	1	Hadagalli			1	H.B.Halli
		2	Kudligi				
3	**Belagavi**	1	Bailahongal			1	Athani
		2	Gokak			2	Ramdurg
		3	Hukkeri			3	Saundatti
4	**Bengaluru Rural**					1	Devenhalli
						2	Dodaballapur
						3	Hoskote
						4	Nelamangala
5	**Bengaluru Urban**					1	Anekal
						2	Bengaluru East
						3	Bengaluru North
						4	Bengaluru South
6	**Bidar**	1	Bhalki				
7	**Chamrajnagara**	1	Chamrajnagara			1	Gundlupet
		2	Kollegal				
		3	Yelandur				
8	**Chikballapur**					1	Bagepalli
						2	Chikballapur
						3	Chintamani
						4	Gauribidalur
						5	Gudibanda
						6	Sidlaghata
9	**Chikkamagaluru**					1	Kadur
10	**Chitradurga**					1	Challakere
						2	Chitradurga
						3	Hiriyur
						4	Holalkere
						5	Hosadurga
11	**Dakshin Kannada**	1	Puttur				
12	**Davangere**			1	Davangere	1	Channagiri
						2	Harpanahalli
						3	Jagalur
13	**Dharwad**	1	Kalghatgi				
14	**Gadag**	1	Mundargi			1	Gadag
		2	Nargund			2	Ron
15	**Hassan**			1	C R Patna	2	Arsikere
16	**Haveri**	1	Byadgi	1	Ranibennur		
		2	Hirekerur				
17	**Kolar**					1	Bangarpet
						2	Kolar
						3	Malur
						4	Mulbagal
						5	Srinivaspur
18	**Koppal**			1	Yelbarga		
19	**Mandya**	1	Malavalli				
20	**Mysuru**	1	Mysuru				
21	**Raichur**	1	Lingsugur				
		2	Raichur				
22	**Ramanagara**	1	Channapatana	1	Magadi	1	Kanakapura
						2	Ranmanagara
23	**Tumakuru**	1	Pavagada	1	Sira	1	Chicknayakanhalli
						2	Koratagere
						3	Madhugiri
						4	Tiptur
						5	Tumakuru
24	**Uttar Kannada**	1	Haliyal				
25	**Vijayapura**	1	Basavana Bagevadi	1	Indi		
		2	Muddebihal				
26	**Yadgir**	1	Yadgir				

ABSTRACT

Total No. of Assessed Units	Semicritical	Critical	Over Exploited
176	26	8	45

CATEGORIZATION of ASSESSMENT UNITS, 2017							
KERALA							
S. No	District	S. No	Semicritical	S. No	Critical	S. No	Over Exploited
1	**Ernakulam**	1	Parakkadavu				
2	**Idukki**	1	Elam Desom				
		2	Kattappana				
		3	Nedumkandam				
3	**Kannur**	1	Kannur				
		2	Panur				
		3	Thalassery				
4	**Kasargod**	1	Kanhangad	1	Kasaragod		
		2	Karadka				
		3	Manjeswar				
5	**Kollam**	1	Mukhathala				
6	**Kozhikode**	1	Ballussery				
		2	Kunnamangalam				
7	**Malappuram**	1	Kondotty				
		2	Kuttippuram				
		3	Malappuram				
		4	Thanur				
		5	Thriurangadi				
		6	Tirur				
		7	Vengara				
8	**Palakkad**	1	Pattambi	1	Malampuzha	1	Chittur
		2	Thrithala				
9	**Thiruvananthapuram**	1	Athiyannur				
		2	Chirayinkil				
		3	Parassala				
		4	Pothencode				
		5	Nedumangad				
10	**Thrissur**	1	Chowannur				
		2	Mathilakom				
		3	Thalikkulam				
Total No. of Assessed Units			**Semicritical**	**Critical**		**Over Exploited**	
152			**30**	**2**		**1**	

CATEGORIZATION of ASSESSMENT UNITS, 2017							
MADHYA PRADESH							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over Exploited
1	**Agar**	1	Barod			1	Nalkhera
						2	Susner
2	**Barwani**	1	Rajpur			1	Pansemal
3	**Betul**	1	Betul				
		2	Multai				
4	**Bhopal**	1	Phanda				
5	**Chhatarpur**	1	Buxwaha				
		2	Chhatarpur				
		3	Nowgaon				
6	**Chhindwara**	1	Chhindwara				
		2	Pandhurna				
7	**Damoh**	1	Batiyagarh				
		2	Patheriya				
8	**Dewas**	1	Khategaon			1	Dewas
						2	Sonkutch
9	**Dhar**	1	Tirla			1	Badnawar
						2	Dhar
						3	Nalcha
10	**Indore**	1	Mhow			1	Depalpur
						2	Indore
						3	Sanwer
11	**Khandwa**	1	Chhegaon makhan				
12	**Khargone**	1	Khargone				
13	**Mandsaur**	1	Garoth	1	Bhanpura	1	Mandsaur
				2	Malahargarh	2	Sitamau
14	**Neemuch**	1	Manasa	1	Jawad		
				2	Neemuch		
15	**Raisen**	1	Obedulla Ganj				
		2	Sanchi				
16	**Rajgarh**	1	Biora	1	Narsingh garh		
		2	Khilchipur	2	Sarangpur		
		3	Zeerapur				
17	**Ratlam**	1	Sailana			1	Alote
		2	Bajna			2	Jaora
						3	Piploda
						4	Ratlam
18	**Sagar**	1	Banda				
19	**Satna**	1	Maihar				
		2	Rampur Baghalan				
		3	Sohawal				
20	**Sehore**	1	Ashta				
21	**Shajapur**	1	Shajapur	1	Kalapipal	1	Mohan Berodia
						2	Shujalpur
22	**Shivpuri**	1	Badarwas				
		2	Khanniyadhana				
		3	Narwar				
		4	Pichor				
23	**Tikamgarh**	1	Baldeogarh				
		2	Jatara				
		3	Niwari				
		4	Palera				
		5	Tikamgarh				
24	**Ujjain**	1	Kachrod			1	Badnagar
		2	Mahidpur			2	Ghatia
		3	Tarana			3	Ujjain

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
313	**44**	**7**	**22**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
MAHARASHTRA							
S.No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
1	**Ahmednagar**	1	Akola	1	Kopargaon	1	Rhata
		2	Newasa	2	Rahuri		
		3	Pathardi	3	Sangamner		
		4	Shevgaon	4	Shrirampur		
		5	Shrigonda				
2	**Akola**	1	Barsi Takli				
3	**Amravati**	1	Amravati			1	Achlapur
		2	Dhamangaon Railway			2	Chandur Bazar
		3	Nandgaon			3	Morshi
						4	Warud
4	**Aurangabad**	1	Aurangabad				
		2	Fulambre				
		3	Gangapur				
		4	Khuldabad				
		5	Paithan				
		6	Sillod				
		7	Vaijapur				
5	**Buldhana**	1	Buldhana			1	Jalgaon
		2	Chikhali			2	Sangrampur
		3	Deulgaon Raja				
		4	Motala				
		5	Nandura				
		6	S'indkhed Raja				
6	**Jalgaon**	1	Amalner			1	Raver
		2	Bhadgaon			2	Yawal
		3	Bhusawal				
		4	Bodwad				
		5	Chalisgaon				
		6	Chopda				
		7	Erandol				
		8	Jamner				
		9	Pachora				
		10	Parola				
7	**Latur**	1	Latur				
8	**Nagpur**	1	Katol				
		2	Saoner				
9	**Nashik**	1	Baglan Satana	1	Deola		
		2	Chandwad	2	Niphad		
		3	Kalwan	3	Sinnar		
		4	Yeola				
10	**Osmanabad**	1	Kalamb				
		2	Osmanabad				
11	**Pune**	1	Ambegaon	1	Purandhar		
		2	Baramati	2	Shirur		
		3	Daund				
		4	Indapur				
		5	Junnar				
		6	Khed				
12	**Sangli**	1	Jat			1	Kavathe Mahankal
13	**Satara**	1	Khatav				
		2	Man				
		3	Patan				
		4	Phaltan				
		5	Wai				
14	**Solapur**	1	Barshi			1	Malshiras
		2	Karmala				
		3	Madha				
		4	Mangalwedha				
		5	Mohol				
		6	Pandharpur				
		7	Sangola				
15	**Wardha**	1	Karanja				

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
353	**61**	**9**	**11**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
ODISHA							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over Exploited
1	**Balasore**	1	Bahanaga				
		2	Baliapal				
2	**Jajpur**	1	Korei				
3	**Kendrapara**	1	Garadpur				
4	**Khurda**	1	Bologarh				

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
314	**5**	**Nil**	**Nil**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
PUNJAB							
S.No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over-Exploited
1	**Amritsar**					1	Ajnala
						2	Chogawan
						3	Harsha China
						4	Jandiala
						5	Majitha
						6	Rayya
						7	Tarsika
						8	Verka
2	**Barnala**					1	Barnala
						2	Mahal Kalan
						3	Sehna
3	**Bathinda**	1	Nathana			1	Bathinda
						2	Maur
						3	Phul
4	**Faridkot**					1	Faridkot
						2	Kot Kapura
5	**Fatehgarh Sahib**					1	Amloh
						2	Bassi Pathana
						3	Khamanon
						4	Khera
						5	Sirhind
6	**Fazilka**					1	Jalalabad
7	**Ferozepur**					1	Ferozpur
						2	Ghall Khurd
						3	Guru Har Sahai
						4	Makhu
						5	Mamdot
						6	Zira
8	**Gurdaspur**			1	Gurdaspur	1	Batala
						2	Dera Baba Nanak
						3	Dhariwal
						4	Fatehgarh Churian
						5	Kahnuwan
						6	Kalanaur
						7	Qadian
						8	Sri Hargobindpur
9	**Hoshiarpur**	1	Mukerian			1	Dasuya
		2	Talwara			2	Garhsahnkar
						3	Hoshiarpur-1
						4	Tanda
10	**Jalandhar**					1	Adampur
						2	Bhogpur
						3	Jalandhar-East
						4	Jalandhar-West
						5	Lohian
						6	Nakodar
						7	Nur Mahal
						8	Phillaur
						9	Rurka Kalan
						10	Shahkot
11	**Kapurthala**					1	Dhilwan
						2	Kapurthala
						3	Nadala
						4	Phagwara
						5	Sultanpur Lodhi
12	**Ludhiana**					1	Dehlon
						2	Doraha
						3	Jagraon
						4	Khanna
						5	Ludhiana
						6	Machhiwara
						7	Mangat
						8	Pakhowal
						9	Raikot
						10	Samrala
						11	Sidhwan Bet
						12	Sudhar
13	**Mansa**			1	Jhunir	1	Bhikhi
						2	Budhlada
						3	Mansa
						4	Sardulgarh

CATEGORIZATION of ASSESSMENT UNITS, 2017							
PUNJAB							
S.No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over-Exploited
14	**Moga**					1	Bagha Purana
						2	Dharamkot (Kot Isa Khan)
						3	Moga I
						4	Moga Ii
						5	Nihal Singh Wala
15	**Mohali**					1	Dera Bassi
						2	Kharar
16	**Nawanshahar**					1	Aur
						2	Banga
						3	Nawan Shahr
17	**Pathankot**	1	Pathankot				
18	**Patiala**					1	Bhuner Heri
						2	Ghanaur
						3	Nabha
						4	Patiala
						5	Patran
						6	Rajpura
						7	Samana
						8	Sanaur
19	**Ropar**	1	Anandpur Sahib			1	Chamkaur Sahib
						2	Morinda
						3	Nurpur Bedi
20	**Sangrur**					1	Ahmedgarh
						2	Andana
						3	Bhiwanigarh
						4	Dhuri
						5	Lehraghaga
						6	Maler Kotla
						7	Sangrur
						8	Sherpur
						9	Sunam
21	**Tarn Taran**					1	Bhikhiwind
						2	Chola Sahib
						3	Gandiwind
						4	Khadur Sahib
						5	Naushehra Panuan
						6	Patti
						7	Tarn Taran
						8	Valtoha

ABSTRACT			
Total No. of Assessed Units	Semicritical	Critical	Over Exploited
138	5	2	109

CATEGORIZATION of ASSESSMENT UNITS, 2017							
RAJASTHAN							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over-Exploited**
1	**Ajmer**					1	Arain
						2	Bhinay
						3	Jawaja
						4	Kekri
						5	Masuda
						6	Pisangan
						7	Sarwar
						8	Shrinagar
						9	Silora
2	**Alwar**					1	Bansur
						2	Behror
						3	Kathumar
						4	Kishangarh
						5	Kotkasim
						6	Laxmangarh
						7	Mandawar
						8	Neemrana
						9	Rajgarh
						10	Ramgarh
						11	Reni
						12	Thanagazi
						13	Tijara
						14	Umrain
3	**Baran**	1	Anta			1	Atru
		2	Kishanganj			2	Baran
		3	Shahbad			3	Chhabra
						4	Chhipabarod
4	**Barmer**			1	Dhanau	1	Baitu
				2	Kalyanpur	2	Balotra
				3	Ramsar	3	Dhorimana
				4	Sedwa	4	Gadra Road
				5	Sindhary	5	Gida
						6	Gudamalani
						7	Patodi
						8	Samadri
						9	Shiv
						10	Siwana
5	**Bharatpur**			1	Deeg	1	Bayana
				2	Nagar	2	Kumher
				3	Kaman	3	Nadbai
				4	Pahari	4	Rupbas
						5	Sewar
						6	Weir
6	**Bhilwara**					1	Asind
						2	Banera
						3	Bhilwara
						4	Bijoliya
						5	Hurda
						6	Jahazpur
						7	Kotri
						8	Mandal
						9	Mandalgarh
						10	Raipur
						11	Sahara
						12	Shahpura
7	**Bikaner**	1	Panchoo	1	Kolayat	1	Bikaner
						2	Dungargarh
						3	Nokha
8	**Bundi**	1	Bundi			1	Hindoli
						2	Nainwa
9	**Chittaurgarh**					1	Bari Sadri
						2	Begun
						3	Bhadesar
						4	Bhupalsagar
						5	Chittaurgarh
						6	Dungla
						7	Gangrar
						8	Kapasan
						9	Nimbahera
						10	Rashmi
						11	Rawatbhata

CATEGORIZATION of ASSESSMENT UNITS, 2017							
RAJASTHAN							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over-Exploited
10	**Churu**	1	Ratangarh			1	Bidasar
		2	Churu			2	Sujangarh
						3	Rajgarh
11	**Dausa**					1	Bandikui
						2	Dausa
						3	Lalsot
						4	Lawan
						5	Mahwa
						6	Sikrai
12	**Dhaulpur**	1	Bari			1	Dhaulpur
		2	Baseri			2	Rajakhera
						3	Saipau
13	**Dungarpur**	1	Dovda				
		2	Dungarpur				
		3	Simalwara				
14	**Jaipur**			1	Phagi	1	Amber
						2	Bassi
						3	Chaksu
						4	Dudu
						5	Govindgar
						6	Jalsu
						7	Jamwa Ramgarh
						8	Jhotwara
						9	Kotputli
						10	Paota
						11	Sambhar
						12	Sanganer
						13	Shahpura
						14	Viratnaga
15	**Jaisalmer**					1	Jaisalmer
						2	Sam
						3	Sankra
16	**Jalor**	1	Chitalwana			1	Ahore
						2	Bhinmal
						3	Jalor
						4	Jaswantpura
						5	Raniwara
						6	Sanchore
						7	Sayla
17	**Jhalawar**	1	Bhawani Mandi	1	Jhalrapatan	1	Khanpur
		2	Dug	2	Manoharthana		
		3	Aklera	3	Pirawa		
				4	Bakani		
18	**Jhunjhunun**					1	Alsisar
						2	Buhana
						3	Chirawa
						4	Jhunjhunu
						5	Khetri
						6	Nawalgarh
						7	Surajgarh
						8	Udaipurwati
19	**Jodhpur**					1	Balesar
						2	Baori
						3	Bapini
						4	Bhopalgarh
						5	Bilara
						6	Dechu
						7	Lohawat
						8	Mandor
						9	Osian
						10	Phalodi
						11	Pipar City
						12	Shekhala
						13	Shergarh
						14	Tinwari
20	**Karauli**	1	Nadoti			1	Hindaun
						2	Karauli
						3	Mandrial
						4	Sapotra
						5	Todabhim

CATEGORIZATION of ASSESSMENT UNITS, 2017							
RAJASTHAN							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over-Exploited**
21	**Kota**	1	Itawa	1	Ladpura	1	Khairabad
		2	Sultanpur			2	Sangod
22	**Nagaur**	1	Nagaur	1	Ladnu	1	Degana
						2	Didwana
						3	Jayal
						4	Khinvsar
						5	Kuchaman
						6	Makrana
						7	Merta
						8	Molasar
						9	Mundwa
						10	Nawa
						11	Parbatsar
						12	Riyan
23	**Pali**			1	Sumerpur	1	Bali
						2	Desuri
						3	Jaitaran
						4	Marwar Ju
						5	Raipur
						6	Rani
						7	Sojat
24	**Pratapgarh**			1	Dhariawad	1	Arnod
						2	Chhoti Sadri
						3	Pratapgarh
25	**Rajsamand**			1	Khamnor	1	Amet
				2	Kumbhalgarh	2	Bhim
				3	Deogarh	4	Railmagra
						5	Rajsamand
26	**Sawai Madhopur**					1	Bamanwas
						2	Bonli
						3	Chauth Ka Berwada
						4	Gangapur
						5	Khandar
						6	Sawai Madhopur
27	**Sikar**	1	Fatehpur			1	Danta Ramgarh
						2	Dhod
						3	Khandela
						4	Lachhmangarh
						5	Neem Ka Thana
						6	Patan
						7	Piprali
						8	Sri Madhopur
28	**Sirohi**	1	Pindwara	1	Abu Road	1	Reodar
				2	Sirohi	2	Sheoganj
29	**Tonk**	1	Deoli			1	Malpura
		2	Tonk			2	Niwai
						3	Uniara
30	**Udaipur**	1	Jallara	1	Girwa	1	Badgaon
		2	Kotra	2	Gogunda	2	Bhinder
		3	Salumbar	3	Jhadol	4	Mavli
		4	Sarada	4	Kherwara		
		5	Semari	5	Kurawad		
				6	Lasadiya		
				7	Phalasiya		
				8	Rishabhdev		
				9	Sayara		
ABSTRACT							
Total No. of Assessed Units		**Semicritical**		**Critical**		**Over Exploited**	
295		**29**		**33**		**185**	

CATEGORIZATION of ASSESSMENT UNITS, 2017							
TAMIL NADU							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over-Exploited
1	**Ariyalur**	1	Sendurai				
2	**Chennai**					1	Egmore - Nungambakkam--I
						2	Egmore - Nungambakkam-II
						3	Egmore - Nungambakkam--III
						4	Egmore - Nungambakkam-IV
						5	Kottai - Thondiarpet-I
						6	Kottai - Thondiarpet-III
						7	Kottai - Thondiarpet-III
						8	Kottai - Thondiarpet-IV
						9	Mambalam - Guindy-I
						10	Mambalam - Guindy-III
						11	Mambalam - Guindy-III
						12	Mambalam - Guindy-IV
						13	Mylapore - Tiruvallikeni-I
						14	Mylapore - Tiruvallikeni-II
						15	Mylapore - Tiruvallikeni-III
						16	Mylapore - Tiruvallikeni-IV
						17	Purasawalkam -Perambur-I
						18	Purasawalkam -Perambur-III
						19	Purasawalkam -Perambur-III
						20	Purasawalkam - Perambur-IV
3	**Coimbatore**	1	Karamadai	1	Kottur	1	Alandurai
		2	Kuniamuthur	2	Madukkarai	2	Anamalai
		3	Kurichi	3	Mettupalayam	3	Annur (N)
		4	Marchinaickenpalayam	4	Saravanampatti	4	Annur (S)
		5	Periyanaickenpalayam	5	Thirumalaiampalayam	5	Anupparpalayam
		6	Thudialur			6	Coimbatore
						7	Ganapathi
						8	Karumathampatti
						9	Kinathukatavu
						10	Kolarpatti
						11	Kovilpalayam
						12	Madampatti
						13	Ottakkal Mandabam
						14	Perianegamam
						15	Perur
						16	Pollachi (N)
						17	Pollachi (S)
						18	Ramapattinam
						19	Sarkar Samakulam
						20	Selakkarichal
						21	Singanallur
						22	Sulur
						23	Thondamuthur
						24	Vadachittur
						25	Vadavalli
						26	Varapatti
4	**Cuddalore**	1	Manjakuppam	1	Pennadam	1	Kammapuram (E)
		2	Marungur			2	Kammapuram (W)
		3	Panruti			3	Nellikuppam
		4	Sethiyathoppu			4	Rettichavadi
		5	Sirupakkam			5	Thiruvanthipuram
						6	Umangalam
						7	Virudhachalam (S)
5	**Dharmapuri**	1	Dharmapuri	1	Krishnapuram	1	Bommidi
		2	Harur	2	Morappur	2	Indur
				3	Nallampalli	3	Kadathur
				4	Pappireddipatty	4	Kambainallur
						5	Karimangalam
						6	Marandahalli
						7	Palacode
						8	Palayam
						9	Papparapatty
						10	Pennagaram
						11	Perianahalli
						12	Perumbalai
						13	Pulikarai
						14	Thenkaraikottai
						15	Vellichandai
6	**Dindigul**	1	Athoor	1	Neikkarapattai	1	Ayakudi
		2	Kambiliampatti	2	Oruthattu	2	Ayyalur
		3	Korikadavu	3	Pillaiyarnatham	3	Ayyampalayam
		4	Pappampatti			4	Chinnakkampatti
						5	Chinnalpatti
						6	Devathur
						7	Dharmathupatti
						8	Dindigul West

CATEGORIZATION of ASSESSMENT UNITS, 2017							
TAMIL NADU							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over-Exploited
						9	Eriodu
						10	Kallimanthayam
						11	Kottanatham
						12	Kovilur
						13	Nilakottai
						14	Oddanchathram
						15	Palakkanoothu
						16	Palayam
						17	Puliyurnatham
						18	Reddiarchatram
						19	Shanarpatti
						20	Silvathur
						21	Thoppampatti
						22	Vadamadurai
						23	Vatlagundu
						24	Vedasandur
						25	Viruveedu
7	**Erode**	1	Bhavani	1	Ammapettai	1	Anthiyur
		2	Kanjikoil	2	Kasipalayam	2	Arachalur
		3	Kavandapadi	3	Kilampadi	3	Arasur
		4	Kurichi	4	Sathyamangalam	4	Athani
		5	Siruvalur	5	Thingalur	5	Bhavanisagar
		6	Thalavadi			6	Chennimalai
						7	Elathur
						8	Erode East
						9	Erode North
						10	Erode West
						11	Kodumudi
						12	Modakurichi
						13	Nambiyur
						14	Perundurai
						15	Punjaipuliampatti
						16	Vellode
8	**Kancheepuram**	1	Acchirupakkam	1	L.Endathur	1	Appur
		2	Cheyyur	2	Thirukazhukundram	2	Arumpuliyur
		3	Chithamur	3	Thiruppu Kuzhi	3	Chengalpattu
		4	Guduvancheri			4	Govindhavadi
		5	Jameenendathur			5	Nerumbur
		6	Kaliyampoondi			6	Orathi
		7	Karumbakkam			7	Singaperumalkoil
		8	Kattankulathur			8	Sirukaveripakkam
		9	Kayapakkam			9	Thirupulivanam
		10	Kollapakkam			10	Walajabad
		11	Kunnavakkam				
		12	Mamallapuram				
		13	Onampakkam				
		14	Pallur				
		15	Perumpakkam				
		16	Ponvilayanthakalathur				
		17	Uthiramerur				
		18	Vandalur				
9	**Kanyakumari**	1	Rajakkamangalam				
10	**Karur**	1	Chinnadharapuram			1	K.Paramathy
		2	Chinthalavadi			2	Kadavur
		3	Manmangalam			3	Karur
						4	Kattalai
						5	Mailampatti
						6	Pallapatti
						7	Panjapatti
						8	Pugalur
						9	Thalapatti
						10	Thennilai
						11	Thogaimalai
						12	Thoranakalpatti
						13	Vangal
						14	Velliyanai

CATEGORIZATION of ASSESSMENT UNITS, 2017							
TAMIL NADU							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over-Exploited**
11	**Krishnagiri**	1	Bagalur	1	Mathigiri	1	Alapatti
		2	Kakkadasam	2	Nagarasampatti	2	Bargur
		3	Kelamangalam	3	Rayakottai	3	Berigai
		4	Periyamuthur			4	Guruparapalli
		5	Thally			5	Hosur
		6	Uthanapalli			6	Kallavi
						7	Krishnagiri
						8	Mathur
						9	Palepalli
						10	Pochampalli
						11	Samalpatti
						12	Singarapettai
						13	Uthangarai
						14	Veppanapalli
12	**Madurai**	1	Elumalai	1	Karumathur	1	A.Vellalapatti
		2	Kalligudi	2	Madurai West	2	Kokkulam
		3	Madurai East	3	Thirumangalam	3	Kottampatti
		4	Pannikkundu			4	Muduvarpatti
		5	Peraiyur			5	Nagamalali Pudukotta
		6	Valanthur			6	Palamedu
		7	Valayankulam			7	Sedapatti
						8	Sindhupatti
						9	Usilampatti
						10	Uthappanaickanur
						11	Vellalur
13	**Nagapattinam**					1	Kuttalam
						2	Madhanam
						3	Manganallur
						4	Mayiladuthurai
						5	Melaiyur
						6	Palaiyur
						7	Pattavarthi
						8	Puthur
						9	Sembanarkoil
						10	Sirkali
						11	Thiruvenkadu
						12	Thiruvilaiyattam
						13	Vaitheeswaran Koil
14	**Namakkal**	1	Jedarpalayam	1	Elachipalayam	1	Alanganatham
		2	Manickampalayam			2	Erumaipatti
		3	Molasi			3	Kalappanaikanpatti
		4	Pallapatti			4	Kumarapalayam
						5	Mallasamudram
						6	Mangalapuram
						7	Mohanur
						8	Mullukurichi
						9	Nallipalayam
						10	Nallur
						11	Namagiripettai
						12	Namakkal
						13	Pandamangalam
						14	Paramathi
						15	Puduchatram
						16	Rasipuram
						17	Sellappampatti
						18	Senthamagalam
						19	Tiruchengode
						20	Vaiyappamalai
						21	Valaiyapatti
						22	Vennandur
15	**Peramabalur**	1	Koothur			1	Chettikulam
						2	Keelapuliyur
						3	Kurumbalur
						4	Pasumbalur
						5	Perambalur
						6	Valikandapuram
						7	Vengalam
16	**Pudukottai**	1	Kodumbalur	1	Keeramangalam		
		2	Arasamalai				
		3	Arasarkulam				
		4	Karaiyur				
		5	Kottur				

CATEGORIZATION of ASSESSMENT UNITS, 2017							
TAMIL NADU							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over-Exploited**
		6	Narthamalai				
		7	Ponnamaravathy				
		8	Varappur				
		9	Veerapatty				
		10	Vennavalkudi				
		11	Viralimalai				
17	**Salem**	1	Kolathur			1	Alagapuram
		2	Patchamalai			2	Attur
						3	Belur
						4	Edappadi
						5	Ernapuram
						6	Gangavalli
						7	Kadayampatti
						8	Karippatti
						9	Karupur
						10	Kattukkottai
						11	Kondalampatti
						12	Konganapuram
						13	Malliyakarai
						14	Mecheri
						15	Mettur
						16	Nangavalli
						17	Omalur
						18	Palamalai
						19	Pethanaickanpalayam
						20	Poolampatti
						21	Pottaneri
						22	Salem Town
						23	Sankari East
						24	Sankari West
						25	Semmandappatti
						26	Suramangalam
						27	Thalaivasal
						28	Tharamangalam
						29	Thirumalaigiri
						30	Valasaiyur
						31	Vazhappadi
						32	Veeraganoor
						33	Veerapandi
						34	Vembadithalam
						35	Yethapur
18	**Sivagangai**	1	Varappur				
19	**Thanjavur**	1	Budalur	1	Adirampattinam	1	Aduthurai
		2	Kurichi	2	Agarapettai	2	Ammapet
		3	Orathanad	3	Nambivayal	3	Andikkadu
		4	Perambur	4	Pattukkottai	4	Avanam
		5	Peravurani	5	Periyakottai	5	Ayyampettai
		6	Saliyamangalam	6	Sillathur	6	Devanancheri
		7	Thanjavur	7	Thambikkottai	7	Kabisthalam
				8	Ulur	8	Kandiyur
						9	Kathiramangalam
						10	Kavalipatti
						11	Kumbakonam
						12	Kuruvikarambai
						13	Madukkur
						14	Melattur
						15	Murukkangudi
						16	Nachiyarkoil
						17	Nadukaveri
						18	Nanjikottai
						19	Pandanallur
						20	Papanasam
						21	Ramapuram
						22	Thirukkattupalli
						23	Thirumangalakottai
						24	Thiruvaiyaru
						25	Thiruvidamarudur
						26	Thondarampattu
						27	Thuvarankurichi
						28	Tiruchitrambalam
						29	Tiruppanandal
						30	Vallam

CATEGORIZATION of ASSESSMENT UNITS, 2017							
TAMIL NADU							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over-Exploited
20	**Theni**	1	Andipatti	1	Kandamanur	1	Erasakkanaickanur
		2	Devathanapatti	2	Rajathani	2	Thevaram
		3	Kodangipatti				
		4	Kodivilarpatti				
		5	Theni				
		6	Thenkarai				
		7	Uthamapalayam				
21	**Thiruppur**	1	Kurichikottai	1	Dharapuram	1	Alangiyam
		2	Nallur	2	Thungavi	2	Avinashi(E)
		3	Udumalpet	3	Tiruppur (N)	3	Avinashi(W)
						4	Avinashipalayam(S)
						5	Cheyur
						6	Gudimangalam
						7	Kangeyam
						8	Kannivadi
						9	Karadivavi
						10	Kundadam
						11	Kunnathur
						12	Mulanur
						13	Nathakadaiyur
						14	Palladam
						15	Periavalavadi
						16	Perumanallur
						17	Pethappampatti
						18	Pongalur
						19	Ponnapuram
						20	Samalapuram
						21	Sankarandampalayam
						22	Tiruppur (S)
						23	Uthiyur
						24	Uthukuli
						25	Velampalayam
						26	Vellakoil
22	**Thiruvallur**	1	Ammanambakkam	1	Cherukkanoor	1	Ambattur
		2	Erumbi	2	Kanagammachattram	2	Avadi
		3	Kadambathur	3	Kannigaipair	3	Korattur
		4	Kattur	4	Thirumazhisai	4	Maduravoil
		5	Kolur	5	Tiruttani	5	Manali
		6	Madhavaram			6	Morai
		7	Mappedu			7	Nemam
		8	Pallipattu			8	Poonamallee
		9	Poonimangadu			9	Porur
		10	Thiruvalangadu			10	R.K.Pet
		11	Uthukkottai			11	Thirumullaivoyil
		12	Velliyur			12	Thiruninravur
						13	Thiruvotriyur
						14	Vellanur
						15	Vengathur
						16	Voyalanallur
23	**Thoothukudi**	1	Sattankulam	1	Parivallikottai	1	Ilayarasanendal
						2	Pallakurichi
						3	Udangudi
24	**Tirunelveli**	1	Alankulam	1	Kadayanallur	1	Ayikudi
		2	Levinjipuram	2	Radhapuram	2	Kallurani
		3	Manur	3	Veerakeralampudur	3	Gudalur
		4	Moolakaraipatti			4	Karisal Kulam
		5	Sivanthipatti			5	Karivaklamvandanallur
		6	Thalaiyuthu			6	Karuvantha
		7	Thiruvengadem			7	Keezhapavoor
		8	Vasudevanallur			8	Kurukkalpatti
		9	Vijayanarayanapuram			9	Nettur
						10	Pazhankottai
						11	Pazhavoor
						12	Puliyankudi
						13	Sankarankoil
						14	Sernthamangalam
						15	Surandai
						16	Uthumalai
						17	Vannikonenthal
						18	Veerasigamani
						19	Venkadampatti

CATEGORIZATION of ASSESSMENT UNITS, 2017							
TAMIL NADU							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over-Exploited**
25	**Tiruvannamalai**	1	Agrapalayam	1	Anakavoor	1	Arni
		2	Mandakolathur	2	Devikapuram	2	Chengam,Jawadhuhills
		3	Nateri	3	Kannamangalam	3	Chennavaram
		4	Perungattur	4	T.V.Malai (North)	4	Cheyyar
		5	Sathyavijayanagaram	5	Thellar	5	Desur
		6	T.V.Malai (South)	6	Thethurai	6	Dusi
		7	Vakkadai	7	Vadathandalam	7	Eraiyur
		8	Vembakkam			8	Kadaladi
						9	Kalasapakkam
						10	Kelur
						11	Kettavarampalayam
						12	Kilkodungalur
						13	Kilpennathur
						14	Kolappalur
						15	Malaiyur
						16	Melpallipattu
						17	Modayur
						18	Mullipattu
						19	Nayadumangalam
						20	Nedungunam
						21	Osur
						22	Pachal
						23	Peranamallur
						24	Polur
						25	Pudupalayam
						26	Santhavasal
						27	Somaspadi
						28	Thachambadi
						29	Thandarampat
						30	Thanipadi
						31	Thatchampattu
						32	Thurinjapuram
						33	Vanapuram
						34	Vandavasi
						35	Veraiyur
						36	Vettavlam
						37	Mangalam
26	**Tiruvarur**	1	Koothanallur	1	Vadapathimangalam	1	Agarathirumalam
		2	Nannilam			2	Alangudi
		3	Sannanallur			3	Avoor
						4	Kodavasal
						5	Koradacheri
						6	Kulikkarai
						7	Peralam
						8	Thirukkannamangai
						9	Thiruvizhimazhalai
						10	Valangaiman
27	**Trichy**	1	Andanallur	1	Ealurpatti	1	Eragudi
		2	Mannachanallur	2	Kattuputhur	2	Kannanur
		3	Musiri	3	Thottiyam	3	Kariyamanickam
		4	Peruvalpur			4	Koppampatti
		5	Sirugambur			5	Manapparai
		6	Valadi			6	Manikandam
						7	Marungapuri
						8	Pannappatti
						9	Pulivalam
						10	Sengattuppatti
						11	Thathaiyangarpettai
						12	Thumbalam
						13	Thuraiyur
						14	Thuvaranguriichi
						15	Uppiliyapuram
						16	V.Periyapatti
						17	Vaiyampatti
						18	Valaieduppu
28	**Vellore**	1	Arakonam(South)	1	Ambalur	1	Agaram
		2	Jolarpet	2	Mambakkam	2	Alangayam
		3	Kaniyambadi	3	Pallur	3	Ambur
		4	Kaveripakkam	4	Pudurnadu	4	Ammanankoil
		5	Panapakkam	5	Ussoor	5	Anaicut
		6	Paranji			6	Andiyappanur
		7	Ranipet			7	Arcot

CATEGORIZATION of ASSESSMENT UNITS, 2017							
TAMIL NADU							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over-Exploited**
		8	Thiruvalam			8	Gudiyatham (West)
		9	Velam			9	Gudiyatham(East)
		10	Visharam			10	K.V.Kuppam
						11	Kalavai
						12	Kandhili
						13	Katpadi
						14	Koratti
						15	Madhanur
						16	Melasannankuppam
						17	Melpatti
						18	Natrampalli
						19	Nemili
						20	Odugathur
						21	Pallikonda
						22	Pennathur
						23	Pernampattu
						24	Pudupadi
						25	Sathuvachari
						26	Thuthipattu
						27	Timiri
						28	Tirupathur
						29	Vaduganthangal
						30	Valathur
						31	Vaniyambadi
						32	Vellore
						33	Walajah
29	**Villupuram**	1	Avanipur	1	Arasur	1	Anniyur
		2	Chinnaselam	2	Chithalingamadam	2	Avalurpettai
		3	Kallakurichi	3	Nagalur	3	Brammadesam
		4	Kanai	4	Olakkur	4	Elavanasurkottai
		5	Kandamangalam	5	Ulundurpettai	5	Eraiyur
		6	Mailam	6	Vadasiruvalur	6	Gingee
		7	Manalurpettai			7	Indili
		8	Mugaiyur			8	Kalamarudur
		9	Sengurichi			9	Kanjanur
		10	T.V.Nallur			10	Kiliyanur
		11	Vadakanandal			11	Marakanam
		12	Vanur			12	Melmalayanur
		13	Vellimalai			13	Melolakkur
						14	Nainarpalayam
						15	Nemili
						16	Sathampati
						17	Sathiyamangalam
						18	Siruvadi
						19	Sithalampattu
						20	Thiruppalapandal
						21	Thiyagadurgam
						22	Tindivanam
						23	Uppuvelur
						24	Vallam
						25	Villupuram
30	**Virudhunagar**	1	Elayiram- Pannai	1	Alangulam	1	Cholapuram
		2	Iyankollankondan	2	Amathur	2	Mallankinar
		3	Kottaiyur	3	Mangalam	3	Nathampatti
		4	Malli	4	Ondipulinaickanur	4	Pillaiyarkulam
		5	Sivakasi	5	Salwarpatti	5	Rajapalayam
		6	Watrap	6	Srivilliputtur	6	Vatchakara-Patti
						7	Vembakottai
						8	Keelarajakularaman

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
1166	**163**	**79**	**462**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
TELANGANA							
Sl. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
1	**Adilabad**	1	Bazarhathnoor	1	Boath	1	Gudihathnur
		2	Inderavelly	2	Mavala	2	Ichoda
		3	Narnoor	3	Neradigonda	3	Tamsi
2	**Bhadradri_Kothagudem**	1	Dammapeta				
3	**Hyderabad**					1	Amberpet
						2	Ameerpet
						3	Asifnagar
						4	Bahadurpura
						5	Bandlaguda
						6	Charminar
						7	Golkonda
						8	Himayatnagar
						9	Khairatabad
						10	Maredpally
						11	Musheerabad
						12	Nampally
						13	Saidabad
						14	Secunderabad
						15	Shaikpet
						16	Tirumalgiri
4	**Jagtial**	1	Ibrahimpatnam	1	Kodimial	1	Kathlapur
		2	Jagityal_Rural	2	Medipalle	2	Malial
		3	Mallapur				
		4	Metpalle				
5	**Jangaon**	1	Chilpur	1	Bachannapeta	1	Jangaon
		2	Ganpur_stn	2	Devaruppala		
		3	Kodakandla	3	Gundala		
		4	Narmetta	4	Lingalaghanpur		
				5	Palakurthi		
				6	Raghunathpalle		
				7	Tharigoppula		
				8	Zaffergadh		
6	**Jayashankar_Bhupalapa**	1	Bhupalpalle			1	Kataram
		2	Ghanapur_Mulug				
		3	Mogullapalle				
		4	Regonda				
		5	Venkatapuram				
7	**Jogulamba_Gadwal**	1	Kaloor_Timmanadodd				
		2	Maldakal				
8	**Kamareddy**	1	Bichkunda	1	Bhiknur		
		2	Birkoor	2	Bibipet		
		3	Gandhari	3	Domakonda		
		4	Jukkal	4	Kamareddy		
		5	Lingampet	5	Machareddy		
		6	Madnur	6	Ramareddy		
		7	Nasurullabad				
		8	Pedda Kodapgal				
		9	Pitlam				
		10	Rajampet				
		11	Sadasivanagar				
		12	Tadwai				
9	**Karimnagar**	1	Ellandakunta	1	Chigurumamidi	1	Gangadhara
		2	Huzurabad	2	Choppadandi		
		3	Karimnagar	3	Gannervaram		
		4	Kothapalle	4	Ramadugu		
		5	Manakondur				
		6	Thimmapur				
		7	V_Saidapur				
10	**Khammam**	1	Chinthakani	1	Raghunadhapalem	1	Khammam_Rural
		2	Mudigonda			2	Kusumanchi
		3	Nelakondapalle			3	Thirumalayapalem
		4	Vemsoor				
11	**Komarambhem_Asifaba**	1	Kagaznagar				
12	**Mahabubabad**	1	Chinnagudur	1	Thorrur	1	Danthalapalle
		2	Mahabubabad			2	Maripeda
		3	Nellikudur			3	Narsimhulapet
						4	Peddavangara
13	**Mahabubnagar**	1	Addakal	1	Hanwada	1	Balanagar
		2	Kosgi	2	Narva	2	Midjil
		3	Marikal	3	Rajapur		
		4	Musapet				

CATEGORIZATION of ASSESSMENT UNITS, 2017							
TELANGANA							
Sl. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over Exploited
		5	Nawabpet				
14	**Mancherial**	1	Chennur				
15	**Medak**	1	Chegunta	1	Nizampet		
		2	Chilipched				
		3	Kowdipalle				
		4	Manoharabad				
		5	Narsapur				
		6	Narsingi				
		7	Ramayampet				
		8	Regode				
		9	Shankarampet_R				
		10	Shivampet				
		11	Tupran				
16	**Medchal_Malkajgiri**	1	Alwal	1	Bachpalle	1	Balanagar
		2	Dundigal_Gandimais	2	Medchel	2	Kapra
		3	Keesara			3	Kukatpally
		4	Medipally			4	Malkajgiri
		5	Shamirpet			5	Quthbullapur
						6	Uppal
17	**Nagarkurnool**	1	Balmoor	1	Tadoor		
		2	Bijinapalle	2	Veldanda		
		3	Charakonda				
		4	Kalwakurthy				
		5	Kodair				
		6	Lingal				
		7	Nagar_Kurnool				
		8	Peddakothapalle				
		9	Telkapalle				
		10	Thimmajipeta				
		11	Uppunuthala				
		12	Urkonda				
		13	Vangoor				
18	**Nalgonda**	1	Chandampet			1	Kangal
		2	Chandur			2	Kattangoor
		3	Chinthapalle			3	Peddavura
		4	Chityala			4	Vemulapalle
		5	Kethepalle				
		6	Kondamallapally				
		7	Madugulapally				
		8	Miryalaguda				
		9	Munugode				
		10	Nakrekal				
		11	Nalgonda				
		12	Nampalle				
		13	Tirumalagiri_Sagar				
19	**Nirmal**	1	Dilawarpur				
		2	Nirmal_Rural				
20	**Nizamabad**	1	Bheemgal	1	Vailpur	1	Armur
		2	Bodhan			2	Mortad
		3	Dichpalle			3	Mupkal
		4	Jakranpalle			4	Nizamabad_North
		5	Makloor				
		6	Nandipet				
		7	Rudrur				
		8	Sirkonda				
		9	Varni				
21	**Peddapalli**	1	Manthani				
22	**Rajanna_Sircilla**	1	Chandurthi	1	Konaraopeta	1	Mustabad
		2	Ellanthakunta			2	Sirsilla
		3	Thangallapalle				
		4	Veernapalle				
		5	Vemulawada				
		6	Vemulawada_Rural				
		7	Yellareddypeta				
23	**Rangareddy**	1	Balapur	1	Amangal	1	Kothur
		2	Chowdergudem	2	Kadthal		
		3	Farooqnagar	3	Kondurg		
		4	Hayathnagar	4	Moinabad		
		5	Ibrahimpatnam	5	Rajendranagar		
		6	Kandukur	6	Saroornagar		
		7	Keshampeta	7	Serilingampally		
		8	Madgul	8	Shamshabad		
		9	Maheshwaram	9	Talakondapalle		

CATEGORIZATION of ASSESSMENT UNITS, 2017							
TELANGANA							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over Exploited
		10	Manchal				
		11	Nandigam				
		12	Shabad				
		13	Shankarpalle				
24	**Sangareddy**	1	Gummadidala	1	Kalher	1	Ameenapur
		2	Hathanoora			2	Jharasangam
		3	Jinnaram			3	Naykal
		4	Kandi			4	Patancheruvu
		5	Kohir			5	Zahirabad
		6	Kondapur				
		7	Mogdampalle				
		8	Ramachandrapuram				
		9	Sangareddy				
25	**Siddipet**	1	Anthakkapeta	1	Bejjanki	1	Kondapak
		2	Chinnakodur	2	Cheriyal	2	Maddur
		3	Gajwel	3	Doultabad	3	Markook
		4	Husnabad	4	Dubbak	4	Mirdoddi
		5	Siddipet_Urban	5	Jagadevpur	5	Mulug
		6	Thoguta	6	Koheda	6	Nanganur
				7	Komaravelly	7	Wargal
				8	Rayapole		
				9	Siddipet_Rural		
26	**Suryapet**	1	Jajireddigudem	1	Atmakur_S	1	Nagaram
		2	Maddirala	2	Chivvemla		
		3	Noothankal	3	Mothey		
		4	Thirumalagiri	4	Thungathurthi		
27	**Vikarabad**	1	Bantwaram				
		2	Bomraspeta				
		3	Doma				
		4	Doulatabad				
		5	Kotepally				
		6	Nawabpet				
28	**Wanaparthy**	1	Amarchinta	1	Gopalpeta		
		2	Ghanpur				
		3	Pangal				
		4	Peddamandadi				
		5	Revelly				
		6	Wanaparthy				
29	**Warangal_Rural**	1	Chennaraopeta	1	Geesugonda	1	Duggondi
		2	Nekkonda	2	Nallabelly	2	Raiparthy
		3	Parvathagiri	3	Sangem		
				4	Wardhannapet		
30	**Warangal_Urban**	1	Kamalapur	1	Bheemadevarapalle	1	Dharmasagar
						2	Elkathurthi
						3	Inole
						4	Khilla_Warangal
						5	Velair
31	**Yadadri_Bhongiri**	1	Alair	1	Bhongiri		
		2	Atmakur_M	2	Rajapet		
		3	Bommalaramaram	3	Turkapalle_M		
		4	Choutuppal				
		5	Mootakondur				
		6	Mothkur				
		7	Narayanapur				
		8	Ramannapeta				

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
584	**169**	**67**	**70**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
UTTAR PRADESH							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over-Exploited**
1	**Agra**	1	Bah	1	Achhnera	1	Barauli Ahir
		2	Jagner	2	Akola	2	Bichpuri
		3	Kheragarh			3	Etmadpur
						4	Fatehabad
						5	Fatehpur Sikri
						6	Khandauli
						7	Saiya
						8	Shamsabad
2	**Aligarh-City**	1	Chandaus	1	Iglas		
		2	Gangiri				
		3	Jawan				
		4	Khair				
		5	Lodha				
3	**Ambedkar Nagar**	1	Baskhari				
		2	Bhiti				
		3	Jahangirganj				
		4	Jalalpur				
		5	Katehari				
4	**Amethi**	1	Sangrampur				
5	**Amroha**	1	Amroha			1	Dhanora
		2	Gangeshwari			2	Gajraula
						3	Hasanpur
						4	Joya
6	**Ayodhya**	1	Bikapur				
		2	Milkipur				
7	**Azamgarh**	1	Sathiaon				
8	**Baghpat**	1	Baraut	1	Baghpat	1	Binauli
		2	Chaprauli			2	Khekra
						3	Pilana
9	**Banda**	1	Baberu				
		2	Jaspura				
		3	Naraini				
		4	Tindwari				
10	**Barabanki**	1	Banikodar				
11	**Bareilly**	1	Alampur Zafarabad				
		2	Fatehganj				
		3	Ram Nagar				
12	**Bijnor**	1	Aaku Nehtaur	1	Noorpur	1	Jalilpur
		2	Budhanpur Seohara				
13	**Budaun**	1	Bisauli	1	Asafpur	1	Ambiapur
		2	Jagat			2	Islamnagar
		3	Mion				
		4	Quadarchowk				
		5	Sahaswan				
		6	Salarpur				
		7	Ujhani				
14	**Bulandshahar**	1	Anupshahar	1	B.B. Nagar	1	Bulandshahar
		2	Arnia Khurd	2	Khurja	2	Danpur
		3	Jahangirabad	3	Shikarpur	3	Gulaoti
		4	Lakhaoti	4	Unchagaon	4	Sikandrabad
		5	Pahasu			5	Siyana
15	**Chitrakoot**	1	Manikpur	1	Karwi		
		2	Mau				
		3	Pahari				
		4	Ram Nagar				
16	**Etah**	1	Aliganj	1	Jalesar		
		2	Awagarh				
		3	Jaithara				
		4	Nidholikalan				
		5	Sheetalpur				
17	**Farrukhabad**	1	Barhpur				
		2	Kamalganj				
		3	Mohammdabad				
		4	Nawabganj				
		5	Shamsabad				
18	**Fatehpur**	1	Airayan	1	Amauli	1	Bhitaura
		2	Bahua				
		3	Dhata				
		4	Haswa				
		5	Hathgaon				
		6	Malwan				
		7	Teliyani				

CATEGORIZATION of ASSESSMENT UNITS, 2017							
UTTAR PRADESH							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over-Exploited
19	**Firozabad**	1	Madanpur	1	Araon	1	Firozabad
						2	Khairgarh(Hathwant)
						3	Narkhi
						4	Shikohabad
						5	Tundla
20	**G.B.Nagar**	1	Dadri	1	Dankaur	1	Bisrakh
						2	Jewar
21	**Ghaziabad**	1	Muradnagar			1	Bhojpur
						2	Loni
						3	Razapur
22	**Ghazipur**	1	Barachawar				
		2	Muhammadabad				
		3	Saidpur				
23	**Hamirpur**	1	Gohand				
		2	Maudaha				
		3	Rath				
		4	Sarila				
		5	Sumerpur				
24	**Hapur**	1	Dhaulana			1	Grahmukteshwar
						2	Hapur
						3	Simbhaoli
25	**Hathras**	1	Sadabad	1	Hathras	1	Mursan
		2	Sikandrarao			2	Sahpau
						3	Sasni
26	**Jaunpur**	1	Barasathi	1	Buxa	1	Badalapur
		2	Dharamapur	2	Muftiganj	2	Karanjakalan
		3	Dobhi			3	Kerakat
		4	Ramnagar			4	Mahrajganj
		5	Rampur			5	Sikarara
						6	Sirkoni
27	**Jhansi**	1	Babina				
		2	Bangra				
		3	Baragaon				
		4	Mauranipur				
28	**Kannauj**	1	Chibramau			1	Jalalabad
		2	Gugrapur			2	Talgram
		3	Kannauj				
29	**Kanpur Dehat**	1	Akbarpur				
		2	Malasa				
		3	Rasoolabad				
		4	Sarvan Khera				
30	**Kanpur Nagar**	1	Bidhnoo	1	Ghatampur	1	Chaubeypur
		2	Bilhaur	2	Sarsaul		
		3	Patara				
		4	Shivrajpur				
31	**Kasganj**	1	G.Dhundwara	1	Kasganj		
		2	Sahawar				
32	**Kaushambi**	1	Kara			1	Chail
		2	Manjhanpur			2	Moorat Ganj
		3	Newada				
		4	Sirathu				
33	**Lalitpur**	1	Bar				
		2	Birdha				
		3	Jakhaura				
		4	Madaora				
		5	Mehrauni				
		6	Talbehat				
34	**Mahoba**	1	Charkhari			1	Jaitpur
		2	Kabrai			2	Panwari
35	**Mainpuri**	1	Jageer			1	Barnahal
		2	Mainpuri				
36	**Mathura**	1	Farah			1	Baldeo
						2	Nohjhil
						3	Raya
37	**Meerut**	1	Hastinapur	1	Meerut	1	Kharkhoda
		2	Mawana	2	Parichhatgarh	2	Machhra
		3	Sarurpur			3	Rajpura
38	**Mirzapur**	1	Sikhar	1	Chanbey		
				2	City		
				3	Kon		
				4	Majhawan		

CATEGORIZATION of ASSESSMENT UNITS, 2017							
UTTAR PRADESH							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over-Exploited**
39	**Moradabad**	1	Chhijlet	1	Bhagatpur Tanda		
		2	Dingerpur	2	Bilari		
		3	Munda Pandey	3	Dilari		
		4	Moradabad				
40	**Muzaffarnagar**	1	Muzaffar Nagar	1	Charthawal	1	Baghara
		2	Shahpur			2	Budhana
41	**Pratapgarh**	1	Aspur Deosara	1	Mangraura	1	Mandhata
		2	Baba Belkhernath	2	Patti	2	Pratapgarh Sadar
		3	Gaura			3	Sandwa Chandrika
		4	Lakshmanpur			4	Shivgarh
		5	Lalganj				
		6	Rampur Sangramgarh	-			
42	**Prayagraj**	1	Holagarh	1	Bahadurpur	1	Chaka
		2	Mau-Aima	2	Baheria		
		3	Saidabad	3	Dhanupur		
				4	Pratappur		
43	**Raibareli**	1	Sareni				
44	**Rampur**	1	Said Nagar			1	Chamraua
		2	Shahabad				
		3	Swar				
		4	Baliakheri				
45	**Saharanpur**			1	Deoband	1	Gangoh
				2	Muzafarabad	2	Nagal
				3	Nanauta	3	Nakur
				4	Rampur	4	Saduli Qudim
						5	Sarsawa
46	**Sambhal**	1	Junawai	1	Asmoli	1	Bahjoi
				2	Gunnaur	2	Baniakhera
				3	Sambhal	3	Pawansa
47	**Sant Ravidas Nagar**	1	Abholi	1	Bhadohi		
		2	Aurai	2	Gyanpur		
		3	Deegh				
		4	Suriyawan				
48	**District-Shamli**	1	Thana Bhawan			1	Kairana
						2	Kandhala
						3	Shamli
						4	Un
49	**Sonbhadra**	1	Duddhi				
50	**Varanasi**	1	Baragaon	1	Pindara	1	Araziline
		2	Chiraigaon			2	Harhua
		3	Cholapur				
		4	Kashi Viddyapeeth				
		5	Sewapuri				
Cities							
				1	Agra-City	1	Aligarh-City
						2	Bareilly-City
						3	Ghaziabad-City
						4	Kanpur-City
						5	Lucknow-City
						6	Meerut-City
						7	Moradabad-City
						8	Prayagraj-City
						9	Varanasi-City

ABSTRACT

Total No. of Assessed Units	Semicritical	Critical	Over Exploited
830	**151**	**48**	**91**

CATEGORIZATION of ASSESSMENT UNITS, 2017							
Uttarakhand							
S. No	District	S. No	Semi-Critical	S. No	Critical	S. No	Over Exploited
1	Haridwar	1	Bahadarabad				
		2	Bhagwanpur				
2	Nainital	1	Haldwani				
3	Udham Singh Nagar	1	Kashipur				
		2	Khatima				

ABSTRACT

Total No. of Assessed Units	Semicritical	Critical	Over Exploited
18	5	Nil	Nil

CATEGORIZATION of ASSESSMENT UNITS, 2013							
WEST BENGAL							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
1	**Malda**	1	Habibpur				
2	**Murshidabad**	1	Barwan				
		2	Bhagabangola-I				
		3	Bhagabangola-Ii				
		4	Bharatpur-I				
		5	Bharatpur-Ii				
		6	Domkal				
		7	Jalangi				
		8	Kandi				
		9	Khargram				
		10	Lalgola				
		11	Mur-Jiaganj				
		12	Nabagram				
		13	Nowda				
		14	Raninagar-I				
		15	Raninagar-Ii				
		16	Sagardighi				
		17	Suti-Ii				
3	**Nadia**	1	Chapra				
		2	Hanskhali				
		3	Kaligunj				
		4	Karimpur-I				
		5	Karimpur-Ii				
		6	Krishnaganj				
		7	Krishnagar-I				
		8	Nakashipara				
		9	Ranaghat-Ii				
		10	Tehatta-I				
		11	Tehatta-Ii				
4	**North 24-Parganas**	1	Barrackpore-Ii				
5	**Hooghly**	1	Arambag	1	Goghat-II		
		2	Chanditala-I				
		3	Chanditala-Ii				
		4	Dhaniakhali				
		5	Goghat-I				
		6	Jangipara				
		7	Khanakul-I				
		8	Pandua				
		9	Polba-Dadpur				
		10	Purshura				
		11	Singur				
		12	Tarakeswar				
6	**Burdwan**	1	Bhatar				
		2	Kalna-Ii				
		3	Katwa-I				
		4	Katwa-Ii				
		5	Ketugram-I				
		6	Ketugram-Ii				
		7	Memari-Ii				
		8	Mongalkote				
		9	Monteswar				
		10	Raina-I				
		11	Raina-I I				
7	**Birbhum**	1	Labhpur				
		2	Murarai-Ii				
		3	Nalhati-Ii				
		4	Nanoor				
		5	Rampurhat-Ii				
		6	Sainthia				
8	**Bankura**	1	Bishnupur				
9	**Purba Medinipore**	1	Bhagawanpur-I				
		2	Bhagawanpur-Ii				
		3	Egra-I				
		4	Egra-Ii				

CATEGORIZATION of ASSESSMENT UNITS, 2013							
WEST BENGAL							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
		5	Kolaghat (Panskura-Ii)				
		6	Moyna				
		7	Panskura-I				
		8	Potashpur-I				
		9	Potashpur-Ii				
10	**Paschim Medinipore**	1	Chandrakona-Ii				
		2	Dantan-Ii				
		3	Daspur-Ii				
		4	Debra				
		5	Ghatal				
		6	Pingla				
		7	Sabang				

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
268	76	1	Nil

NOTE:

For West Bengal GWRA, 2013 is used as the 2017 Resources of the State was not approved By CLEG, 2017

CATEGORIZATION of ASSESSMENT UNITS, 2017							
UT OF CHANDIGARH							
S. No	UT	S. No	Semi-Critical	S. No	Critical	S. No	Over Exploited
1	Chandigarh	1	Chandigarh				
ABSTRACT							
Total No. of Assessed Units			Semicritical	Critical		Over Exploited	
1			1	Nil		Nil	

CATEGORIZATION of ASSESSMENT UNITS, 2017							
UT OF DAMAN & DIU							
Sl. No	UT	S. No	Semi-Critical	S. No	Critical	S. No	Over Exploited
1	UT of Daman & Diu			1	Diu		
ABSTRACT							
Total No. of Assessed Units			Semicritical	Critical		Over Exploited	
2			Nil	1		Nil	

CATEGORIZATION OF ASSESSMENT UNITS, 2017							
LAKSHADWEEP							
S. No	**Island**	**S. No**	**Semicritical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
1	**Agatti**	1	Agatti				
2	**Amini**	1	Amini				
3	**Kavaratti**	1	Kavaratti				

ABSTRACT			
Total No. of Assessed Units	**Semicritical**	**Critical**	**Over Exploited**
9	**3**	**Nil**	**Nil**

CATEGORIZATION OFASSESSMENT UNITS, 2017							
UT OF PUDUCHERRY							
S. No	**District**	**S. No**	**Semi-Critical**	**S. No**	**Critical**	**S. No**	**Over Exploited**
1	**UT of Puducherry**					1	Puducherry
ABSTRACT							
Total No. of Assessed Units			**Semicritical**	**Critical**		**Over Exploited**	
4			**Nil**	**Nil**		**1**	

ANNEXURE-IV (B)

QUALITY PROBLEMS IN ASSESSMENT UNITS (AS IN MARCH 2017)

NOTE:

 # Only Assessment Units where the Quality Tag of As, F & Salinity have been reported are provided against respective districts and states.

 # The Assessment Units with “C”, indicates the phreatic aquifer in the assessment unit is almost/ completely brackish /saline

 # The Quality Tag In Respect of As & F indicates Sporadic Occurrences.

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
ANDHRA PRADESH							
S. No	**District**	**S. No**	**Fluoride**	**S. No**	**Arsenic**	**S. No**	**Salinity**
1	**East Godavari**					1	Allavaram
						2	I Polavaram
						3	Kajuluru
						4	Karapa
						5	Katrenikona
						6	Malikipuram
						7	Mamidikuduru
						8	Sakhinetipalle
						9	Thallarevu
						10	Uppalaguptam
2	**Guntur**					1	Amaravathi
						2	Amruthalur
						3	Bapatla
						4	Chebrole
						5	Chilakaluripet
						6	Duggirala
						7	Edlapadu
						8	Guntur Mandal
						9	Kakumanu
						10	Karlapalem
						11	Medikonduru
						12	Nadendla
						13	Nagaram
						14	Nizampatnam
						15	Pedakakani
						16	Pedanandipad(C)
						17	Phirangipuram
						18	Pittalavanipalem
						19	Ponnur
						20	Prathipadu
						21	Repalle
						22	Sattenapalle
						23	Tadikonda
						24	Tenali
						25	Thullur
						26	Tsundur
						27	Vatticherukuru(C)
						28	Vinukonda
3	**Krishna**					1	Bantumilli(C)
						2	Gudlavalleru(C)
						3	Gudur (Krishna)(C)
						4	Kaikalur(C)
						5	Kalidindi(C)
						6	Koduru(C)
						7	Kruthivennu(C)
						8	Machilipatnam(C)
						9	Mandavalli(C)
						10	Mudinapalle(C)
						11	Nagayalanka(C)
						12	Nandivada(C)
						13	Pedana(C)
4	**Nellore**					1	Chittamur
						2	Tada
5	**Prakasam**					1	Addanki
						2	Darsi
						3	Inkollu
						4	Janakavarampangulu
						5	Karamchedu(C)
						6	Kothapatnam
						7	Maddipadu
						8	Mundlamuru
						9	Naguluppalapadu
						10	Ongole
						11	Parchur
						12	Santhanuthlapadu
						13	Tangutur
						14	Yeddanapudi

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
ANDHRA PRADESH							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
6	**West Godavari**					1	Akiveedu(C)
						2	Bheemavaram(C)
						3	Ganapavaram(C)
						4	Kalla(C)
						5	Mogalthur(C)
						6	Narasapuram(C)
						7	Nidamarru(C)
						8	Palacole(C)
						9	Palakoderu(C)
						10	Pentapadu(C)
						11	Poduru(C)
						12	Undi(C)
						13	Veeravasaram(C)
						14	Yelamanchili(C)

ABSTRACT				
Total No. of Assessed Units	**Fluoride**	**Arsenic**		**Salinity**
670	**Nil**	**Nil**		**41 Partial, 40 Complete**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
ASSAM							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
1	**Baksa**			1	Baksa		
2	**Barpeta**	1	Barpeta	2	Barpeta		
3	**Bongaigaon**			3	Bongaigaon		
4	**Cachar**			4	Cachar		
5	**Darrang**			5	Darrang		
6	**Dhemaji**			6	Dhemaji		
7	**Dhubri**	2	Dhubri	7	Dhubri		
8	**Goalpara**	3	Goalpara	8	Goalpara		
9	**Golaghat**	4	Golaghat	9	Golaghat		
10	**Hailakandi**			10	Hailakandi		
11	**Jorhat**	1	Jorhat	11	Jorhat		
12	**Kamrup**	2	Kamrup	12	Kamrup		
13	**Kamrup Metro (U)**	3	Kamrup Metro (U)	13	Kamrup Metro (U)		
14	**Karbi Anglong**	4	Karbi Anglong				
15	**Karimganj**	5	Karimganj	14	Karimganj		
16	**Kokrajhar**			15	Kokrajhar		
17	**Lakhimpur**			16	Lakhimpur		
18	**Morigaon**			17	Morigaon		
19	**Nagaon**	6	Nagaon	18	Nagaon		
20	**Nalbari**	7	Nalbari	19	Nalbari		
21	**Sivasagar**			20	Sivasagar		
22	**Sonitpur**			21	Sonitpur		
23	**Udalguri**	8	Udalguri				

ABSTRACT			
Total No. of Assessed Units	Fluoride	Arsenic	Salinity
28	12	21	Nil

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
BIHAR							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
1	**Aurangabad**	1	Aurangabad				
		2	Barun				
		3	Deo				
		4	Goh				
		5	Haspura				
		6	Kutumba				
		7	Madanpur				
		8	Nabinagar				
		9	Obra				
		10	Rafiganj				
2	**Banka**	1	Amarpur				
		2	Banka				
		3	Barahat				
		4	Bausi				
		5	Belhar				
		6	Chandan				
		7	Dhuraiya				
		8	Katoria				
		9	Phulidumar				
		10	Rajun				
		11	Shambhuganj				
3	**Begusarai**			1	Bachhawara		
				2	Balia		
				3	Barauni		
				4	Begusarai		
				5	Matihani		
				6	Naokothi		
				7	Sahebpur Kamal		
4	**Bhabhua**	1	Adhaura				
		2	Bhabhua				
		3	Bhagwanpur				
		4	Chainpur				
		5	Chand				
		6	Durgawati				
		7	Kudra				
		8	Mohania				
		9	Nuaon				
		10	Ramgarh				
		11	Rampur				
5	**Bhagalpur**	1	Goradih	1	Jagdishpur		
		2	Jagdishpur	2	Kahalgaon		
		3	Kahalgaon	3	Nathnagar		
		4	Kharik	4	Pirpainti		
		5	Narayanpur	5	Sabour		
		6	Nathnagar	6	Sultanganj		
		7	Naugachia				
		8	Pirpainti				
		9	Sabour				
		10	Sonhaula				
		11	Sultanganj				
6	**Bhojpur**			1	Arrah		
				2	Barhara		
				3	Behea		
				4	Koilbar		
				5	Shahpur		
				6	Udwantnagar		
7	**Buxar**			1	Brahampur		
				2	Buxar		
				3	Chakki		
				4	Simari		
8	**Darbhanga**			1	Baheri		
				2	Biraul		
9	**Gaya**	1	Amas				
		2	Atri				
		3	Banka Bazar				
		4	Barachatti				
		5	Belaganj				
		6	Bodhgaya				
		7	Dobhi				
		8	Dumaria				
		9	Fatehpur				
		10	Gaya Sadar				

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
BIHAR							
S. No	**District**	**S. No**	**Fluoride**	**S. No**	**Arsenic**	**S. No**	**Salinity**
		11	Guraru				
		12	Gurua				
		13	Imamganj				
		14	Khizirsarai				
		15	Konch				
		16	Manpur				
		17	Mohanpur				
		18	Mouhra				
		19	Nimchak Bathani				
		20	Paraiya				
		21	Sherghati				
		22	Tankupa				
		23	Tekari				
		24	Wazirganj				
12	**Jamui**	1	Aliganj				
		2	Barhat				
		3	Chakai				
		4	Gidhaur				
		5	Jamui				
		6	Jhajha				
		7	Khaira				
		8	Lakhimpur				
		9	Sikandra				
		10	Sono				
13	**Jehanabad**	1	Hulasganj				
		2	Jehanabad				
		3	Ratni Faridpur				
14	**Katihar**			1	Amdabad		
				2	Barari		
				3	Kursela		
				4	Manihari		
				5	Mansahi		
				6	Samili		
15	**Khagaria**			1	Gogari		
				2	Khagaria		
				3	Mansi		
				4	Parbatta		
16	**Kishanganj**			1	Bahadurganj		
				2	Kishanganj		
17	**Lakhisarai**	1	Ramgarh Chowk	1	Barahia		
				2	Lakhisarai		
				3	Piparia		
				4	Surajgarha		
18	**Munger**	1	Asarganj	1	Bariarpur		
		2	Bariarpur	2	Dharhara		
		3	Dharhara	3	Jamalpur		
		4	Jamalpur	4	Munger		
		5	Kharagpur				
		6	Munger				
		7	Sangrampur				
		8	Tarapur				
		9	Tetia Bhamber				
19	**Nalanda**	1	Asthawan				
		2	Ben				
		3	Biharsarif				
		4	Bind				
		5	Chandi				
		6	Ekangasarai				
		7	Giriak				
		8	Harnaut				
		9	Hilsa				
		10	Islampur				
		11	Karai parsauni				
		12	katrisarai				
		13	Nagarnausa				
		14	Noorsarai				
		15	Parwalpur				
		16	Rahui				
		17	Rajgir				
		18	Sarmera				

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
BIHAR							
S. No	**District**	**S. No**	**Fluoride**	**S. No**	**Arsenic**	**S. No**	**Salinity**
		19	Silao				
		20	Tharthari				
20	**Nawada**	1	Akbarpur				
		2	Govindpur				
		3	Hisua				
		4	Kasichak				
		5	Kawakol				
		6	Meskaur				
		7	Nardiganj				
		8	Narhat				
		9	Nawada				
		10	Pakribarwan				
		11	Rajauli				
		12	Roh				
		13	Sirdala				
		14	Warsaliganj				
21	**Patna**			1	Bakhtiarpur		
				2	Barh		
				3	Danapur		
				4	Maner		
22	**Purnia**			1	Kasba		
				2	Purnea (E)		
23	**Rohtas**	1	Akhorigola				
		2	Bikramganj				
		3	Chenari				
		4	Dawath				
		5	Dehari				
		6	Dinara				
		7	Karahgar				
		8	Karakat				
		9	Nasariganj				
		10	Nokha				
		11	Sanjhauli				
		12	Sheosagar				
24	**Samastipur**			1	Mohanpur		
				2	Mohiaddinagar		
				3	Patori		
				4	Vidyapatinagar		
25	**Saran**			1	Chapra		
				2	Dighwara		
				3	Revelganj		
				4	Sonpur		
26	**Sheihkpura**	1	Ariari				
		2	Barbihga				
		3	Chebara				
		4	Ghatkusumba				
		5	Sheihkpura				
		6	Shekhopursarai				
27	**Vaishali**			1	Biddupur		
				2	Hazipur		
				3	Premraj/ Desri		
				4	Raghopur		
				5	Sahdai Bizurg		

ABSTRACT			
Total No. of Assessed Units	**Fluoride**	**Arsenic**	**Salinity**
534	**142**	**64**	**Nil**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
CHHATTISGARH							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
1	**Balrampur**	1	Kusmi				
		2	Ramchandrapur				
		3	Wadrafnagar				
2	**Bastar**	1	Bastanar				
3	**Kondagaon**	1	Kondagaon				
		2	Makdi				
		3	Pharasgaon				
4	**Korba**	1	Katghora				
		2	Podi Uprora				
5	**Koriya**	1	Baikunthpur				
		2	Khadgawan				
6	**Mahasamund**	1	Bagbahera				
		2	Mahasamund				
		3	Pithora				
7	**Rajnandgaon**			1	Ambagarh Chowki		
8	**Surajpur**	1	Ramanujnagar				
		2	Surajpur				
9	**Surguja**	1	Udaipur				

ABSTRACT			
Total No. of Assessed Units	**Fluoride**	**Arsenic**	**Salinity**
146	**17**	**1**	**Nil**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
DELHI							
S. No	**District**	**S. No**	**Fluoride**	**S. No**	**Arsenic**	**S. No**	**Salinity**
1	**Central Delhi**	1	Civil Lines				
2	**New Delhi**	1	Delhi Cantonment				
3	**North Delhi**	1	Alipur			1	Alipur
		2	Narela			2	Model Town
						3	Narela
4	**North West Delhi**	1	Kanjhawala			1	Kanjhawala
		2	Rohini			2	Rohini
		3	Saraswati Vihar			3	Saraswati Vihar
5	**South Delhi**	1	Hauz Khas				
		2	Mehrauli				
6	**South East Delhi**	1	Kalkaji				
7	**South West Delhi**	1	Kapashera			1	Dwarka
		2	Najafgarh			2	Kapashera
						3	Najafgarh
8	**West Delhi**	1	Punjabi Bagh			1	Patel Nagar
						2	Punjabi Bagh
						3	Rajouri Garden

ABSTRACT			
Total No. of Assessed Units	**Fluoride**	**Arsenic**	**Salinity**
34	**13**	**1**	**12**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
GUJARAT							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
1	**Ahmedabad**					1	Dhandhuka(C)
						2	Dholera(C)
2	**Banaskantha**					1	Bhabhar(C)
						2	Suigam(C)
						3	Vav(C)
3	**Kachchh**					1	Gandhidham(C)
4	**Morbi**					1	Maliya(C)
5	**Patan**					1	Harij(C)
						2	Radhanpur(C)
						3	Sami(C)
						4	Sankheswar(C)
						5	Santalpur(C)
6	**Surendranagar**					1	Lakhtar(C)

ABSTRACT

Total No. of Assessed Units	Fluoride	Arsenic	Salinity
248	Nil	Nil	13

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
HARYANA							
S. No	**District**	**S. No**	**Fluoride**	**S. No**	**Arsenic**	**S. No**	**Salinity**
1	**Ambala**			1	Ambala-I		
2	**Bhiwani**	1	Bawani khera	1	Tosham	1	Bawani khera
		2	Behal			2	Behal
		3	Bhiwani			3	Bhiwani
		4	Kairu			4	Kairu
		5	Loharu			5	Loharu
		6	Siwani			6	Siwani
		7	Tosham			7	Tosham
3	**Charki Dadri**	1	Charkhi dadri			1	Baund
						2	Charkhi dadri
						3	Jhojhu
4	**Faridabad**					1	Ballabgarh
						2	Faridabad
5	**Fatehabad**	1	Tohana			1	Bhattu kalan
						2	Bhuna
6	**Gurugram**	1	Farrukh nagar			1	Sohna
		2	Pataudi				
7	**Hisar**	1	Adampur			1	Barwala
		2	Agroha				
		3	Barwala				
		4	Bass				
		5	Hisar-i				
		6	Hisar-ii				
		7	Narnaund				
		8	Uklana				
8	**Jhajjar**	1	Bahadurgarh			1	Bahadurgarh
		2	Beri			2	Beri
		3	Salhawas			3	Jhajjar
						4	Matannail
						5	Salhawas
9	**Jind**	1	Alewa			1	Julana
		2	Julana			2	Narwana
						3	Pillukhera
						4	Uchana
10	**Kaithal**					1	Kalayat
						2	Rajound
11	**Karnal**	1	Assandh			1	Assandh
		2	Gharaunda (part)				
		3	Nissing at chirao				
12	**Mahendragarh**	1	Kanina			1	Ateli nangal
		2	Mahendragarh			2	Kanina
						3	Nizampur
						4	Satnali
						5	Sihma
13	**Mewat**					1	Ferozepur jhirka
						2	Nagina
						3	Nuh
						4	Punahana
14	**Palwal**	1	Hathin			1	Hathin
		2	Hodal			2	Hodal
		3	Palwal			3	Palwal
15	**Panchkula**	1	Pinjore				
16	**Panipat**	1	Madlauda			1	Israna
		2	Samalkha				
17	**Rewari**	1	Rewari			1	Khol at rewari
						2	Nahar
18	**Rohtak**	1	Maham			1	Kalanaur
		2	Rohtak			2	Lakhan majra
		3	Sampla			3	Maham
						4	Rohtak
						5	Sampla
19	**Sirsa**	1	Baragudha			1	Baragudha
		2	Dabwali			2	Dabwali
		3	Ellenabad			3	Ellenabad
		4	Nathusari Chopta			4	Nathusari Chopta
		5	Odhan			5	Odhan
		6	Rania			6	Rania
						7	Sirsa

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
HARYANA							
S. No	**District**	**S. No**	**Fluoride**	**S. No**	**Arsenic**	**S. No**	**Salinity**
20	**Sonipat**	1	Gohana			1	Gohana
		2	Kathura			2	Kathura
		3	Mundlana			3	Kharkhoda
						4	Mundlana
						5	Rai
						6	Sonipat

ABSTRACT			
Total No. of Assessed Units	**Fluoride**	**Arsenic**	**Salinity**
128	**47**	**2**	**61**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
JHARKHAND							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
1	**Bokaro**	1	Chas				
		2	Chandan Kiyari				
		3	Peterbar				
2	**Dhanbad**	1	Jharia				
		2	Baliapur				
3	**Garhwa**	1	Bhandaria				
		2	Bhawanathpur				
		3	Chinia				
		4	Dandai				
		5	Dhurki				
		6	Garhwa				
		7	Kandi				
		8	Majhiaon				
		9	Meral				
		10	Ramkanda				
		11	Ramna				
		12	Ranka				
		13	Untari				
4	**Giridih**	1	Giridih				
		2	Tisri				
5	**Godda**	1	Boarijor				
		2	Godda				
		3	Mahagama				
		4	Pathargama				
		5	Poreyahat				
6	**Gumla**	1	Bishunpur				
		2	Chainpur				
		3	Dumri				
		4	Ghaghra				
		5	Gumla				
		6	Sisai				
7	**Khunti**	1	Karra				
		2	Murhu				
8	**Koderma**	1	Chandwara				
		2	Jainagar				
		3	Koderma				
		4	Markachho				
		5	Satgawan				
9	**Pakur**	1	Amrapara				
		2	Litipara				
		3	Pakur				
10	**Palamu**	1	Bishrampur				
		2	Chainpur				
		3	Chhatarpur				
		4	Daltonganj				
		5	Haidernagar				
		6	Hariharganj				
		7	Leslieganj				
		8	Manatu				
		9	Pandu				
		10	Panki				
		11	Patan				
		12	Satbarwa				
11	**Ranchi**	1	Namkum				
		2	Ormanjhi				
		3	Silli				
12	**Sahebganj**	1	Barhait	1	Rajmahal		
		2	Borio	2	Sahebganj		
		3	Rajmahal	3	Udhua		
		4	Sahebganj				

ABSTRACT			
Total No. of Assessed Units	**Fluoride**	**Arsenic**	**Salinity**
260	**60**	**3**	**Nil**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
KERALA							
Sl. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
1	**Alappuzha**	1	Ambalappuzha (Deeper Zone)				
2	**Ernakulam**					1	Mulamthuruthy
3	**Kottayam**					1	Vaikom
4	**Malappuram**					1	Ponnani
5	**Palakkad**	1	Attappadi			1	Alathur
		2	Chittur			2	Kollengode
		3	Palakkad				
6	**Thiruvananthapuram**					1	Nemom
Total No. of Assessed Units		**Fluoride**		**Arsenic**		**Salinity**	
152		**4**		**Nil**		**6**	

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
MAHARASHTRA							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
1	**Ahmednagar**					1	Nagar
						2	Newasa
						3	Parner
						4	Rahuri
						5	Shrigonda
2	**Akola**					1	Akola
						2	Akot
						3	Balapur
						4	Murtizapur
						5	Telhara
3	**Amravati**					1	Achlapur
						2	Amravati
						3	Anjangaon Surji
						4	Bhatkuli
						5	Chandur Bazar
						6	Daryapur (C)
4	**Buldhana**					1	Jalgaon
						2	Nandura
						3	Sangrampur
						4	Shegaon
5	**Pune**					1	Baramati
						2	Daund
						3	Indapur
						4	Purandhar
6	**Sangli**					1	Miraj
						2	Palus
						3	Shirala
						4	Tasgaon
						5	Walwa

ABSTRACT			
Total No. of Assessed Units	**Fluoride**	**Arsenic**	**Salinity**
353	**Nil**	**Nil**	**29 (1Completely Saline)**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
ODISHA							
S. No	**District**	**S. No**	**Fluoride**	**S. No**	**Arsenic**	**S. No**	**Salinity**
1	**Balasore**					1	Bahanaga
						2	Balasore
						3	Baliapal
						4	Basta
						5	Bhograi
						6	Remuna
2	**Bhadrak**					1	Basudevpur
						2	Chandbali(C)
						3	Dhamnagar
						4	Tihidi
3	**Ganjam**					1	Chhatrapur
						2	Chikiti
						3	Ganjam
						4	Khalikote
						5	Rangeilunda
4	**Jagatsinghpur**					1	Balikuda
						2	Ersama(C)
						3	Kujanga
						4	Naugaon
5	**Jajpur**					1	Bari
						2	Binjharpur
						3	Dasarathpur
6	**Kendrapara**					1	Aul
						2	Derabish
						3	Garadpur
						4	Kendrapara
						5	Mahakalpada(C)
						6	Marshaghai(C)
						7	Pattamundai
						8	Rajkanika(C)
						9	Rajnagar(C)
7	**Khurda**						
8	**Puri**					1	Astarang
						2	Brahmagiri
						3	Delang
						4	Gop
						5	Kakatpur
						6	Kanas
						7	Krushnaprasad
						8	Nimapara
						9	Pipili
						10	Puri
						11	Satyabadi

ABSTRACT			
Total No. of Assessed Units	**Fluoride**	**Arsenic**	**Salinity**
314	**Nil**	**Nil**	**42**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
PUNJAB							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity/Tag
1	**Amritsar**			1	Ajnala		
				2	Chogawan		
2	**Barnala**					1	Barnala
						2	Sehna
3	**Bathinda**	1	Bathinda			1	Bathinda
		2	Nathana			2	Maur
		3	Phul			3	Nathana
		4	Rampura			4	Phul
		5	Talwandi Saboo			5	Rampura
						6	Sangat
						7	Talwandi Saboo
4	**Faridkot**	1	Faridkot	1	Faridkot	1	Faridkot
		2	Kot Kapura			2	Kot Kapura
5	**Fatehgarh Sahib**	1	Khera				
6	**Fazilka**	1	Abohar			1	Abohar
		2	Fazilka			2	Fazilka
		3	Khuyian Sarwar			3	Jalalabad
						4	Khuyian Sarwar
7	**Ferozepur**	1	Guru Har Sahai			1	Guru Har Sahai
8	**Gurdaspur**			1	Dera Baba Nanak		
				2	Fatehgarh Churian		
				3	Kalanaur		
9	**Hoshiarpur**			1	Hoshiarpur-1		
				2	Hoshiarpur-II		
10	**Mansa**					1	Bhikhi
						2	Budhlada
						3	Jhunir
						4	Mansa
						5	Sardulgarh
11	**Moga**					1	Bagha Purana
						2	Moga Ii
						3	Nihal Singh Wala
12	**Mohali**	1	Dera Bassi				
13	**Muktsar**	1	Lambi			1	Gidderbaha/ (Kot Bhai)
		2	Malout			2	Malout
		3	Muktsar			3	Muktsar
14	**Nawanshahar**			1	Nawan Shahr		
15	**Patiala**	1	Rajpura				
16	**Ropar**			1	Ropar		
17	**Sangrur**	1	Andana	1	Andana	1	Dhuri
		2	Lehraghaga	2	Maler Kotla	2	Lehraghaga
						3	Sangrur
						4	Sherpur
						5	Sunam
18	**Tarn Taran**	1	Bhikhiwind	1	Bhikhiwind		
				2	Patti		
ABSTRACT							
Total No. of Assessed Units		Fluoride		Arsenic		Salinity	
138		20		14		32	

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
RAJASTHAN							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity/Tag
1	**Alwar**					1	Kathumar
						2	Laxmangarh
2	**Barmer**					1	Baitu
						2	Balotra
						3	Barmer
						4	Chohtan
						5	Dhorimana
						6	Gadra Road
						7	Gida
						8	Gudamalani
						9	Kalyanpur
						10	Patodi
						11	Ramsar
						12	Samadri
						13	Sedwa
						14	Shiv
						15	Sindhary
						16	Siwana
3	**Bharatpur**					1	Deeg
						2	Kumher
						3	Nadbai
						4	Nagar
						5	Sewar
						6	Weir
4	**Bikaner**					1	Bikaner
						2	Dungargarh
						3	Khajuwala ©
						4	Kolayat
						5	Lunkaransar
						6	Nokha
5	**Churu**					1	Taranagar(C)
						2	Bidasar
						3	Churu
						4	Rajgarh
						5	Ratangarh
						6	Sardarshahar
						7	Sujangarh
6	**Ganganagar**					1	Vijainagar
						2	Anoopgarh
						3	Ganganagar
						4	Gharsana
						5	Karanpur
						6	Padampur
						7	Raisinghnagar
						8	Sadulshahar
						9	Suratgarh
7	**Hanumangarh**					1	Bhadra
						2	Hanumangarh
						3	Nohar
						4	Pilibangan
						5	Rawatsar(C)
						6	Sangria
						7	Tibbi
8	**Jaipur**					1	Phagi
9	**Jaisalmer**					1	Jaisalmer
						2	Sam
						3	Sankra
						1	Ahore
10	**Jalor**					2	Bhinmal
						3	Chitalwana
						4	Jalor
						5	Sayla
11	**Jhunjhunun**					1	Alsisar
12	**Jodhpur**					1	Balesar
						2	Bap
						3	Bilara
						4	Luni
						5	Mandor
						6	Shergarh
13	**Nagaur**					1	Degana
						2	Jayal
						3	Ladnu
						4	Makrana

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
RAJASTHAN							
S. No	**District**	**S. No**	**Fluoride**	**S. No**	**Arsenic**	**S. No**	**Salinity/Tag**
						5	Merta
						6	Nagaur
						7	Nawa
14	**Pali**					1	Jaitaran
						2	Marwar Ju
						3	Pali
						4	Rani
						5	Rohat
						6	Sojat
						7	Sumerpur
15	**Sikar**					1	Fatehpur
						2	Lachhmangarh
						3	Piprali
16	**Tonk**					1	Malpura
						2	Tonk

ABSTRACT			
Total No. of Assessed Units	**Fluoride**	**Arsenic**	**Saline**
295	**Nil**	**Nil**	**88 (3 Completely Saline)**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
TAMIL NADU							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
1	**Coimbatore**	1	Saravanampatti				
2	**Cuddalore**	1	Thozhudur			1	Parangipettai(C)
3	**Dharmapuri**	1	Bommidi				
		2	Dharmapuri				
		3	Harur				
		4	Indur				
		5	Karimangalam				
		6	Marandahalli				
		7	Morappur				
		8	Nallampalli				
		9	Palacode				
		10	Pappireddipatty				
		11	Pennagaram				
		12	Pulikarai				
		13	Theerthamalai				
4	**Dindigul**	1	Vatlagundu				
5	**Erode**	1	Ammapettai				
		2	Sathyamangalam				
		3	Vaniputhur				
6	**Karur**	1	Chinnadharapuram				
		2	K.Paramathy				
		3	Pugalur				
7	**Krishnagiri**	1	Bagalur				
		2	Bargur				
		3	Barur				
		4	Hosur				
		5	Kelamangalam				
		6	Krishnagiri				
		7	Mathur				
		8	Pochampalli				
		9	Shoolagiri				
		10	Uthangarai				
		11	Veppanapalli				
8	**Madurai**	1	Melur				
		2	Neerathan				
		3	Othakkadai				
		4	T.Kallupatti				
		5	Thirumangalam				
9	**Nagapattinam**					1	Kangalancheri(C)
						2	Kariyapattinam(C)
						3	Keelaiyur(C)
						4	Kilvelur(C)
						5	Nagappattinam(C)
						6	Nirmulai(C)
						7	Thagatur(C)
						8	Thalainayar(C)
						9	Therkupoigainallur(C)
						10	Thevoor(C)
						11	Thillayadi(C)
						12	Thirukannapuram(C)
						13	Thirukkuvalai(C)
						14	Thirumarugal(C)
						15	Valivalam(C)
						16	Vedaranyam(C)
						17	Velanganni(C)
10	**Namakkal**	1	Nallipalayam				
		2	Namakkal				
		3	Paramathi				
11	**Peramabalur**	1	Varagur				
12	**Pudukottai**	1	Karaiyur			1	Kottaipattinam(C)
						2	Perumaruthur(C)
						3	Sinkavanam(C)
13	**Ramanathapuram**	1	Keelakkarai			1	Kadaladi(C)
						2	Mangalakudi(C)
						3	Melachelvanur(C)
						4	Mudukulathur South(C)
						5	S.Tharaikudi(C)
						6	Sayalkudi(C)
						7	Sikkal(C)
						8	Thirupullani(C)
						9	Thondi(C)

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
TAMIL NADU							
S. No	**District**	**S. No**	**Fluoride**	**S. No**	**Arsenic**	**S. No**	**Salinity**
14	**Salem**	1	Edappadi				
		2	Ernapuram				
		3	Gangavalli				
		4	Kadayampatti				
		5	Karippatti				
		6	Konganapuram				
		7	Mettur				
		8	Salem Town				
		9	Veerapandi				
		10	Vembadithalam				
15	**Sivagangai**	1	Kallal				
		2	Pallathur				
		3	Sivagangai				
16	**Theni**	1	Cumbam				
		2	Devathanapatti				
17	**Thiruppur**	1	Avinashipalayam(S)				
		2	Kangeyam				
		3	Mulanur				
		4	Nallur				
		5	Tiruppur (S)				
		6	Vellakoil				
18	**Thiruvallur**					1	Minjur(C)
19	**Thoothukudi**	1	Vilathikulam				
20	**Tiruvannamalai**	1	Melpallipattu				
21	**Tiruvarur**					1	Alathampadi(C)
						2	Edaiyur(C)
						3	Muthupet(C)
						4	Thiruthuraipoondi(C)
22	**Trichy**	1	Trichy East Taluk-Trichy South				
		2	Trichy West Taluk-Trichy South				
		3	Vaiyampatti				
23	**Vellore**	1	Alangayam				
		2	Andiyappanur				
		3	Ranipet				
		4	Tirupathur				
		5	Vaniyambadi				
24	**Villupuram**	1	Arasur				
		2	Avanipur				
		3	Thirukoilur				

ABSTRACT			
Total No. of Assessed Units	**Fluoride**	**Arsenic**	**Salinity**
1166	**78**	**0**	**35**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
TELANGANA							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
1	**Bhadradri_Kothagudem**	1	Aswapuram				
		2	Burgampadu				
		3	Manuguru				
2	**Jagtial**	1	Kodimial				
		2	Velgatoor				
3	**Jangaon**	1	Bachannapeta				
		2	Chilpur				
		3	Devaruppala				
		4	Ganpur_stn				
4	**Jayashankar_Bhupalapally**	1	Mahadevpur				
		2	Mogullapalle				
5	**Jogulamba_Gadwal**	3	Alampur				
6	**Kamareddy**	1	Banswada				
		2	Bichkunda				
		3	Gandhari				
		4	Jukkal				
		5	Kamareddy				
		6	Machareddy				
		7	Madnur				
		8	Nasurullabad				
		9	Pedda Kodapgal				
		10	Ramareddy				
		11	Tadwai				
7	**Karimnagar**	1	Ramadugu				
		2	Shankarapatnam				
		3	Thimmapur				
		4	V_Saidapur				
		5	Veenavanka				
8	**Khammam**	1	Madhira				
		2	Wyra				
9	**Komarambhem_Asifabad**	1	Bejjur				
10	**Mahabubabad**	1	Mahabubabad				
		2	Nellikudur				
11	**Mahabubnagar**	1	Chinna_Chintha_Kun				
		2	Dhanwada				
		3	Mahabubnagar_Urban				
		4	Marikal				
		5	Midjil				
		6	Narayanpet				
		7	Utkoor				
12	**Mancherial**	1	Bellampalle				
		2	Chennur				
13	**Medak**	1	Chegunta				
14	**Medchal_Malkajgiri**	1	Alwal				
		2	Balanagar				
		3	Keesara				
		4	Malkajgiri				
		5	Shamirpet				
15	**Nagarkurnool**	1	Balmoor				
		2	Bijinapalle				
		3	Charakonda				
		4	Kalwakurthy				
		5	Nagar_Kurnool				
		6	Urkonda				
		7	Vangoor				
		8	Veldanda				
16	**Peddapalli**	1	Elgaid				
		2	Julapalle				
		3	Odela				
		4	Peddapalle				
		5	Srirampur				
		6	Sultanabad				
17	**Rangareddy**	1	Abdullapurmet				
		2	Chevella				
		3	Hayathnagar				
		4	Manchal				
		5	Talakondapalle				
		6	Yacharam				
18	**Sangareddy**	1	Kandi				
		2	Mogdampalle				
		3	Sangareddy				
		4	Zahirabad				

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
TELANGANA							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
19	**Siddipet**	1	Cheriyal				
		2	Chinnakodur				
		3	Mulug				
		4	Rayapole				
20	**Warangal_Rural**	1	Atmakur				
		2	Damera				
		3	Narsampet				
21	**Warangal_Urban**	1	Bheemadevarapalle				
		2	Elkathurthi				
		3	Hanamkonda				
		4	Inole				
22	**Yadadri_Bhongiri**	1	Addagudur				
		2	Alair				
		3	Bhongiri				
		4	Bibinagar				
		5	Choutuppal				
		6	Mothkur				
		7	Rajapet				
		8	Ramannapeta				
		9	Turkapalle_M				
		10	Yadagirigutta				

ABSTRACT

Total No. of Assessed Units	Fluoride	Arsenic	Salinity
584	93	Nil	Nil

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
ANDAMAN & NICOBAR ISLANDS							
S. No	**District**	**S. No**	**Fluoride**	**S. No**	**Arsenic**	**S. No**	**Salinity**
1	**Nicobar**					1	Chowra island(C)

ABSTRACT			
Total No. of Assessed Units	**Fluoride**	**Arsenic**	**Salinity**
36	**Nil**	**Nil**	**1**

QUALITY PROBLEMS IN ASSESSMENT UNITS, 2017							
UT OF PUDUCHERRY							
S. No	District	S. No	Fluoride	S. No	Arsenic	S. No	Salinity
1	UT of Puducherry					1	Yanam(C)

ABSTRACT			
Total No. of Assessed Units	Fluoride	Arsenic	Salinity
4	Nil	Nil	1

Annexure V (A)

State-wise Summary of Assessment units improved or deteriorated from 2013 to 2017 assessment

State-wise Summary of Assessment units approved or deteriorated from 2013 to 2017 assessment				
S. No.	**States / Union Territories**	**Improved**	**Deteriorated**	**No Change**
	States			
1	**Andhra Pradesh**	46	65	514
2	**Arunachal Pradesh**	Nil	Nil	11
3	**Assam**	Nil	Nil	27
4	**Bihar**	3	100	431
5	**Chhattisgarh**	4	5	137
6	**Delhi**	3	6	13
7	**Goa**	Nil	Nil	12
8	**Gujarat**	Nil	2	207
9	**Haryana**	13	23	79
10	**Himachal Pradesh**	1	3	4
11	**Jammu & Kashmir**	Nil	Nil	22
12	**Jharkhand**	3	1	256
13	**Karnataka**	10	10	156
14	**Kerala**	Nil	12	140
15	**Madhya Pradesh**	26	15	272
16	**Maharashtra**	3	63	286
17	**Manipur**	0	0	13
18	**Meghalaya**	Nil	Nil	11
19	**Mizoram**	Nil	Nil	22
20	**Nagaland**	Nil	Nil	11
21	**Odisha**	Nil	5	303
22	**Punjab**	3	11	124
23	**Rajasthan**	6	23	210
24	**Sikkim***			
25	**Tamil Nadu**	185	67	839
26	**Telangana***			
27	**Tripura**	Nil	Nil	37
28	**Uttar Pradesh**	79	91	650
29	**Uttarakhand**	3	1	Nil
30	**West Bengal****			
	Total States	**388**	**503**	**4787**
	Union Territories			
1	**Andaman & Nicobar**	Nil	Nil	33
2	**Chandigarh**	Nil	1	Nil
3	**Dadra & Nagar Haveli**	Nil	Nil	1
4	**Daman & Diu**	Nil	Nil	2
5	**Lakshadweep**	Nil	Nil	9
6	**Puducherry**	Nil	Nil	3
	Total UTs	**0**	**1**	**48**
	Grand Total	**388**	**504**	**4835**
Note				
*In State of Telangana the mandal boundaries have been redistributed and therefore comparison of categorization				
**In the State of West Bengal, the Ground water resources 2013 is considered				

Annexure V (B)
Comparison of Categorization of assessment Units (2013 to 2017)

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
ANDHRA PRADESH									
S. No	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2013	Categorization in 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization in 2017	Remark
Improved									
1	**Ananthapuramu**	Anantapur	99.29	Critical	**Anantapur**	Anantapur Mandal	26.02	Safe	Improved
2	**Ananthapuramu**	Bathalapalli	111.17	Over Exploited	**Anantapur**	Bathalapalle	63.42	Safe	Improved
3	**Ananthapuramu**	Bommanahal	79.31	Semi-Critical	**Anantapur**	Bommanahal	55.36	Safe	Improved
4	**Ananthapuramu**	Brahmasamudram	150.23	Over Exploited	**Anantapur**	Brahmasamudram	91.35	Critical	Improved
5	**Ananthapuramu**	Bukkapatnam	107.76	Over Exploited	**Anantapur**	Bukkapatnam	52.87	Safe	Improved
6	**Ananthapuramu**	Bukkarayasamudram	86.68	Semi-Critical	**Anantapur**	Bukkarayasamudram	40.29	Safe	Improved
7	**Ananthapuramu**	Chenne Kothapalle	108.08	Over Exploited	**Anantapur**	Chenne Kothapalle	64.68	Safe	Improved
8	**Ananthapuramu**	D.Hirehal	91.70	Critical	**Anantapur**	D Hirchal	56.96	Safe	Improved
9	**Ananthapuramu**	Gooty	74.59	Semi-Critical	**Anantapur**	Gooty	54.46	Safe	Improved
10	**Ananthapuramu**	Gummagatta	72.55	Semi-Critical	**Anantapur**	Gummagatta	58.23	Safe	Improved
11	**Ananthapuramu**	Kalyandurg	91.44	Critical	**Anantapur**	Kalyandurg	60.94	Safe	Improved
12	**Ananthapuramu**	Kambadur	122.24	Over Exploited	**Anantapur**	Kambadur	98.46	Critical	Improved
13	**Ananthapuramu**	Kanaganapall	97.60	Critical	**Anantapur**	Kanaganapalle	60.85	Safe	Improved
14	**Ananthapuramu**	Kundurpi	133.71	Over Exploited	**Anantapur**	Kundurpi	88.01	Semi-Critical	Improved
15	**Ananthapuramu**	Lepakshi	152.60	Over Exploited	**Anantapur**	Lepakshi	82.90	Semi-Critical	Improved
16	**Ananthapuramu**	Nallacheruvu	139.82	Over Exploited	**Anantapur**	Nallacheruvu	97.25	Critical	Improved
17	**Ananthapuramu**	Narpala	108.29	Over Exploited	**Anantapur**	Narpala	44.27	Safe	Improved
18	**Ananthapuramu**	Obuladevaracheruvu	142.79	Over Exploited	**Anantapur**	Obuladevaracheruvu	95.94	Critical	Improved
19	**Ananthapuramu**	Peddapappur	261.20	Over Exploited	**Anantapur**	Peddapappur	64.18	Safe	Improved
20	**Ananthapuramu**	Penukonda	87.57	Semi-Critical	**Anantapur**	Penu Konda	64.91	Safe	Improved
21	**Ananthapuramu**	Puttaparthi	105.15	Over Exploited	**Anantapur**	Puttaparthi	98.62	Critical	Improved
22	**Ananthapuramu**	Ramagiri	89.23	Semi-Critical	**Anantapur**	Ramagiri	54.82	Safe	Improved
23	**Ananthapuramu**	Raptadu	94.73	Critical	**Anantapur**	Raptadu	40.71	Safe	Improved
24	**Ananthapuramu**	Rayadurg	98.73	Critical	**Anantapur**	Rayadurg	53.74	Safe	Improved
25	**Ananthapuramu**	Tadimarri	208.73	Over Exploited	**Anantapur**	Tadimarri	76.55	Semi-Critical	Improved
26	**Chittoor**	B.Kothakota	77.63	Semi-Critical	**Chittoor**	B Kothakota	56.76	Safe	Improved
27	**Chittoor**	Baireddypalli	94.20	Critical	**Chittoor**	Baireddi Palle	71.91	Semi-Critical	Improved
28	**Chittoor**	Chinnagottigallu	91.38	Critical	**Chittoor**	Chinnagottigallu	73.26	Semi-Critical	Improved
29	**Chittoor**	Gangavaram	88.74	Semi-Critical	**Chittoor**	Gangavaram	44.16	Safe	Improved
30	**Chittoor**	Irala	80.06	Semi-Critical	**Chittoor**	Irala	66.57	Safe	Improved
31	**Chittoor**	Kambhamvaripalle	71.60	Semi-Critical	**Chittoor**	Kambhamvaripalle	46.66	Safe	Improved
32	**Chittoor**	Kurabalakota	81.16	Semi-Critical	**Chittoor**	Kurabalakota	59.91	Safe	Improved
33	**Chittoor**	Madanapalli	79.21	Semi-Critical	**Chittoor**	Mandapalle	68.15	Safe	Improved
34	**Chittoor**	Molakalacheruvu	83.95	Semi-Critical	**Chittoor**	Mulakalacheruvu	65.85	Safe	Improved
35	**Chittoor**	Pakala	127.01	Over Exploited	**Chittoor**	Pakala	90.28	Critical	Improved
36	**Chittoor**	Palamaneru	80.00	Semi-Critical	**Chittoor**	Palamaner	51.99	Safe	Improved
37	**Chittoor**	Palasamudram	98.52	Critical	**Chittoor**	Palasamudram	86.62	Semi-Critical	Improved
38	**Chittoor**	Pedda Thippa Samudram	85.13	Semi-Critical	**Chittoor**	Peddathippasamudra	56.91	Safe	Improved
39	**Chittoor**	Penumuru	117.49	Over Exploited	**Chittoor**	Penumuru	96.07	Critical	Improved
40	**Chittoor**	Piler	93.47	Critical	**Chittoor**	Pileru	80.25	Semi-Critical	Improved
41	**Chittoor**	Pulicherla	103.90	Over Exploited	**Chittoor**	Pulicherla	94.28	Critical	Improved
42	**Chittoor**	Ramakuppam	106.95	Over Exploited	**Chittoor**	Rama Kuppam	92.90	Critical	Improved
43	**Chittoor**	Ramachandrapuram	118.98	Over Exploited	**Chittoor**	Ramachandrapuram	93.65	Critical	Improved
44	**Chittoor**	Santhipuram	108.41	Over Exploited	**Chittoor**	Santhi Puram	93.71	Critical	Improved
45	**Chittoor**	Sodam	80.10	Semi-Critical	**Chittoor**	Sodam	65.59	Safe	Improved
46	**Chittoor**	Srirangarajapuram	136.63	Over Exploited	**Chittoor**	Srirangarajapuram	91.48	Critical	Improved
47	**Chittoor**	Thavanampalli	114.04	Over Exploited	**Chittoor**	Thavanampalle	90.38	Critical	Improved
48	**Chittoor**	Yadamarri	86.74	Semi-Critical	**Chittoor**	Yadamari	66.53	Safe	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
ANDHRA PRADESH									
S. No	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2013	Categorization in 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization in 2017	Remark
Improved									
49	**Chittoor**	Yarravaripalem	77.05	Semi-Critical	**Chittoor**	Yarravaripalem	51.49	Safe	Improved
50	**Guntur**	Nagaram	96.54	Semi-Critical	**Guntur**	Nagaram	18.92	Safe	Improved
51	**Kadappa**	Atloor	76.00	Semi-Critical	**Kadapa**	Atlur	60.67	Safe	Improved
52	**Kadappa**	Kalasapadu	76.00	Semi-Critical	**Kadapa**	Kalasapadu	45.75	Safe	Improved
53	**Kadappa**	Kondapuram	74.00	Semi-Critical	**Kadapa**	Kondapuram	31.26	Safe	Improved
54	**Kadappa**	Muddanur	98.00	Critical	**Kadapa**	Muddanur	68.34	Safe	Improved
55	**Kadappa**	Pendlimarri	91.00	Critical	**Kadapa**	Pendlimarri	30.78	Safe	Improved
56	**Kadappa**	Proddatur	83.00	Semi-Critical	**Kadapa**	Proddutur	57.01	Safe	Improved
57	**Kadappa**	Pulivendula	153.00	Over Exploited	**Kadapa**	Pulivendla	64.15	Safe	Improved
58	**Kadappa**	Vallur	111.00	Over Exploited	**Kadapa**	Vallur	84.48	Semi-Critical	Improved
59	**Kadappa**	Veeraballi	92.00	Semi-Critical	**Kadapa**	Veeraballe	62.65	Safe	Improved
60	**Kurnool**	C.Belagal	80.00	Semi-Critical	**Kurnool**	C Belagal	56.81	Safe	Improved
61	**Kurnool**	Krishnagiri	83.00	Semi-Critical	**Kurnool**	Krishnagiri	46.48	Safe	Improved
62	**Kurnool**	Peddakadabur	82.00	Semi-Critical	**Kurnool**	Pedda Kadubur	66.15	Safe	Improved
63	**Prakasam**	Cumbum	98.26	Critical	**Prakasam**	Cumbum	79.42	Semi-Critical	Improved
64	**Prakasam**	Dornala	104.11	Over Exploited	**Prakasam**	Dornala	77.63	Semi-Critical	Improved
65	**Prakasam**	Yerragondapalem	134.10	Over Exploited	**Prakasam**	Yerragondapalem	75.31	Semi-Critical	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
ANDHRA PRADESH									
S. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization 2017	Remark
Deteriorated									
1	**Ananthapuramu**	Chilamathur	84	Semi-Critical	**Anantapur**	Chilamathur	125.62	Over Exploited	Deteriorated
2	**Ananthapuramu**	Mudigubba	46	Safe	**Anantapur**	Mudigubba	89.95	Semi-Critical	Deteriorated
3	**Ananthapuramu**	Nallamada	27	Safe	**Anantapur**	Nallamada	136.79	Over Exploited	Deteriorated
4	**Ananthapuramu**	Roddam	92	Critical	**Anantapur**	Roddam	124.03	Over Exploited	Deteriorated
5	**Chittoor**	Gudupalli	93	Critical	**Chittoor**	Gudi Palle	119.49	Over Exploited	Deteriorated
6	**Chittoor**	Vadamalapeta	68	Safe	**Chittoor**	Vadamalapeta	70.10	Semi-Critical	Deteriorated
7	**East Godavari**	Eleswaram	64	safe	**East Godavari**	Yeleswaram	72.84	Semi-Critical	Deteriorated
8	**East Godavari**	Rangampeta	53	Safe	**East Godavari**	Rangampeta	78.26	Semi-Critical	Deteriorated
9	**Guntur**	Karempudi	52	Safe	**Guntur**	Karempudi	71.87	Semi-Critical	Deteriorated
10	**Kadappa**	B.Kodur	81	Safe	**Kadapa**	B Kodur	76.51	Semi-Critical	Deteriorated
11	**Kadappa**	Brahmamgarimattam	73	Safe	**Kadapa**	Brahmamgarimattam	80.57	Semi-Critical	Deteriorated
12	**Kadappa**	Chapadu	87	Safe	**Kadapa**	Chapad	79.26	Semi-Critical	Deteriorated
13	**Kadappa**	Chinthakommadinne.K.Dinne	62	Safe	**Kadapa**	Chintha Kommadinne	84.30	Semi-Critical	Deteriorated
14	**Kadappa**	Chitvel	88	Safe	**Kadapa**	Chitvel	76.97	Semi-Critical	Deteriorated
15	**Kadappa**	Duvvuru	58	Safe	**Kadapa**	Duvvur	76.89	Semi-Critical	Deteriorated
16	**Kadappa**	Gopavaram	52	Safe	**Kadapa**	Gopavaram	89.75	Semi-Critical	Deteriorated
17	**Kadappa**	Jammalamadugu	47	Safe	**Kadapa**	Jammalamadugu	77.09	Semi-Critical	Deteriorated
18	**Kadappa**	Kamalapuram	87	Semi-Critical	**Kadapa**	Kamalapuram	114.95	Over Exploited	Deteriorated
19	**Kadappa**	Kodur	60	Safe	**Kadapa**	Kodur	126.94	Over Exploited	Deteriorated
20	**Kadappa**	Lingala	79	Semi-Critical	**Kadapa**	Lingala	165.69	Over Exploited	Deteriorated
21	**Kadappa**	Penagalur	65	Safe	**Kadapa**	Penagaluru	99.43	Critical	Deteriorated
22	**Kadappa**	Porumamilla	85	Semi-Critical	**Kadapa**	Porumamilla	92.93	Critical	Deteriorated
23	**Kadappa**	Rajampet	79	Semi-Critical	**Kadapa**	Rajampet	92.88	Critical	Deteriorated
24	**Kadappa**	Sambepalle	66	Safe	**Kadapa**	Sambepalle	101.13	Over Exploited	Deteriorated
25	**Kadappa**	Sidhout	77	Safe	**Kadapa**	Sidhout	79.32	Semi-Critical	Deteriorated
26	**Kadappa**	Simhadripuram	68	Safe	**Kadapa**	Simhadripuram	91.60	Critical	Deteriorated
27	**Kadappa**	Vn Palle	48	Safe	**Kadapa**	Veerapunayunipalle	78.61	Semi-Critical	Deteriorated
28	**Kadappa**	Vempalle	71	Semi-Critical	**Kadapa**	Vempalle	125.91	Over Exploited	Deteriorated
29	**Kurnool**	Bethamcherla	67	Safe	**Kurnool**	Bethamcherla	76.31	Semi-Critical	Deteriorated
30	**Kurnool**	Chagalamarri	62	Safe	**Kurnool**	Chagalamarri	91.25	Critical	Deteriorated
31	**Kurnool**	Kodumuru	75	Safe	**Kurnool**	Kodumur	73.54	Semi-Critical	Deteriorated
32	**Kurnool**	Nandikotkuru	85	Safe	**Kurnool**	Nandi Kotkur	86.14	Semi-Critical	Deteriorated
33	**Kurnool**	Peapully	61	Safe	**Kurnool**	Peapally	86.89	Semi-Critical	Deteriorated
34	**Nellore**	Naidupeta	80	Safe	**Nellore**	Naidupeta	83.35	Semi-Critical	Deteriorated
35	**Srinakulam**	Ganguvari Singadam	61	Safe	**Srikakulam**	Ganguvari Singadam	97.93	Critical	Deteriorated
36	**Srinakulam**	Kavity	58	Safe	**Srikakulam**	Kaviti	77.45	Semi-Critical	Deteriorated
37	**Srinakulam**	Ponduru	48	Safe	**Srikakulam**	Ponduru	79.50	Semi-Critical	Deteriorated
38	**Srinakulam**	Rajam	65	Safe	**Srikakulam**	Rajam	75.03	Semi-Critical	Deteriorated
39	**Vishakhapatnam**	Munagapaka	59	Safe	**Visakhapatnam**	Munagapaka	76.19	Semi-Critical	Deteriorated
40	**West Godavari**	Chintalapudi	66	Safe	**West Godavari**	Chintalapudi	70.50	Semi-Critical	Deteriorated
41	**West Godavari**	Dwaraka Tirumala	75	Safe	**West Godavari**	Dwaraka Tirumala	81.22	Semi-Critical	Deteriorated
42	**West Godavari**	Jangareddigudem	93	Safe	**West Godavari**	Jangareddigudem	95.19	Critical	Deteriorated
43	**West Godavari**	Koyyalagudem	74	Safe	**West Godavari**	Koyyalagudem	81.06	Semi-Critical	Deteriorated
44	**West Godavari**	Lingapalem	91	Semi-Critical	**West Godavari**	Lingapalem	95.35	Critical	Deteriorated
45	**West Godavari**	Pedavegi	83	Safe	**West Godavari**	Padavegi	90.27	Critical	Deteriorated
46	**West Godavari**	Tadepalligudem	62	Safe	**West Godavari**	Tadepalligudem	71.75	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
BIHAR									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remark**
Improved									
1	**Nalanda**	Nagarnausa	96	Semi-Critical	**Nalanda**	Nagarnausa	66.60	Safe	Improved
2	**Nalanda**	Silao	94	Semi-Critical	**Nalanda**	Silao	36.27	Safe	Improved
3	**Samastipur**	Tajpur	78	Semi-Critical	**Samastipur**	Tajpur	63.75	Safe	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
BIHAR									
S. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization 2017	Remark
Deteriorated									
1	**Begusarai**	Bhagwanpur	91.32	Semi-Critical	**Begusarai**	Bhagwanpur	96.63	Critical	Deteriorated
2	**Begusarai**	Khudabandpur	60.77	Safe	**Begusarai**	Khudabandpur	82.36	Semi-Critical	Deteriorated
3	**Begusarai**	Naokothi	98.71	Semi-Critical	**Begusarai**	Naokothi	96.26	Critical	Deteriorated
4	**Bhojpur**	Arrah	64.51	Safe	**Bhojpur**	Arrah	85.15	Semi-Critical	Deteriorated
5	**Bhojpur**	Behea	77.11	Safe	**Bhojpur**	Behea	93.70	Critical	Deteriorated
6	**Bhojpur**	Jagdishpur	50.71	Safe	**Bhojpur**	Jagdishpur	78.89	Semi-Critical	Deteriorated
7	**Bhojpur**	Koilbar	81.06	Safe	**Bhojpur**	Koilbar	91.21	Critical	Deteriorated
8	**Bhojpur**	Piro	61.64	Safe	**Bhojpur**	Piro	83.07	Semi-Critical	Deteriorated
9	**Bhojpur**	Shahpur	51.98	Safe	**Bhojpur**	Shahpur	75.09	Semi-Critical	Deteriorated
10	**Buxar**	Chaungai	70.00	Safe	**Buxar**	Chaungai	77.90	Semi-Critical	Deteriorated
11	**Buxar**	Simari	69.99	Safe	**Buxar**	Simari	75.68	Semi-Critical	Deteriorated
12	**East Champaran**	Madhuban	78.41	Safe	**East Champaran**	Madhuban	88.01	Semi-Critical	Deteriorated
13	**Gaya**	Belaganj	81.18	Safe	**Gaya**	Belaganj	73.36	Semi-Critical	Deteriorated
14	**Gaya**	Bodhgaya	49.38	Safe	**Gaya**	Bodhgaya	78.81	Semi-Critical	Deteriorated
15	**Gaya**	Dumaria	73.01	Safe	**Gaya**	Dumaria	91.45	Critical	Deteriorated
16	**Gaya**	Imamganj	96.93	Semi-Critical	**Gaya**	Imamganj	118.17	Over Exploited	Deteriorated
17	**Gaya**	Khizirsarai	86.23	Safe	**Gaya**	Khizirsarai	82.15	Semi-Critical	Deteriorated
18	**Gaya**	Konch	42.17	Safe	**Gaya**	Konch	77.81	Semi-Critical	Deteriorated
19	**Gaya**	Manpur	70.48	Safe	**Gaya**	Manpur	125.97	Over Exploited	Deteriorated
20	**Gaya**	Tekari	54.77	Safe	**Gaya**	Tekari	86.21	Semi-Critical	Deteriorated
21	**Gopalganj**	Barauli	48.54	Safe	**Gopalganj**	Barauli	71.55	Semi-Critical	Deteriorated
22	**Gopalganj**	Bhore	87.97	Safe	**Gopalganj**	Bhore	85.87	Semi-Critical	Deteriorated
23	**Gopalganj**	Bijaipur	71.76	Safe	**Gopalganj**	Bijaipur	112.31	Over Exploited	Deteriorated
24	**Gopalganj**	Hathwa	69.08	Safe	**Gopalganj**	Hathwa	84.15	Semi-Critical	Deteriorated
25	**Gopalganj**	Kateyan	57.41	Safe	**Gopalganj**	Kateyan	76.25	Semi-Critical	Deteriorated
26	**Gopalganj**	Manjha	60.73	Safe	**Gopalganj**	Manjha	80.30	Semi-Critical	Deteriorated
27	**Gopalganj**	Panchdeori	62.77	Safe	**Gopalganj**	Panchdeori	78.39	Semi-Critical	Deteriorated
28	**Gopalganj**	Thawe	84.05	Safe	**Gopalganj**	Thawe	100.83	Over Exploited	Deteriorated
29	**Gopalganj**	Uchkagaon	81.27	Safe	**Gopalganj**	Uchkagaon	113.54	Over Exploited	Deteriorated
30	**Jehanabad**	Ghosi	38.27	Safe	**Jehanabad**	Ghosi	98.26	Critical	Deteriorated
31	**Jehanabad**	Hulasganj	78.50	Safe	**Jehanabad**	Hulasganj	88.93	Semi-Critical	Deteriorated
32	**Jehanabad**	Jehanabad	74.69	Safe	**Jehanabad**	Jehanabad	98.56	Critical	Deteriorated
33	**Jehanabad**	Kako	83.35	Semi-Critical	**Jehanabad**	Kako	91.59	Critical	Deteriorated
34	**Jehanabad**	Makhdumpur	67.95	safe	**Jehanabad**	Makhdumpur	86.49	Semi-Critical	Deteriorated
35	**Jehanabad**	Modanganj	73.86	safe	**Jehanabad**	Modanganj	84.78	Semi-Critical	Deteriorated
36	**Jehanabad**	Ratni Faridpur	89.63	safe	**Jehanabad**	Ratni Faridpur	119.23	Over Exploited	Deteriorated
37	**Katihar**	Azamnagar	73.13	safe	**Katihar**	Azamnagar	88.43	Semi-Critical	Deteriorated
38	**Katihar**	Balrampur	61.98	safe	**Katihar**	Balrampur	72.48	Semi-Critical	Deteriorated
39	**Katihar**	Barsoi	73.64	safe	**Katihar**	Barsoi	76.22	Semi-Critical	Deteriorated
40	**Katihar**	Dandkhora	89.07	safe	**Katihar**	Dandkhora	95.49	Critical	Deteriorated
41	**Katihar**	Kadwa	79.03	safe	**Katihar**	Kadwa	70.15	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
BIHAR									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remark**
Deteriorated									
42	**Katihar**	Korha	63.39	safe	**Katihar**	Korha	76.15	Semi-Critical	Deteriorated
43	**Katihar**	Mansahi	83.74	safe	**Katihar**	Mansahi	88.79	Semi-Critical	Deteriorated
44	**Katihar**	Pranpur	47.18	Safe	**Katihar**	Pranpur	80.43	Semi-Critical	Deteriorated
45	**Madhepura**	Bihariganj	76.13	safe	**Madhepura**	Bihariganj	74.54	Semi-Critical	Deteriorated
46	**Madhepura**	Gamharia	78.26	safe	**Madhepura**	Gamharia	74.21	Semi-Critical	Deteriorated
47	**Madhepura**	Gwalpara	66.64	safe	**Madhepura**	Gwalpara	86.02	Semi-Critical	Deteriorated
48	**Madhepura**	Sankarpur	71.31	safe	**Madhepura**	Sankarpur	77.06	Semi-Critical	Deteriorated
49	**Madhepura**	Singheswar	74.97	safe	**Madhepura**	Singheswar	73.15	Semi-Critical	Deteriorated
50	**Madhubani**	Uda Kishanganj	81.16	safe	**Madhepura**	Uda Kishanganj	80.45	Semi-Critical	Deteriorated
51	**Muzaffarpur**	Bochaha	67.92	Safe	**Muzaffarpur**	Bochaha	74.84	Semi-Critical	Deteriorated
52	**Muzaffarpur**	Kurahni	50.54	Safe	**Muzaffarpur**	Kurahni	76.74	Semi-Critical	Deteriorated
53	**Muzaffarpur**	Minapur	68.08	Safe	**Muzaffarpur**	Minapur	71.46	Semi-Critical	Deteriorated
54	**Muzaffarpur**	Moraul (Dholi)	82.92	Safe	**Muzaffarpur**	Moraul (Dholi)	77.67	Semi-Critical	Deteriorated
55	**Muzaffarpur**	Mushari	97.75	Semi-Critical	**Muzaffarpur**	Mushari	111.21	Over Exploited	Deteriorated
56	**Muzaffarpur**	Sakra	78.69	Safe	**Muzaffarpur**	Sakra	101.75	Over Exploited	Deteriorated
57	**Nalanda**	Asthawan	55.68	Safe	**Nalanda**	Asthawan	93.39	Critical	Deteriorated
58	**Nalanda**	Ben	63.59	Safe	**Nalanda**	Ben	79.34	Semi-Critical	Deteriorated
59	**Nalanda**	Bind	74.43	Safe	**Nalanda**	Bind	92.97	Critical	Deteriorated
60	**Nalanda**	Giriak	89.94	Safe	**Nalanda**	Giriak	105.65	Over Exploited	Deteriorated
61	**Nalanda**	Harnaut	56.32	Safe	**Nalanda**	Harnaut	82.34	Semi-Critical	Deteriorated
62	**Nalanda**	Islampur	89.13	Safe	**Nalanda**	Islampur	80.59	Semi-Critical	Deteriorated
63	**Nalanda**	Karai parsauni	84.43	Safe	**Nalanda**	Karai parsauni	97.69	Critical	Deteriorated
64	**Nalanda**	Noorsarai	37.25	Safe	**Nalanda**	Noorsarai	77.17	Semi-Critical	Deteriorated
65	**Nalanda**	Parwalpur	46.72	Safe	**Nalanda**	Parwalpur	89.76	Semi-Critical	Deteriorated
66	**Nalanda**	Rahui	50.68	Safe	**Nalanda**	Rahui	73.61	Semi-Critical	Deteriorated
67	**Nalanda**	Rajgir	78.24	Semi-Critical	**Nalanda**	Rajgir	91.54	Critical	Deteriorated
68	**Nawada**	Meskaur	95.67	Semi-Critical	**Nawada**	Meskaur	90.63	Critical	Deteriorated
69	**Nawada**	Nawada	72.73	Safe	**Nawada**	Nawada	73.51	Semi-Critical	Deteriorated
70	**Nawada**	Roh	20.28	Safe	**Nawada**	Roh	74.37	Semi-Critical	Deteriorated
71	**Patna**	Athmalgola	86.92	Safe	**Patna**	Athmalgola	113.44	Over Exploited	Deteriorated
72	**Patna**	Belchi	59.13	Safe	**Patna**	Belchi	77.69	Semi-Critical	Deteriorated
73	**Patna**	Khusrupur	59.70	Safe	**Patna**	Khusrupur	74.20	Semi-Critical	Deteriorated
74	**Patna**	Masuarhi	70.05	Safe	**Patna**	Masuarhi	86.42	Semi-Critical	Deteriorated
75	**Patna**	Patna Sadar	95.39	Semi-Critical	**Patna**	Patna Sadar	93.87	Critical	Deteriorated
76	**Patna**	Phulwarisarif	89.98	Safe	**Patna**	Phulwarisarif	100.95	Over Exploited	Deteriorated
77	**Patna**	Punpun	88.32	Safe	**Patna**	Punpun	94.47	Critical	Deteriorated
78	**Patna**	Sampatchak	84.29	Semi-Critical	**Patna**	Sampatchak	90.19	Critical	Deteriorated
79	**Purnia**	Amaur	51.33	Safe	**Purnia**	Amaur	82.98	Semi-Critical	Deteriorated
80	**Purnia**	Baisi	66.50	Safe	**Purnia**	Baisi	71.69	Semi-Critical	Deteriorated
81	**Purnia**	Dagarua	53.54	Safe	**Purnia**	Dagarua	87.50	Semi-Critical	Deteriorated
82	**Samastipur**	Ujiarpur	47.49	Safe	**Samastipur**	Ujiarpur	71.20	Semi-Critical	Deteriorated
83	**Saran**	Garakha	89.90	Safe	**Saran**	Garakha	82.00	Semi-Critical	Deteriorated
84	**Saran**	Lahladpur	59.05	Safe	**Saran**	Lahladpur	75.17	Semi-Critical	Deteriorated
85	**Saran**	Manjhi	61.65	Safe	**Saran**	Manjhi	71.89	Semi-Critical	Deteriorated
86	**Saran**	Nagra	74.29	Safe	**Saran**	Nagra	91.37	Critical	Deteriorated
87	**Sitamarhi**	Bajpatti	29.74	Safe	**Sitamarhi**	Bajpatti	79.15	Semi-Critical	Deteriorated
88	**Siwan**	Basantpur	54.04	Safe	**Siwan**	Basantpur	72.25	Semi-Critical	Deteriorated
89	**Siwan**	Daraunda	62.88	Safe	**Siwan**	Daraunda	88.69	Semi-Critical	Deteriorated
90	**Siwan**	Guthani	54.08	Safe	**Siwan**	Guthani	72.70	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
BIHAR									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remark**
Deteriorated									
91	**Siwan**	Hussainganj	81.81	Safe	**Siwan**	Hussainganj	73.14	Semi-Critical	Deteriorated
92	**Siwan**	Jeradei	53.69	Safe	**Siwan**	Jeradei	84.13	Semi-Critical	Deteriorated
93	**Siwan**	Siswan	60.73	Safe	**Siwan**	Siswan	71.63	Semi-Critical	Deteriorated
94	**Vaishali**	Bhagwanpur	88.43	Safe	**Vaishali**	Bhagwanpur	80.32	Semi-Critical	Deteriorated
95	**Vaishali**	Chehra kala	87.80	Safe	**Vaishali**	Chehra kala	77.71	Semi-Critical	Deteriorated
96	**Vaishali**	Jandaha	80.99	Safe	**Vaishali**	Jandaha	84.68	Semi-Critical	Deteriorated
97	**Vaishali**	Lalganj	53.55	Safe	**Vaishali**	Lalganj	73.18	Semi-Critical	Deteriorated
98	**Vaishali**	Patepur	83.44	Safe	**Vaishali**	Patepur	107.89	Over Exploited	Deteriorated
99	**Vaishali**	Premraj/ Desri	65.47	Safe	**Vaishali**	Premraj/ Desri	71.04	Semi-Critical	Deteriorated
100	**Vaishali**	Rajapakar	58.97	Safe	**Vaishali**	Rajapakar	88.20	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
CHHATTISGARH									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2017**	**Categorization 2017**	**Remarks**
Improved									
1	**Balod**	Gurur	103.26	Over Exploited	**Balod**	Gurur	96.62	Critical	Improved
2	**Dhamtari**	Dhamtari	90.08	Critical	**Dhamtari**	Dhamtari	74.28	Semi-Critical	Improved
3	**Dhamtari**	Nagri	84.65	Semi-Critical	**Dhamtari**	Nagri	54.10	Safe	Improved
4	**Raigarh**	Baramkela	98.73	Critical	**Raigarh**	Baramkela	77.72	Semi-Critical	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
CHHATTISGARH									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2017**	**Categorization 2017**	**Remarks**
Deteriorated									
1	**Bemetara**	Berla	70.77	Safe	**Bemetara**	Berla	86.24	Semi-Critical	Deteriorated
2	**Bemetara**	Nawagarh	51.68	Safe	**Bemetara**	Nawagarh	86.88	Semi-Critical	Deteriorated
3	**Mahasamund**	Basna	62.52	Safe	**Mahasamund**	Basna	80.09	Semi-Critical	Deteriorated
4	**Mahasamund**	Pithora	55.27	Safe	**Mahasamund**	Pithora	83.96	Semi-Critical	Deteriorated
5	**Raipur**	Dharsiwa	73.06	Semi-Critical	**Raipur**	Dharsiwa	92.81	Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
DELHI									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2017**	**Categorization 2017**	**Remarks**
Improved									
1	**East Delhi**	Preet Vihar	152.52	Over Exploited	**East Delhi**	Preet Vihar	99.74	Critical	Improved
2	**North Delhi**	Model Town	104.90	Over Exploited	**North Delhi**	Model Town	71.41	Semi-Critical	Improved
3	**West Delhi**	Patel Nagar	182.41	Over Exploited	**West Delhi**	Patel Nagar	85.87	Semi-Critical	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
DELHI									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2017**	**Categorization 2017**	**Remarks**
Deteriorated									
1	**Central Delhi**	Civil Lines	82.76	Safe	**Central Delhi**	Civil Lines	74.63	Semi-Critical	Deteriorated
2	**East Delhi**	Gandhi Nagar	71.65	Safe	**East Delhi**	Gandhi Nagar	78.70	Semi-Critical	Deteriorated
3	**North West Delhi**	Saraswati Vihar	94.99	Semi-Critical	**North West Delhi**	Saraswati Vihar	109.92	Over Exploited	Deteriorated
4	**South East Delhi**	Defence Colony	98.75	Semi-Critical	**South East Delhi**	Defence Colony	181.19	Over Exploited	Deteriorated
5	**South West Delhi**	Najafgarh	95.15	Semi-Critical	**South West Delhi**	Najafgarh	230.57	Over Exploited	Deteriorated
6	**West Delhi**	Punjabi Bagh	89.18	Safe	**West Delhi**	Punjabi Bagh	92.02	Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
GUJARAT									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remark**
Improved									
1	**Ahmedabad**	City-Daskroi	92	Critical	**Ahmedabad**	Ahmedabad City & Daskroi	85.11	Semi-Critical	Improved
2	**Ahmedabad**	Dholka	96	Critical	**Ahmedabad**	Dholka	79.20	Semi-Critical	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
HARYANA									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
Improved									
1	**Ambala**	Ambala-II	91	Semi-Critical	**Ambala**	Ambala-II	53	Safe	Improved
2	**Bhiwani**	Bawani Khera	115	Critical	**Bhiwani**	Bawani Khera	69	Safe	Improved
3	**Bhiwani**	Siwani	77	Safe	**Bhiwani**	Siwani	64	Safe	Improved
4	**Jind**	Julana	92	Semi-Critical	**Jind**	Julana	63	Safe	Improved
5	**Jind**	Narwana	144	Over Exploited	**Jind**	Narwana	67	Safe	Improved
6	**Panchkula**	Raipur Rani	100	Critical	**Panchkula**	Raipur Rani	88	Semi-Critical	Improved
7	**Rohtak**	Kalanaur	65	Safe	**Rohtak**	Kalanaur	42	Safe	Improved
8	**Rohtak**	Lakhan Majra	87	Safe	**Rohtak**	Lakhan Majra	62	Safe	Improved
9	**Rohtak**	Rohtak	72	Safe	**Rohtak**	Rohtak	56	Safe	Improved
10	**Sonepat**	Gohana	99	Semi-Critical	**Sonipat**	Gohana	70	Safe	Improved
11	**Sonepat**	Kharkhoda	91	Semi-Critical	**Sonipat**	Kharkhoda	68	Safe	Improved
12	**Yamunanagar**	Bilaspur	101	Critical	**Yamunanagar**	Bilaspur	90	Semi-Critical	Improved
13	**Yamunanagar**	Sadhuara	102	Over Exploited	**Yamunanagar**	Sadaura (Part)	77	Semi-Critical	Improved
COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
HARYANA									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
Deteriorated									
1	**Ambala**	Ambala-I	80	Safe	**Ambala**	Ambala-I	72	Semi-Critical	Deteriorated
2	**Ambala**	Shahzadpur	78	Semi-Critical	**Ambala**	Shahzadpur	98	Critical	Deteriorated
4	**Faridabad**	Faridabad	92	Critical	**Faridabad**	Faridabad	123	Over Exploited	Deteriorated
5	**Fatehabad**	Bhuna	90	Semi-Critical	**Fatehabad**	Bhuna	98	Critical	Deteriorated
6	**Gurgaon**	Gurgaon	94	Critical	**Gurugram**	Gurgaon	300	Over Exploited	Deteriorated
7	**Hissar**	Agroha	81	Safe	**Hisar**	Agroha	101	Critical	Deteriorated
8	**Hissar**	Barwala	85	Safe	**Hisar**	Barwala	92	Semi-Critical	Deteriorated
9	**Hissar**	Hissar-I	77	Safe	**Hisar**	Hisar-I	87	Semi-Critical	Deteriorated
10	**Hissar**	Hissar-II	76	Safe	**Hisar**	Hisar-II	83	Semi-Critical	Deteriorated
12	**Jind**	Pillukhera	72	Safe	**Jind**	Pillukhera	94	Critical	Deteriorated
13	**Jind**	Uchana	97	Critical	**Jind**	Uchana	120	Over Exploited	Deteriorated
14	**Karnal**	Indri	66	Safe	**Karnal**	Indri	85	Semi-Critical	Deteriorated
15	**Mahendragarh**	Mahendragarh	85	Safe	**Mahendragarh**	Mahendragarh	129	Over Exploited	Deteriorated
16	**Mewat**	Ferozepur Zhirka	59	Safe	**Mewat**	Ferozepur Jhirka	80	Semi-Critical	Deteriorated
17	**Mewat**	Nuh	74	Safe	**Mewat**	Nuh	78	Semi-Critical	Deteriorated
18	**Mewat**	Punahana	99	Critical	**Mewat**	Punahana	125	Over Exploited	Deteriorated
19	**Palwal**	Hassanpur	94	Critical	**Palwal**	Hassanpur	106	Over Exploited	Deteriorated
20	**Palwal**	Hathin	85	Semi-Critical	**Palwal**	Hathin	105	Over Exploited	Deteriorated
21	**Palwal**	Hodal	95	Semi-Critical	**Palwal**	Hodal	104	Over Exploited	Deteriorated
23	**Rewari**	Jatusana	72	Safe	**Rewari**	Jatusana	79	Semi-Critical	Deteriorated
24	**Rewari**	Nahar	78	Safe	**Rewari**	Nahar	102	Over Exploited	Deteriorated
29	**Sonepat**	Mundlana	81	Safe	**Sonipat**	Mundlana	78	Semi-Critical	Deteriorated
31	**Yamunanagar**	Chachrauli	116	Critical	**Yamunanagar**	Chhachhrauli	150	Over Exploited	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
HIMACHAL PRADESH									
S.No.	**District**	**Valley**	**Stage of Ground Water Development 2013**	**Categorization 2013**	**District**	**Valley**	**Stage of Ground Water Development 2017**	**Categorization 2017**	**Remarks**
Improved									
1	**Una**	**Hum**	90.29	**Critical**	**Una**	**Hum**	75.50	**Semi-Critical**	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
HIMACHAL PRADESH									
S.No.	**District**	**Valley**	**Stage of Ground Water Development 2013**	**Categorization 2013**	**District**	**Valley**	**Stage of Ground Water Development 2017**	**Categorization 2017**	**Remarks**
Deteriorated									
1	**Kangra**	Indora	69.07	Safe	**Kangra**	Indora	125.05	Over Exploited	Deteriorated
2	**Solan**	Nalagarh	47.61	Safe	**Solan**	Nalagarh	116.58	Over Exploited	Deteriorated
3	**Una**	Una	74.43	Safe	**Una**	Una	147.59	Over Exploited	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
JHARKHAND									
S. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization 2017	Remarks
Improved									
1	**East Singhbhum**	Golmuri cum Jugsalai	147.42	Over Exploited	**East Singhbhum**	Golmuri cum Jugsalai	79.52	Semi-Critical	Improved
2	**Ranchi**	Ormanjhi	72.92	Semi-Critical	**Ranchi**	Ormanjhi	65.12	Safe	Improved
3	**Ranchi**	Ratu	70.80	Semi-Critical	**Ranchi**	Ratu	58.68	Safe	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
JHARKHAND									
S. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization 2017	Remarks
Deteriorated									
1	**Ranchi**	Silli	46.25	Safe	**Ranchi**	Silli	78.01	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
KARNATAKA									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
Improved									
1	**Bagalkote**	Hungund	88.64	Semi-Critical	**Bagalkote**	Hungund	68.70	Safe	Improved
2	**Bellary**	Hadagalli	91.97	Critical	**Ballari**	Hadagalli	84.47	Semi-Critical	Improved
3	**Belgaum**	Chikodi	92.79	Critical	**Belagavi**	Chikodi	66.49	Safe	Improved
4	**Belgaum**	Raybag	71.98	Semi-Critical	**Belagavi**	Raybag	69.58	Safe	Improved
5	**Dakshin Kannada**	Puttur	98.81	Critical	**Dakshin Kannada**	Puttur	81.84	Semi-Critical	Improved
6	**Davangere**	Harihar	73.51	Semi-Critical	**Davangere**	Harihar	65.81	Safe	Improved
7	**Haveri**	Byadgi	94.32	Critical	**Haveri**	Byadgi	89.25	Semi-Critical	Improved
8	**Mysore**	Mysuru	90.47	Critical	**Mysuru**	Mysuru	85.59	Semi-Critical	Improved
9	**Ramanagara**	Channapatana	91.98	Critical	**Ramanagara**	Channapatana	79.72	Semi-Critical	Improved
10	**Bijapur**	Bijapur	83.58	Semi-Critical	**Vijayapura**	Vijayapura	64.11	Safe	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
KARNATAKA									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
Deteriorated									
1	**Bagalkote**	Jamkhandi	63.17	Safe	**Bagalkote**	Jamkhandi	72.39	Semi-Critical	Deteriorated
2	**Bagalkote**	Mudhol	89.98	Semi-Critical	**Bagalkote**	Mudhol	98.17	Critical	Deteriorated
3	**Belgaum**	Hukkeri	69.62	Safe	**Belagavi**	Hukkeri	80.96	Semi-Critical	Deteriorated
4	**Chamrajnagara**	Chamrajnagara	63.50	Safe	**Chamrajnagara**	Chamrajnagara	75.42	Semi-Critical	Deteriorated
5	**Chamrajnagara**	Kollegal	56.72	Safe	**Chamrajnagara**	Kollegal	70.60	Semi-Critical	Deteriorated
6	**Chikballapur**	Bagepalli	94.73	Critical	**Chikballapur**	Bagepalli	109.68	Over Exploited	Deteriorated
7	**Chitradurga**	Hosadurga	98.38	Critical	**Chitradurga**	Hosadurga	118.28	Over Exploited	Deteriorated
8	**Mandya**	Malavalli	63.99	Safe	**Mandya**	Malavalli	70.54	Semi-Critical	Deteriorated
9	**Bijapur**	Indi	86.19	Semi-Critical	**Vijayapura**	Indi	91.26	Critical	Deteriorated
10	**Bijapur**	Muddebihal	60.99	Safe	**Vijayapura**	Muddebihal	73.93	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
KERALA									
Sl. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
1	**Ernakulam**	Parakkadavu	69	Safe	**Ernakulam**	Parakkadavu	79.12	Semi-Critical	Deteriorated
2	**Idukki**	Elam Desom	53	Safe	**Idukki**	Elam Desom	73.80	Semi-Critical	Deteriorated
3	**Kasaragod**	Kanhangad	64	Safe	**Kasargod**	Kanhangad	77.67	Semi-Critical	Deteriorated
4	**Kasaragod**	Karadka	71	Safe	**Kasargod**	Karadka	82.03	Semi-Critical	Deteriorated
5	**Malappuram**	Kondotty	67	Safe	**Malappuram**	Kondotty	84.72	Semi-Critical	Deteriorated
6	**Malappuram**	Kuttippuram	67	Safe	**Malappuram**	Kuttippuram	77.92	Semi-Critical	Deteriorated
7	**Malappuram**	Malappuram	64	Safe	**Malappuram**	Malappuram	74.91	Semi-Critical	Deteriorated
8	**Malappuram**	Tirur	72	Safe	**Malappuram**	Tirur	77.75	Semi-Critical	Deteriorated
9	**Palakkad**	Thrithala	66	Safe	**Palakkad**	Thrithala	76.64	Semi-Critical	Deteriorated
10	**Thiruvananthapuram**	Pothencode	79	Safe	**Thiruvananthapuram**	Pothencode	87.71	Semi-Critical	Deteriorated
11	**Thiruvananthapuram**	Nedumangad	72	Safe	**Thiruvananthapuram**	Nedumangad	85.02	Semi-Critical	Deteriorated
12	**Thrissur**	Thalikkulam	68	Safe	**Thrissur**	Thalikkulam	75.22	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
MADHYA PRADESH									
S. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction2017	Categorization 2017	Remarks
Improved									
1	Agar	Agar	58	Semi-Critical	Agar	Agar	62.57	Safe	Improved
2	Barwani	Rajpur	100	Over Exploited	Barwani	Rajpur	81.40	Semi-Critical	Improved
3	Barwani	Thikari	79	Semi-Critical	Barwani	Thikari	34.95	Safe	Improved
4	Burhanpur	Burhanpur	95	Semi-Critical	Burhanpur	Burhanpur	67.48	Safe	Improved
5	Chhatarpur	Badamalhara	61	Semi-Critical	Chhatarpur	Badamalhara	61.54	Safe	Improved
6	Chhatarpur	Rajnagar	65	Semi-Critical	Chhatarpur	Rajnagar	62.20	Safe	Improved
7	Damoh	Hatta	80	Semi-Critical	Damoh	Hatta	69.12	Safe	Improved
8	Dhar	Dharampuri	92	Over Exploited	Dhar	Dharampuri	37.70	Safe	Improved
9	Dhar	Manawar	62	Semi-Critical	Dhar	Manawar	39.82	Safe	Improved
10	Gwalior	Morar	77	Semi-Critical	Gwalior	Morar	59.12	Safe	Improved
11	Khargone	Barwaha	81	Semi-Critical	Khargone	Barwaha	39.87	Safe	Improved
12	Khargone	Mahashwar	88	Semi-Critical	Khargone	Mahashwar	52.40	Safe	Improved
13	Morena	Morena	35	Semi-Critical	Morena	Morena	32.63	Safe	Improved
14	Morena	Porsa	41	Semi-Critical	Morena	Porsa	41.92	Safe	Improved
15	Narsinghpur	Gotegaon	70	Semi-Critical	Narsinghpur	Gotegaon	64.56	Safe	Improved
16	Narsinghpur	Narsinghpur	68	Semi-Critical	Narsinghpur	Narsinghpur	67.48	Safe	Improved
17	Panna	Ajaygarh	95	Semi-Critical	Panna	Ajaygarh	61.96	Safe	Improved
18	Rewa	Sirmour	52	Semi-Critical	Rewa	Sirmour	35.34	Safe	Improved
19	Sagar	Banda	78	Semi-Critical	Sagar	Banda	70.38	Safe	Improved
20	Satna	Amarpatan	89	Semi-Critical	Satna	Amarpatan	65.79	Safe	Improved
21	Satna	Nagod	85	Semi-Critical	Satna	Nagod	66.38	Safe	Improved
22	Satna	Rampur Baghalan	81	Over Exploited	Satna	Rampur Baghalan	76.63	Semi-Critical	Improved
23	Satna	Sohawal	84	Critical	Satna	Sohawal	85.77	Semi-Critical	Improved
24	Sehore	Sehore	69	Semi-Critical	Sehore	Sehore	67.12	Safe	Improved
25	Shivpuri	Karera	76	Semi-Critical	Shivpuri	Karera	63.13	Safe	Improved
26	Sidhi	Sidhi	65	Semi-Critical	Sidhi	Sidhi	63.78	Safe	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
MADHYA PRADESH									
S. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction2017	Categorization 2017	Remarks
Deteriorated									
1	Betul	Multai	83	Safe	Betul	Multai	83.30	Semi-Critical	Deteriorated
2	Chhindwara	Pandhurna	69	Safe	Chhindwara	Pandhurna	73.85	Semi-Critical	Deteriorated
3	Damoh	Batiyagarh	80	Safe	Damoh	Batiyagarh	73.37	Semi-Critical	Deteriorated
4	Mandsaur	Bhanpura	90	Semi-Critical	Mandsaur	Bhanpura	96.48	Critical	Deteriorated
5	Mandsaur	Garoth	85	Safe	Mandsaur	Garoth	87.44	Semi-Critical	Deteriorated
6	Mandsaur	Malahargarh	93	Semi-Critical	Mandsaur	Malahargarh	93.97	Critical	Deteriorated
7	Neemuch	Jawad	93	Semi-Critical	Neemuch	Jawad	96.10	Critical	Deteriorated
8	Neemuch	Manasa	67	Safe	Neemuch	Manasa	72.83	Semi-Critical	Deteriorated
9	Raisen	Obedulla Ganj	70	Safe	Raisen	Obedulla Ganj	77.64	Semi-Critical	Deteriorated
10	Raisen	Sanchi	66	Safe	Raisen	Sanchi	73.15	Semi-Critical	Deteriorated
11	Rajgarh	Narsingh garh	92	Semi-Critical	Rajgarh	Narsingh garh	93.07	Critical	Deteriorated
12	Rajgarh	Sarangpur	89	Semi-Critical	Rajgarh	Sarangpur	95.39	Critical	Deteriorated
13	Rajgarh	Zeerapur	67	Safe	Rajgarh	Zeerapur	76.58	Semi-Critical	Deteriorated
14	Shajapur	Kalapipal	97	Semi-Critical	Shajapur	Kalapipal	97.33	Critical	Deteriorated
15	Ujjain	Tarana	73	Safe	Ujjain	Tarana	75.51	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
MAHARASHTRA									
S. No	District	Assessment Unit	Stage of Ground Water Extraction (%) 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) 2017	Categorization 2017	Remarks
Improved									
1	**Ahmednagar**	Sangamner	100	Over Exploited	**Ahmednagar**	Sangamner	94.05	Critical	Improved
2	**Amravati**	Daryapur	168	Over Exploited	**Amravati**	Daryapur	20.47	Safe	Improved
3	**Jalgaon**	Muktainagar	78	Semi-Critical	**Jalgaon**	Muktainagar	65.65	Safe	Improved
4	**Sangli**	Miraj	94	Semi-Critical	**Sangli**	Miraj	55.58	Safe	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
MAHARASHTRA									
S. No	District	Assessment Unit	Stage of Ground Water Extraction (%) 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) 2017	Categorization 2017	Remarks
Deteriorated									
1	**Ahmednagar**	Akola	82	Safe	**Ahmednagar**	Akola	79.39	Semi-Critical	Deteriorated
2	**Ahmednagar**	Kopargaon	96	Semi-Critical	**Ahmednagar**	Kopargaon	93.71	Critical	Deteriorated
3	**Ahmednagar**	Pathardi	68	Safe	**Ahmednagar**	Pathardi	87.59	Semi-Critical	Deteriorated
4	**Ahmednagar**	Rahuri	83	Safe	**Ahmednagar**	Rahuri	96.27	Critical	Deteriorated
5	**Ahmednagar**	Shevgaon	77	Safe	**Ahmednagar**	Shevgaon	84.85	Semi-Critical	Deteriorated
6	**Ahmednagar**	Shrirampur	85	Safe	**Ahmednagar**	Shrirampur	90.55	Critical	Deteriorated
7	**Akola**	Barsi Takli	45	Safe	**Akola**	Barsi Takli	73.58	Semi-Critical	Deteriorated
8	**Amravati**	Achlapur	85	Semi-Critical	**Amravati**	Achlapur	103.40	Over Exploited	Deteriorated
9	**Amravati**	Amravati	54	Safe	**Amravati**	Amravati	77.16	Semi-Critical	Deteriorated
10	**Amravati**	Dhamangaon Railway	57	Safe	**Amravati**	Dhamangaon Railway	73.21	Semi-Critical	Deteriorated
11	**Amravati**	Morshi	92	Semi-Critical	**Amravati**	Morshi	103.39	Over Exploited	Deteriorated
12	**Amravati**	Nandgaon	57	Safe	**Amravati**	Nandgaon	82.49	Semi-Critical	Deteriorated
13	**Aurangabad**	Aurangabad	76	Safe	**Aurangabad**	Aurangabad	75.08	Semi-Critical	Deteriorated
14	**Aurangabad**	Fulambre	83	Safe	**Aurangabad**	Fulambre	80.05	Semi-Critical	Deteriorated
15	**Aurangabad**	Gangapur	85	Safe	**Aurangabad**	Gangapur	71.33	Semi-Critical	Deteriorated
16	**Aurangabad**	Khuldabad	65	Safe	**Aurangabad**	Khuldabad	70.14	Semi-Critical	Deteriorated
17	**Aurangabad**	Paithan	72	Safe	**Aurangabad**	Paithan	71.33	Semi-Critical	Deteriorated
18	**Aurangabad**	Sillod	74	Safe	**Aurangabad**	Sillod	73.35	Semi-Critical	Deteriorated
19	**Aurangabad**	Vaijapur	84	Safe	**Aurangabad**	Vaijapur	82.69	Semi-Critical	Deteriorated
20	**Buldhana**	Buldhana	87	Safe	**Buldhana**	Buldhana	87.04	Semi-Critical	Deteriorated
21	**Buldhana**	Chikhali	74	Safe	**Buldhana**	Chikhali	75.25	Semi-Critical	Deteriorated
22	**Buldhana**	Deulgaon Raja	76	Safe	**Buldhana**	Deulgaon Raja	79.43	Semi-Critical	Deteriorated
23	**Buldhana**	Nandura	80	safe	**Buldhana**	Nandura	73.50	Semi-Critical	Deteriorated
24	**Buldhana**	Sangrampur	83	safe	**Buldhana**	Sangrampur	105.35	Over Exploited	Deteriorated
25	**Buldhana**	S'indkhed Raja	67	safe	**Buldhana**	S'indkhed Raja	72.59	Semi-Critical	Deteriorated
26	**Jalgaon**	Amalner	73	Safe	**Jalgaon**	Amalner	74.90	Semi-Critical	Deteriorated
27	**Jalgaon**	Bhadgaon	75	Safe	**Jalgaon**	Bhadgaon	78.93	Semi-Critical	Deteriorated
28	**Jalgaon**	Bhusawal	80	Safe	**Jalgaon**	Bhusawal	78.40	Semi-Critical	Deteriorated
29	**Jalgaon**	Chalisgaon	76	safe	**Jalgaon**	Chalisgaon	76.18	Semi-Critical	Deteriorated
30	**Jalgaon**	Chopda	76	safe	**Jalgaon**	Chopda	82.99	Semi-Critical	Deteriorated
31	**Jalgaon**	Erandol	64	safe	**Jalgaon**	Erandol	71.01	Semi-Critical	Deteriorated
32	**Jalgaon**	Jamner	68	safe	**Jalgaon**	Jamner	74.81	Semi-Critical	Deteriorated
33	**Jalgaon**	Pachora	68	Safe	**Jalgaon**	Pachora	74.02	Semi-Critical	Deteriorated
34	**Nagpur**	Katol	87	Safe	**Nagpur**	Katol	79.02	Semi-Critical	Deteriorated
35	**Nagpur**	Saoner	78	Safe	**Nagpur**	Saoner	76.34	Semi-Critical	Deteriorated
36	**Nashik**	Baglan Satana	82	Safe	**Nashik**	Baglan Satana	86.23	Semi-Critical	Deteriorated
37	**Nashik**	Deola	99	Semi-Critical	**Nashik**	Deola	96.11	Critical	Deteriorated
38	**Nashik**	Kalwan	68	Safe	**Nashik**	Kalwan	70.10	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
MAHARASHTRA									
S. No	District	Assessment Unit	Stage of Ground Water Extraction (%) 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) 2017	Categorization 2017	Remarks
Deteriorated									
39	**Nashik**	Niphad	100	Semi-Critical	**Nashik**	Niphad	98.00	Critical	Deteriorated
40	**Nashik**	Sinnar	99	Semi-Critical	**Nashik**	Sinnar	97.39	Critical	Deteriorated
41	**Nashik**	Yeola	76	Safe	**Nashik**	Yeola	77.25	Semi-Critical	Deteriorated
42	**Osmanabad**	Kalamb	76	Safe	**Osmanabad**	Kalamb	75.13	Semi-Critical	Deteriorated
43	**Pune**	Ambegaon	83	Safe	**Pune**	Ambegaon	82.56	Semi-Critical	Deteriorated
44	**Pune**	Daund	76	Safe	**Pune**	Daund	73.84	Semi-Critical	Deteriorated
45	**Pune**	Indapur	84	Safe	**Pune**	Indapur	77.21	Semi-Critical	Deteriorated
46	**Pune**	Junnar	86	Safe	**Pune**	Junnar	88.38	Semi-Critical	Deteriorated
47	**Pune**	Khed	77	Safe	**Pune**	Khed	77.03	Semi-Critical	Deteriorated
48	**Pune**	Purandhar	95	Semi-Critical	**Pune**	Purandhar	91.06	Critical	Deteriorated
49	**Pune**	Shirur	90	Safe	**Pune**	Shirur	90.94	Critical	Deteriorated
50	**Sangli**	Jat	74	Safe	**Sangli**	Jat	87.43	Semi-Critical	Deteriorated
51	**Sangli**	Kavathe Mahankal	98	Critical	**Sangli**	Kavathe Mahankal	100.47	Over Exploited	Deteriorated
52	**Satara**	Man	79	Safe	**Satara**	Man	78.25	Semi-Critical	Deteriorated
53	**Satara**	Patan	68	Safe	**Satara**	Patan	72.76	Semi-Critical	Deteriorated
54	**Satara**	Phaltan	89	Safe	**Satara**	Phaltan	70.43	Semi-Critical	Deteriorated
55	**Satara**	Wai	85	Safe	**Satara**	Wai	70.21	Semi-Critical	Deteriorated
56	**Solapur**	Barshi	76	Safe	**Solapur**	Barshi	80.25	Semi-Critical	Deteriorated
57	**Solapur**	Karmala	70	Safe	**Solapur**	Karmala	72.14	Semi-Critical	Deteriorated
58	**Solapur**	Madha	78	Safe	**Solapur**	Madha	81.92	Semi-Critical	Deteriorated
59	**Solapur**	Mangalwedha	77	Safe	**Solapur**	Mangalwedha	79.94	Semi-Critical	Deteriorated
60	**Solapur**	Mohol	84	Safe	**Solapur**	Mohol	89.26	Semi-Critical	Deteriorated
61	**Solapur**	Pandharpur	77	Safe	**Solapur**	Pandharpur	77.22	Semi-Critical	Deteriorated
62	**Solapur**	Sangola	75	Safe	**Solapur**	Sangola	76.25	Semi-Critical	Deteriorated
63	**Wardha**	Karanja	72	Safe	**Wardha**	Karanja	73.35	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
ODISHA									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
Deteriorated									
1	**Balasore**	Bahanaga	65	Safe	**Balasore**	Bahanaga	73.11	Semi-critical	Deteriorated
2	**Balasore**	Baliapal	68	Safe	**Balasore**	Baliapal	87.49	Semi-critical	Deteriorated
3	**Jajpur**	Korei	52	Safe	**Jajpur**	Korei	84.22	Semi-critical	Deteriorated
4	**Kendrapara**	Garadpur	69	Safe	**Kendrapara**	Garadpur	72.3	Semi-critical	Deteriorated
5	**Khurda**	Bologarh	36	Safe	**Khurda**	Bologarh	78.94	Semi-critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
PUNJAB									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2017**	**Categorization 2017**	**Remarks**
Improved									
1	**Fazilka**	Fazilka	144.60	Over- Exploited	**Fazilka**	Fazilka	154.53	Safe	Improved
2	**Hoshiarpur**	Bhunga	112.67	Over- Exploited	**Hoshiarpur**	Bhunga	70.06	Safe	Improved
3	**Hoshiarpur**	Hazipur	120.29	Over- Exploited	**Hoshiarpur**	Hazipur	69.11	Safe	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
PUNJAB									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2017**	**Categorization 2017**	**Remarks**
Deteriorated									
1	**Amritsar**	Majitha	96.44	Critical	**Amritsar**	Majitha	120.17	Over- Exploited	Deteriorated
2	**Bathinda**	Nathana	69.60	Safe	**Bathinda**	Nathana	73.38	Semi-Critical	Deteriorated
3	**Ferozepur**	Guru Har Sahai	94.93	Critical	**Ferozepur**	Guru Har Sahai	116.65	Over- Exploited	Deteriorated
4	**Gurdaspur**	Gurdaspur	85.00	Semi-Critical	**Gurdaspur**	Gurdaspur	93.15	Critical	Deteriorated
5	**Hoshiarpur**	Garhsahnkar	70.43	Safe	**Hoshiarpur**	Garhsahnkar	130.93	Over- Exploited	Deteriorated
6	**Hoshiarpur**	Hoshiarpur-1	63.55	Safe	**Hoshiarpur**	Hoshiarpur-1	147.01	Over- Exploited	Deteriorated
7	**Hoshiarpur**	Talwara	69.52	Safe	**Hoshiarpur**	Talwara	80.65	Semi-Critical	Deteriorated
8	**Ludhiana**	Machhiwara	104.53	Safe	**Ludhiana**	Machhiwara	118.94	Over- Exploited	Deteriorated
9	**Nawan Shahr**	Nawan Shahr	93.52	Critical	**Nawanshahar**	Nawan Shahr	107.64	Over- Exploited	Deteriorated
10	**Patahankot**	Pathankot	66.93	Safe	**Pathankot**	Pathankot	253.87	Semi-Critical	Deteriorated
11	**Ropar**	Chamkaur Sahib	202.20	Safe	**Ropar**	Chamkaur Sahib	211.71	Over- Exploited	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
RAJASTHAN									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2017**	**Categorization 2017**	**Remarks**
Improved									
1	**Barmer**	Chohtan	98	Critical	**Barmer**	Chohtan	69.69	Safe	Improved
2	**Barmer**	Sindhary	101	Over Exploited	**Barmer**	Sindhary	99.50	Critical	Improved
3	**Jalore**	Chitalwana	95	Critical	**Jalore**	Chitalwana	75.55	Semi-Critical	Improved
4	**Nagaur**	Nagaur	97	Critical	**Nagaur**	Nagaur	72.97	Semi-Critical	Improved
5	**Pali**	Rohat	80	Semi-Critical	**Pali**	Rohat	25.98	Safe	Improved
6	**Sirohi**	Sirohi	104	Over Exploited	**Sirohi**	Sirohi	91.30	Critical	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
RAJASTHAN									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) 2017**	**Categorization 2017**	**Remarks**
Deteriorated									
1	**Bikaner**	Kolayat	82	Safe	**Bikaner**	Kolayat	99.87	Critical	Deteriorated
2	**Churu**	Churu	88	Safe	**Churu**	Churu	89.83	Semi-Critical	Deteriorated
3	**Churu**	Ratangarh	74	Safe	**Churu**	Ratangarh	79.88	Semi-Critical	Deteriorated
4	**Dungarpur**	Dungarpur	85	Safe	**Dungarpur**	Dungarpur	89.32	Semi-Critical	Deteriorated
5	**Jhalawar**	Bakani	98	Semi-Critical	**Jhalawar**	Bakani	100.28	Over Exploited	Deteriorated
6	**Jhalawar**	Dug	89	Safe	**Jhalawar**	Dug	89.97	Semi-Critical	Deteriorated
7	**Jhalawar**	Jhalrapatan	98	Semi-Critical	**Jhalawar**	Jhalrapatan	99.08	Critical	Deteriorated
8	**Jhalawar**	Manoharthana	97	Semi-Critical	**Jhalawar**	Manoharthana	99.82	Critical	Deteriorated
9	**Jhalawar**	Pirawa	100	Semi-Critical	**Jhalawar**	Pirawa	99.55	Critical	Deteriorated
10	**Karauli**	Nadoti	82	Safe	**Karauli**	Nadoti	87.55	Critical	Deteriorated
11	**Pali**	Sumerpur	98	Semi-Critical	**Pali**	Sumerpur	95.06	Critical	Deteriorated
12	**Rajsamand**	Deogarh	97	Semi-Critical	**Rajsamand**	Deogarh	99.13	Critical	Deteriorated
13	**Rajsamand**	Khamnor	96	Semi-Critical	**Rajsamand**	Khamnor	99.09	Critical	Deteriorated
14	**Rajsamand**	Kumbhalgarh	99	Semi-Critical	**Rajsamand**	Kumbhalgarh	99.91	Critical	Deteriorated
15	**Sirohi**	Abu Road	99	Semi-Critical	**Sirohi**	Abu Road	99.90	Critical	Deteriorated
16	**Tonk**	Deoli	88	safe	**Tonk**	Deoli	86.45	Semi-Critical	Deteriorated
17	**Tonk**	Tonk	86	safe	**Tonk**	Tonk	84.89	Semi-Critical	Deteriorated
18	**Udaipur**	Girwa	95	Semi-Critical	**Udaipur**	Girwa	94.44	Critical	Deteriorated
19	**Udaipur**	Gogunda	96	Semi-Critical	**Udaipur**	Gogunda	94.31	Critical	Deteriorated
20	**Udaipur**	Jhadol	97	Semi-Critical	**Udaipur**	Jhadol	95.94	Critical	Deteriorated
21	**Udaipur**	Kherwara	93	Semi-Critical	**Udaipur**	Kherwara	99.41	Critical	Deteriorated
22	**Udaipur**	Kotra	82	safe	**Udaipur**	Kotra	89.15	Semicritical	Deteriorated
23	**Udaipur**	Lasadiya	98	Semi-Critical	**Udaipur**	Lasadiya	99.03	Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
TAMIL NADU									
Sl. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization 2017	Remark
Improved									
1	**Ariyalur**	Suthamalli	71.82	Semi-Critical	**Ariyalur**	Suthamalli	60.05	Safe	Improved
2	**Coimbatore**	Periyanaickenpalayam	120.77	Over Exploited	**Coimbatore**	Periyanaickenpalayam	85.01	Semi-Critical	Improved
3	**Coimbatore**	Thudialur	105.73	Over Exploited	**Coimbatore**	Thudialur	76.60	Semi-Critical	Improved
4	**Cuddalore**	Tittagudi (E)	76.06	Semi-Critical	**Cuddalore**	Tittagudi (E)	68.60	Safe	Improved
5	**Dharmapuri**	Sunjalnatham	80.79	Semi-Critical	**Dharmapuri**	Sunjalnatham	53.61	Safe	Improved
6	**Dharmapuri**	Theerthamalai	79.81	Semi-Critical	**Dharmapuri**	Theerthamalai	70.04	Safe	Improved
7	**Dindigul**	Natham	77.70	Semi-Critical	**Dindigul**	Natham	70.49	Safe	Improved
8	**Dindigul**	Reddiapatti	82.21	Semi-Critical	**Dindigul**	Reddiapatti	66.42	Safe	Improved
9	**Dindigul**	Senthurai	75.41	Semi-Critical	**Dindigul**	Senthurai	64.81	Safe	Improved
10	**Erode**	Kuthiyalathur	78.47	Semi-Critical	**Erode**	Kuthiyalathur	65.27	Safe	Improved
11	**Kancheepuram**	L.Endathur	108.56	Over Exploited	**Kancheepuram**	L.Endathur	98.03	Critical	Improved
12	**Kancheepuram**	Mangadu	91.82	Critical	**Kancheepuram**	Mangadu	51.11	Safe	Improved
13	**Krishnagiri**	Barur	79.69	Semi-Critical	**Krishnagiri**	Barur	64.24	Safe	Improved
14	**Krishnagiri**	Shoolagiri	84.44	Semi-Critical	**Krishnagiri**	Shoolagiri	61.08	Safe	Improved
15	**Madurai**	Athipatti	76.67	Semi-Critical	**Madurai**	Athipatti	65.24	Safe	Improved
16	**Madurai**	Neerathan	73.46	Semi-Critical	**Madurai**	Neerathan	61.33	Safe	Improved
17	**Madurai**	Thenkarai	78.96	Semi-Critical	**Madurai**	Thenkarai	63.44	Safe	Improved
18	**Namakkal**	Pallapatti	93.89	Critical	**Namakkal**	Pallapatti	85.13	Semi-Critical	Improved
19	**Perambalur**	Kolakanatham	82.02	Semi-Critical	**Peramabalur**	Kolakanatham	62.80	Safe	Improved
20	**Pudukkottai**	Alangudi	75.89	Semi-Critical	**Pudukottai**	Alangudi	51.51	Safe	Improved
21	**Ramanathapuram**	Perunkulam	77.56	Semi-Critical	**Ramanathapuram**	Perunkulam	67.00	Safe	Improved
22	**Salem**	Panamarathuppatti	137.15	Over Exploited	**Salem**	Panamarathuppatti	38.39	Safe	Improved
23	**Salem**	Thevur	72.03	Semi-Critical	**Salem**	Thevur	63.32	Safe	Improved
24	**Thanjavur**	Cholanmaligai	73.61	Semi-Critical	**Thanjavur**	Cholanmaligai	61.82	Safe	Improved
25	**Thanjavur**	Thanjavur	96.86	Critical	**Thanjavur**	Thanjavur	76.72	Semi-Critical	Improved
26	**Theni**	Andipatti	91.67	Critical	**Theni**	Andipatti	84.82	Semi-Critical	Improved
27	**Theni**	Kandamanur	118.07	Over Exploited	**Theni**	Kandamanur	94.72	Critical	Improved
28	**Theni**	Kodivilarpatti	142.10	Over Exploited	**Theni**	Kodivilarpatti	86.19	Semi-Critical	Improved
29	**Thiruvallur**	Balapuram	98.33	Critical	**Thiruvallur**	Balapuram	59.85	Safe	Improved
30	**Thiruvallur**	Cherukkanoor	102.60	Over Exploited	**Thiruvallur**	Cherukkanoor	92.86	Critical	Improved
31	**Thiruvallur**	Erumbi	93.95	Critical	**Thiruvallur**	Erumbi	81.11	Semi-Critical	Improved
32	**Thiruvallur**	Gummidipoondi	90.78	Critical	**Thiruvallur**	Gummidipoondi	68.83	Safe	Improved
33	**Thiruvallur**	Kadambathur	91.06	Critical	**Thiruvallur**	Kadambathur	87.56	Semi-Critical	Improved
34	**Thiruvallur**	Mappedu	91.58	Critical	**Thiruvallur**	Mappedu	86.26	Semi-Critical	Improved
35	**Thiruvallur**	Periyapalayam	71.29	Semi-Critical	**Thiruvallur**	Periyapalayam	68.07	Safe	Improved
36	**Thiruvallur**	Pothattur Pettai	73.96	Semi-Critical	**Thiruvallur**	Pothattur Pettai	68.55	Safe	Improved
37	**Thiruvallur**	Uthukkottai	91.01	Critical	**Thiruvallur**	Uthukkottai	78.44	Semi-Critical	Improved
38	**Thiruvallur**	Velakapuram	70.80	Semi-Critical	**Thiruvallur**	Velakapuram	66.09	Safe	Improved
39	**Thoothukudi**	Kadambur	71.52	Semi-Critical	**Thoothukudi**	Kadambur	62.41	Safe	Improved
40	**Thoothukudi**	Kayathar	76.06	Semi-Critical	**Thoothukudi**	Kayathar	70.02	Safe	Improved
41	**Thoothukudi**	Ottapidaram	72.17	Semi-Critical	**Thoothukudi**	Ottapidaram	61.51	Safe	Improved
42	**Thirunelveli**	Thiruvengadem	94.76	Critical	**Tirunelveli**	Thiruvengadem	80.75	Semi-Critical	Improved
43	**Thirunelveli**	Tisayanvilai	72.67	Semi-Critical	**Tirunelveli**	Tisayanvilai	64.11	Safe	Improved
44	**Trichy**	Kattuputhur	103.11	Over Exploited	**Trichy**	Kattuputhur	99.66	Critical	Improved
45	**Trichy**	Peruvalpur	95.61	Critical	**Trichy**	Peruvalpur	83.02	Semi-Critical	Improved
46	**Vellore**	Ambalur	112.16	Over Exploited	**Vellore**	Ambalur	98.86	Critical	Improved
47	**Vellore**	Banavaram	83.64	Semi-Critical	**Vellore**	Banavaram	65.86	Safe	Improved
48	**Vellore**	Jolarpet	135.74	Over Exploited	**Vellore**	Jolarpet	87.53	Semi-Critical	Improved
49	**Vellore**	Kaniyambadi	97.25	Critical	**Vellore**	Kaniyambadi	84.26	Semi-Critical	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
TAMIL NADU									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remark**
Improved									
50	**Vellore**	Kaveripakkam	91.33	Critical	**Vellore**	Kaveripakkam	83.91	Semi-Critical	Improved
51	**Vellore**	Melpadi	87.38	Semi-Critical	**Vellore**	Melpadi	69.25	Safe	Improved
52	**Vellore**	Sholinghur	83.38	Semi-Critical	**Vellore**	Sholinghur	54.09	Safe	Improved
53	**Vellore**	Ussoor	110.39	Over Exploited	**Vellore**	Ussoor	98.21	Critical	Improved
54	**Villupuram**	Arakandanallur	70.94	Semi-Critical	**Villupuram**	Arakandanallur	65.35	Safe	Improved
55	**Villupuram**	Arasur	104.19	Over Exploited	**Villupuram**	Arasur	97.59	Critical	Improved
56	**Villupuram**	Chinnaselam	91.38	Critical	**Villupuram**	Chinnaselam	88.72	Semi-Critical	Improved
57	**Villupuram**	Chithalingamadam	101.61	Over Exploited	**Villupuram**	Chithalingamadam	99.05	Critical	Improved
58	**Villupuram**	Kalvarayan Malai	82.16	Semi-Critical	**Villupuram**	Kalvarayan Malai	68.35	Safe	Improved
59	**Villupuram**	Nagalur	150.09	Over Exploited	**Villupuram**	Nagalur	97.82	Critical	Improved
60	**Villupuram**	Olakkur	102.11	Over Exploited	**Villupuram**	Olakkur	97.09	Critical	Improved
61	**Villupuram**	T.V.Nallur	126.06	Over Exploited	**Villupuram**	T.V.Nallur	70.54	Semi-Critical	Improved
62	**Villupuram**	Thirukoilur	78.78	Semi-Critical	**Villupuram**	Thirukoilur	52.02	Safe	Improved
63	**Villupuram**	Ulundurpettai	123.48	Over Exploited	**Villupuram**	Ulundurpettai	99.08	Critical	Improved
64	**Villupuram**	Vadasiruvalur	114.08	Over Exploited	**Villupuram**	Vadasiruvalur	99.93	Critical	Improved
65	**Villupuram**	Vanur	95.21	Critical	**Villupuram**	Vanur	89.08	Semi-Critical	Improved
66	**Villupuram**	Vikkiravandi	107.34	Over Exploited	**Villupuram**	Vikkiravandi	60.25	Safe	Improved
67	**Virudhunagar**	Nalli	74.60	Semi-Critical	**Virudhunagar**	Nalli	70.06	Safe	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
TAMIL NADU									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remark**
Deteriorated									
1	**Coimbatore**	Alandurai	79.55	Semi-Critical	**Coimbatore**	Alandurai	121.71	Over Exploited	Deteriorated
2	**Coimbatore**	Anamalai	45.95	Safe	**Coimbatore**	Anamalai	105.80	Over Exploited	Deteriorated
3	**Coimbatore**	Annur(S)	95.86	Critical	**Coimbatore**	Annur(S)	136.30	Over Exploited	Deteriorated
4	**Coimbatore**	Kottur	71.37	Semi-Critical	**Coimbatore**	Kottur	100.08	Critical	Deteriorated
5	**Coimbatore**	Madukkarai	85.57	Semi-Critical	**Coimbatore**	Madukkarai	100.30	Critical	Deteriorated
6	**Coimbatore**	Mettupalayam	83.75	Semi-Critical	**Coimbatore**	Mettupalayam	92.38	Critical	Deteriorated
7	**Coimbatore**	Perur	82.08	Semi-Critical	**Coimbatore**	Perur	105.57	Over Exploited	Deteriorated
8	**Coimbatore**	Saravanampatti	86.25	Semi-Critical	**Coimbatore**	Saravanampatti	93.41	Critical	Deteriorated
9	**Coimbatore**	Sarkar Samakulam	90.64	Critical	**Coimbatore**	Sarkar Samakulam	175.46	Over Exploited	Deteriorated
10	**Cuddalore**	Marungur	68.62	Safe	**Cuddalore**	Marungur	82.66	Semi-Critical	Deteriorated
11	**Cuddalore**	Nellikuppam	97.89	Critical	**Cuddalore**	Nellikuppam	126.36	Over Exploited	Deteriorated
12	**Dharmapuri**	Krishnapuram	82.41	Semi-Critical	**Dharmapuri**	Krishnapuram	92.64	Critical	Deteriorated
13	**Dindigul**	Ayakudi	88.48	Semi-Critical	**Dindigul**	Ayakudi	106.64	Over Exploited	Deteriorated
14	**Dindigul**	Dharmathupatti	97.52	Critical	**Dindigul**	Dharmathupatti	104.60	Over Exploited	Deteriorated
15	**Dindigul**	Neikkarapattai	52.60	Safe	**Dindigul**	Neikkarapattai	94.40	Critical	Deteriorated
16	**Dindigul**	Thoppampatti	96.01	Critical	**Dindigul**	Thoppampatti	149.21	Over Exploited	Deteriorated
17	**Erode**	Arachalur	97.72	Critical	**Erode**	Arachalur	107.04	Over Exploited	Deteriorated
18	**Erode**	Arasur	97.19	Critical	**Erode**	Arasur	117.78	Over Exploited	Deteriorated
19	**Erode**	Athani	96.15	Critical	**Erode**	Athani	102.74	Over Exploited	Deteriorated
20	**Erode**	Erode West	94.38	Critical	**Erode**	Erode West	107.47	Over Exploited	Deteriorated
21	**Erode**	Kasipalayam	80.16	Semi-Critical	**Erode**	Kasipalayam	95.77	Critical	Deteriorated
22	**Erode**	Kilampadi	88.46	Semi-Critical	**Erode**	Kilampadi	92.05	Critical	Deteriorated
23	**Erode**	Sathyamangalam	87.92	Semi-Critical	**Erode**	Sathyamangalam	90.59	Critical	Deteriorated
24	**Erode**	Thingalur	88.24	Semi-Critical	**Erode**	Thingalur	91.90	Critical	Deteriorated
25	**Kancheepuram**	Appur	94.93	Critical	**Kancheepuram**	Appur	118.15	Over Exploited	Deteriorated
26	**Kancheepuram**	Arumpuliyur	94.86	Critical	**Kancheepuram**	Arumpuliyur	119.81	Over Exploited	Deteriorated
27	**Kancheepuram**	Chengalpattu	87.06	Semi-Critical	**Kancheepuram**	Chengalpattu	106.17	Over Exploited	Deteriorated
28	**Kancheepuram**	Karumbakkam	64.95	Safe	**Kancheepuram**	Karumbakkam	86.05	Semi-Critical	Deteriorated
29	**Kancheepuram**	Kayapakkam	59.97	Safe	**Kancheepuram**	Kayapakkam	79.86	Semi-Critical	Deteriorated
30	**Kancheepuram**	Nerumbur	93.01	Critical	**Kancheepuram**	Nerumbur	109.90	Over Exploited	Deteriorated
31	**Kancheepuram**	Orathi	98.90	Critical	**Kancheepuram**	Orathi	118.69	Over Exploited	Deteriorated
32	**Kancheepuram**	Pallur	60.40	Safe	**Kancheepuram**	Pallur	74.73	Semi-Critical	Deteriorated
33	**Kancheepuram**	Thirupulivanam	96.85	Critical	**Kancheepuram**	Thirupulivanam	128.60	Over Exploited	Deteriorated
34	**Karur**	Chinnadharapuram	60.85	Safe	**Karur**	Chinnadharapuram	77.18	Semi-Critical	Deteriorated
35	**Karur**	Chinthalavadi	64.83	Safe	**Karur**	Chinthalavadi	72.51	Semi-Critical	Deteriorated
36	**Karur**	Karur	84.03	Semi-Critical	**Karur**	Karur	115.78	Over Exploited	Deteriorated
37	**Karur**	Kattalai	91.20	Critical	**Karur**	Kattalai	102.81	Over Exploited	Deteriorated
38	**Karur**	Pugalur	91.98	Critical	**Karur**	Pugalur	104.22	Over Exploited	Deteriorated
39	**Karur**	Thalapatti	91.30	Critical	**Karur**	Thalapatti	101.70	Over Exploited	Deteriorated
40	**Krishnagiri**	Bagalur	68.70	Safe	**Krishnagiri**	Bagalur	78.38	Semi-Critical	Deteriorated
41	**Krishnagiri**	Berigai	82.13	Semi-Critical	**Krishnagiri**	Berigai	119.65	Over Exploited	Deteriorated
42	**Krishnagiri**	Hosur	96.04	Critical	**Krishnagiri**	Hosur	123.50	Over Exploited	Deteriorated
43	**Krishnagiri**	Kakkadasam	57.05	Safe	**Krishnagiri**	Kakkadasam	72.48	Semi-Critical	Deteriorated
44	**Krishnagiri**	Kelamangalam	67.13	Safe	**Krishnagiri**	Kelamangalam	87.41	Semi-Critical	Deteriorated
45	**Krishnagiri**	Mathigiri	80.43	Semi-Critical	**Krishnagiri**	Mathigiri	98.78	Critical	Deteriorated
46	**Krishnagiri**	Nagarasampatti	83.70	Semi-Critical	**Krishnagiri**	Nagarasampatti	95.53	Critical	Deteriorated
47	**Krishnagiri**	Rayakottai	73.50	Semi-Critical	**Krishnagiri**	Rayakottai	98.12	Critical	Deteriorated
48	**Krishnagiri**	Thally	68.26	Safe	**Krishnagiri**	Thally	77.56	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
TAMIL NADU									
S. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization 2017	Remark
Deteriorated									
49	**Madurai**	Karumathur	84.27	Semi-Critical	**Madurai**	Karumathur	97.55	Critical	Deteriorated
50	**Madurai**	Kokkulam	95.65	Critical	**Madurai**	Kokkulam	100.81	Over Exploited	Deteriorated
51	**Madurai**	Kottampatti	96.58	Critical	**Madurai**	Kottampatti	106.29	Over Exploited	Deteriorated
52	**Madurai**	Nagamalali Pudukotta	87.22	Semi-Critical	**Madurai**	Nagamalali Pudukotta	104.25	Over Exploited	Deteriorated
53	**Madurai**	Sedapatti	94.00	Critical	**Madurai**	Sedapatti	101.02	Over Exploited	Deteriorated
54	**Madurai**	Sindhupatti	93.15	Critical	**Madurai**	Sindhupatti	113.02	Over Exploited	Deteriorated
55	**Madurai**	Thirumangalam	88.07	Semi-Critical	**Madurai**	Thirumangalam	94.51	Critical	Deteriorated
56	**Madurai**	Valayankulam	66.73	Safe	**Madurai**	Valayankulam	73.45	Semi-Critical	Deteriorated
57	**Madurai**	Vellalur	78.65	Semi-Critical	**Madurai**	Vellalur	108.68	Over Exploited	Deteriorated
58	**Nagapattinam**	Madhanam	97.92	Critical	**Nagapattinam**	Madhanam	140.71	Over Exploited	Deteriorated
59	**Namakkal**	Kumarapalayam	83.90	Semi-Critical	**Namakkal**	Kumarapalayam	102.94	Over Exploited	Deteriorated
60	**Namakkal**	Tiruchengode	72.09	Semi-Critical	**Namakkal**	Tiruchengode	117.69	Over Exploited	Deteriorated
61	**Pudukkottai**	Kodumbalur	57.11	Safe	**Pudukkotai**	Kodumbalur	81.97	Semi-Critical	Deteriorated
62	**Pudukkottai**	Arasamalai	55.86	Safe	**Pudukottai**	Arasamalai	77.00	Semi-Critical	Deteriorated
63	**Pudukkottai**	Keeramangalam	85.17	Semi-Critical	**Pudukottai**	Keeramangalam	91.79	Critical	Deteriorated
64	**Pudukkottai**	Kottur	30.35	Safe	**Pudukottai**	Kottur	85.48	Semi-Critical	Deteriorated
65	**Pudukkottai**	Narthamalai	67.86	Safe	**Pudukottai**	Narthamalai	80.50	Semi-Critical	Deteriorated
66	**Pudukkottai**	Ponnamaravathy	64.36	Safe	**Pudukottai**	Ponnamaravathy	76.88	Semi-Critical	Deteriorated
67	**Pudukkottai**	Varappur	63.81	Safe	**Pudukottai**	Varappur	78.52	Semi-Critical	Deteriorated
68	**Pudukkottai**	Veerapatty	57.78	Safe	**Pudukottai**	Veerapatty	82.52	Semi-Critical	Deteriorated
69	**Pudukkottai**	Vennavalkudi	51.18	Safe	**Pudukottai**	Vennavalkudi	82.57	Semi-Critical	Deteriorated
70	**Salem**	Belur	87.35	Semi-Critical	**Salem**	Belur	141.72	Over Exploited	Deteriorated
71	**Salem**	Karupur	86.10	Semi-Critical	**Salem**	Karupur	123.84	Over Exploited	Deteriorated
72	**Salem**	Mettur	82.07	Semi-Critical	**Salem**	Mettur	107.55	Over Exploited	Deteriorated
73	**Salem**	Patchamalai	68.53	Safe	**Salem**	Patchamalai	71.73	Semi-Critical	Deteriorated
74	**Salem**	Poolampatti	96.14	Critical	**Salem**	Poolampatti	122.89	Over Exploited	Deteriorated
75	**Salem**	Pottaneri	88.73	Semi-Critical	**Salem**	Pottaneri	146.74	Over Exploited	Deteriorated
76	**Salem**	Suramangalam	96.89	Critical	**Salem**	Suramangalam	157.32	Over Exploited	Deteriorated
77	**Salem**	Veeraganoor	77.17	Semi-Critical	**Salem**	Veeraganoor	170.32	Over Exploited	Deteriorated
78	**Thanjavur**	Adirampattinam	88.77	Semi-Critical	**Thanjavur**	Adirampattinam	97.22	Critical	Deteriorated
79	**Thanjavur**	Agarapettai	66.26	Safe	**Thanjavur**	Agarapettai	95.72	Critical	Deteriorated
80	**Thanjavur**	Andikkadu	86.79	Semi-Critical	**Thanjavur**	Andikkadu	112.21	Over Exploited	Deteriorated
81	**Thanjavur**	Kabisthalam	96.82	Critical	**Thanjavur**	Kabisthalam	108.16	Over Exploited	Deteriorated
82	**Thanjavur**	Kavalipatti	83.86	Semi-Critical	**Thanjavur**	Kavalipatti	107.22	Over Exploited	Deteriorated
83	**Thanjavur**	Madukkur	45.00	Safe	**Thanjavur**	Madukkur	142.15	Over Exploited	Deteriorated
84	**Thanjavur**	Nambivayal	81.34	Semi-Critical	**Thanjavur**	Nambivayal	93.46	Critical	Deteriorated
85	**Thanjavur**	Orathanad	64.34	Safe	**Thanjavur**	Orathanad	89.27	Semi-Critical	Deteriorated
86	**Thanjavur**	Peravurani	63.86	Safe	**Thanjavur**	Peravurani	81.61	Semi-Critical	Deteriorated
87	**Thanjavur**	Periyakottai	50.46	Safe	**Thanjavur**	Periyakottai	94.51	Critical	Deteriorated
88	**Thanjavur**	Saliyamangalam	49.98	Safe	**Thanjavur**	Saliyamangalam	77.65	Semi-Critical	Deteriorated
89	**Thanjavur**	Sillathur	85.26	Semi-Critical	**Thanjavur**	Sillathur	99.63	Critical	Deteriorated
90	**Thanjavur**	Thambikkottai	71.36	Semi-Critical	**Thanjavur**	Thambikkottai	94.13	Critical	Deteriorated
91	**Thanjavur**	Thirukkattupalli	91.18	Critical	**Thanjavur**	Thirukkattupalli	100.64	Over Exploited	Deteriorated
92	**Thanjavur**	Thirumangalakottai	97.17	Critical	**Thanjavur**	Thirumangalakottai	119.59	Over Exploited	Deteriorated
93	**Thanjavur**	Ulur	76.55	Semi-Critical	**Thanjavur**	Ulur	93.85	Critical	Deteriorated
94	**Theni**	Kodangipatti	68.96	Safe	**Theni**	Kodangipatti	72.69	Semi-Critical	Deteriorated
95	**Tiruppur**	Alangiyam	87.57	Semi-Critical	**Thiruppur**	Alangiyam	102.86	Over Exploited	Deteriorated
96	**Tiruppur**	Cheyur	98.25	Critical	**Thiruppur**	Cheyur	113.43	Over Exploited	Deteriorated

	COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)								
	TAMIL NADU								
S. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization 2017	Remark
	Deteriorated								
97	**Tiruppur**	Dharapuram	86.88	Semi-Critical	**Thiruppur**	Dharapuram	93.62	Critical	Deteriorated
98	**Tiruppur**	Nathakadaiyur	98.32	Critical	**Thiruppur**	Nathakadaiyur	117.46	Over Exploited	Deteriorated
99	**Tiruppur**	Thungavi	84.60	Semi-Critical	**Thiruppur**	Thungavi	95.23	Critical	Deteriorated
100	**Tiruppur**	Vellakoil	97.54	Critical	**Thiruppur**	Vellakoil	123.40	Over Exploited	Deteriorated
101	**Thiruvallur**	Avadi	79.85	Semi-Critical	**Thiruvallur**	Avadi	130.91	Over Exploited	Deteriorated
102	**Thiruvallur**	Kanagammachattram	75.97	Semi-Critical	**Thiruvallur**	Kanagammachattram	93.62	Critical	Deteriorated
103	**Thiruvallur**	Kolur	67.20	Safe	**Thiruvallur**	Kolur	72.08	Semi-Critical	Deteriorated
104	**Thiruvallur**	Maduravoil	61.85	Safe	**Thiruvallur**	Maduravoil	145.17	Over Exploited	Deteriorated
105	**Thiruvallur**	Morai	73.93	Semi-Critical	**Thiruvallur**	Morai	113.16	Over Exploited	Deteriorated
106	**Thiruvallur**	Poonamallee	73.68	Semi-Critical	**Thiruvallur**	Poonamallee	194.11	Over Exploited	Deteriorated
107	**Thiruvallur**	Thirumazhisai	75.83	Semi-Critical	**Thiruvallur**	Thirumazhisai	99.44	Critical	Deteriorated
108	**Thiruvallur**	Thiruninravur	96.26	Critical	**Thiruvallur**	Thiruninravur	181.22	Over Exploited	Deteriorated
109	**Thiruvallur**	Thiruvalangadu	56.95	Safe	**Thiruvallur**	Thiruvalangadu	73.93	Semi-Critical	Deteriorated
110	**Thiruvallur**	Tiruttani	75.19	Semi-Critical	**Thiruvallur**	Tiruttani	94.29	Critical	Deteriorated
111	**Thiruvallur**	Velliyur	65.92	Safe	**Thiruvallur**	Velliyur	71.49	Semi-Critical	Deteriorated
112	**Thirunelveli**	Ayikudi	97.51	Critical	**Tirunelveli**	Ayikudi	144.60	Over Exploited	Deteriorated
113	**Thirunelveli**	Gudalur	95.46	Critical	**Tirunelveli**	Gudalur	115.10	Over Exploited	Deteriorated
114	**Thirunelveli**	Kadayanallur	75.01	Semi-Critical	**Tirunelveli**	Kadayanallur	99.12	Critical	Deteriorated
115	**Thirunelveli**	Moolakaraipatti	57.73	Safe	**Tirunelveli**	Moolakaraipatti	85.12	Semi-Critical	Deteriorated
116	**Thirunelveli**	Puliyankudi	98.35	Critical	**Tirunelveli**	Puliyankudi	107.94	Over Exploited	Deteriorated
117	**Thirunelveli**	Veerakeralampudur	87.07	Semi-Critical	**Tirunelveli**	Veerakeralampudur	97.85	Critical	Deteriorated
118	**Thirunelveli**	Venkadampatti	94.75	Critical	**Tirunelveli**	Venkadampatti	102.07	Over Exploited	Deteriorated
119	**Thirunelveli**	Vijayanarayanapuram	63.83	Safe	**Tirunelveli**	Vijayanarayanapuram	89.57	Semi-Critical	Deteriorated
120	**Thiruvannamalai**	Anakavoor	82.80	Semi-Critical	**Tiruvannamalai**	Anakavoor	98.66	Critical	Deteriorated
121	**Thiruvannamalai**	Arni	59.51	Safe	**Tiruvannamalai**	Arni	112.46	Over Exploited	Deteriorated
122	**Thiruvannamalai**	Chennavaram	95.27	Critical	**Tiruvannamalai**	Chennavaram	116.26	Over Exploited	Deteriorated
123	**Thiruvannamalai**	Desur	93.86	Critical	**Tiruvannamalai**	Desur	127.36	Over Exploited	Deteriorated
124	**Thiruvannamalai**	Dusi	84.87	Semi-Critical	**Tiruvannamalai**	Dusi	110.69	Over Exploited	Deteriorated
125	**Thiruvannamalai**	Eraiyur	97.45	Critical	**Tiruvannamalai**	Eraiyur	109.06	Over Exploited	Deteriorated
126	**Thiruvannamalai**	Kadaladi	84.43	Semi-Critical	**Tiruvannamalai**	Kadaladi	115.59	Over Exploited	Deteriorated
127	**Thiruvannamalai**	Kalasapakkam	88.05	Semi-Critical	**Tiruvannamalai**	Kalasapakkam	112.44	Over Exploited	Deteriorated
128	**Thiruvannamalai**	Kannamangalam	86.87	Semi-Critical	**Tiruvannamalai**	Kannamangalam	98.04	Critical	Deteriorated
129	**Thiruvannamalai**	Kelur	94.62	Critical	**Tiruvannamalai**	Kelur	136.94	Over Exploited	Deteriorated
130	**Thiruvannamalai**	Kettavarampalayam	92.60	Critical	**Tiruvannamalai**	Kettavarampalayam	130.86	Over Exploited	Deteriorated
131	**Thiruvannamalai**	Kilkodungalur	95.78	Critical	**Tiruvannamalai**	Kilkodungalur	115.18	Over Exploited	Deteriorated
132	**Thiruvannamalai**	Kolappalur	98.87	Critical	**Tiruvannamalai**	Kolappalur	108.42	Over Exploited	Deteriorated
133	**Thiruvannamalai**	Modayur	72.11	Semi-Critical	**Tiruvannamalai**	Modayur	102.38	Over Exploited	Deteriorated
134	**Thiruvannamalai**	Mullipattu	83.13	Semi-Critical	**Tiruvannamalai**	Mullipattu	141.26	Over Exploited	Deteriorated
135	**Thiruvannamalai**	Nayadumangalam	95.82	Critical	**Tiruvannamalai**	Nayadumangalam	111.29	Over Exploited	Deteriorated
136	**Thiruvannamalai**	Nedungunam	93.78	Critical	**Tiruvannamalai**	Nedungunam	104.34	Over Exploited	Deteriorated
137	**Thiruvannamalai**	Peranamallur	98.37	Critical	**Tiruvannamalai**	Peranamallur	109.14	Over Exploited	Deteriorated
138	**Thiruvannamalai**	Perungattur	69.38	Safe	**Tiruvannamalai**	Perungattur	83.08	Semi-Critical	Deteriorated
139	**Thiruvannamalai**	Polur	85.40	Semi-Critical	**Tiruvannamalai**	Polur	111.88	Over Exploited	Deteriorated
140	**Thiruvannamalai**	Santhavasal	98.75	Critical	**Tiruvannamalai**	Santhavasal	105.58	Over Exploited	Deteriorated
141	**Thiruvannamalai**	Sathyavijayanagaram	52.05	Safe	**Tiruvannamalai**	Sathyavijayanagaram	80.86	Semi-Critical	Deteriorated
142	**Thiruvannamalai**	T.V.Malai (North)	83.87	Semi-Critical	**Tiruvannamalai**	T.V.Malai (North)	93.30	Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
TAMIL NADU									
S. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization 2017	Remark
Deteriorated									
143	**Thiruvannamalai**	Thachambadi	92.49	Critical	**Tiruvannamalai**	Thachambadi	104.06	Over Exploited	Deteriorated
144	**Thiruvannamalai**	Thanipadi	96.89	Critical	**Tiruvannamalai**	Thanipadi	110.94	Over Exploited	Deteriorated
145	**Thiruvannamalai**	Thatchampattu	94.92	Critical	**Tiruvannamalai**	Thatchampattu	100.52	Over Exploited	Deteriorated
146	**Thiruvannamalai**	Thellar	82.28	Semi-Critical	**Tiruvannamalai**	Thellar	99.28	Critical	Deteriorated
147	**Thiruvannamalai**	Thethurai	70.80	Semi-Critical	**Tiruvannamalai**	Thethurai	98.80	Critical	Deteriorated
148	**Thiruvannamalai**	Vanapuram	93.94	Critical	**Tiruvannamalai**	Vanapuram	100.89	Over Exploited	Deteriorated
149	**Thiruvannamalai**	Vembakkam	68.81	Safe	**Tiruvannamalai**	Vembakkam	75.00	Semi-Critical	Deteriorated
150	**Thiruvannamalai**	Vettavlam	87.13	Semi-Critical	**Tiruvannamalai**	Vettavlam	119.84	Over Exploited	Deteriorated
151	**Thiruvarur**	Thiruvizhimazhalai	92.25	Critical	**Tiruvarur**	Thiruvizhimazhalai	145.99	Over Exploited	Deteriorated
152	**Thiruvarur**	Vadapathimangalam	62.13	Safe	**Tiruvarur**	Vadapathimangalam	91.25	Critical	Deteriorated
153	**Trichy**	Andanallur	59.68	Safe	**Trichy**	Andanallur	70.57	Semi-Critical	Deteriorated
154	**Trichy**	Ealurpatti	78.17	Semi-Critical	**Trichy**	Ealurpatti	91.67	Critical	Deteriorated
155	**Trichy**	Eragudi	91.70	Critical	**Trichy**	Eragudi	106.49	Over Exploited	Deteriorated
156	**Trichy**	Manapparai	92.75	Critical	**Trichy**	Manapparai	150.87	Over Exploited	Deteriorated
157	**Trichy**	Pannappatti	95.45	Critical	**Trichy**	Pannappatti	167.84	Over Exploited	Deteriorated
158	**Trichy**	Sengattuppatti	97.58	Critical	**Trichy**	Sengattuppatti	124.00	Over Exploited	Deteriorated
159	**Trichy**	Uppiliyapuram	72.70	Semi-Critical	**Trichy**	Uppiliyapuram	100.99	Over Exploited	Deteriorated
160	**Trichy**	V.Periyapatti	91.45	Critical	**Trichy**	V.Periyapatti	157.69	Over Exploited	Deteriorated
161	**Trichy**	Valadi	60.76	Safe	**Trichy**	Valadi	71.70	Semi-Critical	Deteriorated
162	**Vellore**	Agaram	90.93	Critical	**Vellore**	Agaram	126.82	Over Exploited	Deteriorated
163	**Vellore**	Alangayam	98.15	Critical	**Vellore**	Alangayam	101.10	Over Exploited	Deteriorated
164	**Vellore**	Andiyappanur	83.81	Semi-Critical	**Vellore**	Andiyappanur	101.08	Over Exploited	Deteriorated
165	**Vellore**	Kandhili	93.88	Critical	**Vellore**	Kandhili	127.47	Over Exploited	Deteriorated
166	**Vellore**	Koratti	84.52	Semi-Critical	**Vellore**	Koratti	129.99	Over Exploited	Deteriorated
167	**Vellore**	Mambakkam	76.89	Semi-Critical	**Vellore**	Mambakkam	93.96	Critical	Deteriorated
168	**Vellore**	Melasannankuppam	93.73	Critical	**Vellore**	Melasannankuppam	215.59	Over Exploited	Deteriorated
169	**Vellore**	Melpatti	97.59	Critical	**Vellore**	Melpatti	125.65	Over Exploited	Deteriorated
170	**Vellore**	Natrampalli	88.93	Semi-Critical	**Vellore**	Natrampalli	234.59	Over Exploited	Deteriorated
171	**Vellore**	Odugathur	91.54	Critical	**Vellore**	Odugathur	147.92	Over Exploited	Deteriorated
172	**Vellore**	Pallur	82.39	Semi-Critical	**Vellore**	Pallur	91.77	Critical	Deteriorated
173	**Vellore**	Pernampattu	83.43	Semi-Critical	**Vellore**	Pernampattu	110.64	Over Exploited	Deteriorated
174	**Vellore**	Pudurnadu	65.48	Safe	**Vellore**	Pudurnadu	93.32	Critical	Deteriorated
175	**Vellore**	Walajah	84.36	Semi-Critical	**Vellore**	Walajah	184.18	Over Exploited	Deteriorated
176	**Villupuram**	Kanjanur	98.38	Critical	**Villupuram**	Kanjanur	101.07	Over Exploited	Deteriorated
177	**Villupuram**	Thiruppalapandal	51.84	Safe	**Villupuram**	Thiruppalapandal	126.43	Over Exploited	Deteriorated
178	**Villupuram**	Vellimalai	69.30	Safe	**Villupuram**	Vellimalai	81.47	Semi-Critical	Deteriorated
179	**Villupuram**	Villupuram	92.47	Critical	**Villupuram**	Villupuram	109.56	Over Exploited	Deteriorated
180	**Virudhunagar**	Amathur	72.11	Semi-Critical	**Virudhunagar**	Amathur	100.21	Critical	Deteriorated
181	**Virudhunagar**	Mallankinar	98.12	Critical	**Virudhunagar**	Mallankinar	103.36	Over Exploited	Deteriorated
182	**Virudhunagar**	Ondipulinaickanur	79.27	Semi-Critical	**Virudhunagar**	Ondipulinaickanur	98.70	Critical	Deteriorated
183	**Virudhunagar**	Rajapalayam	85.18	Semi-Critical	**Virudhunagar**	Rajapalayam	110.44	Over Exploited	Deteriorated
184	**Virudhunagar**	Srivilliputtur	80.44	Semi-Critical	**Virudhunagar**	Srivilliputtur	95.30	Critical	Deteriorated
185	**Virudhunagar**	Vatchakara-Patti	98.10	Critical	**Virudhunagar**	Vatchakara-Patti	101.02	Over Exploited	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
UTTAR PRADESH									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
Improved									
1	**Agra**	Achhnera	107.14	Over Exploited	**Agra**	**Achhnera**	97.57	Critical	Improved
2	**Agra**	Akola	113.42	Over Exploited	**Agra**	**Akola**	96.54	Critical	Improved
3	**Aligarh**	Chandaus	103.67	Over Exploited	**Aligarh**	**Chandaus**	79.96	Semi-Critical	Improved
4	**Aligarh**	Iglas	102.12	Over Exploited	**Aligarh**	**Iglas**	96.35	Critical	Improved
5	**Amethi**	Bhadar	93.43	Semi-Critical	**Amethi**	**Bhadar**	67.13	Safe	Improved
6	**Amroha**	Amroha	100.34	Over Exploited	**Amroha**	**Amroha**	83.46	Semi-Critical	Improved
7	**Azamgarh**	Palhani	94.81	Critical	**Azamgarh**	**Palhani**	67.65	Safe	Improved
8	**Azamgarh**	Sathiyaon	101.97	Over Exploited	**Azamgarh**	**Sathiaon**	78.55	Semi-Critical	Improved
9	**Baghpat**	Chhaprauli	91.66	Critical	**Bagpat**	**Chaprauli**	71.17	Semi-Critical	Improved
10	**Ballia**	Rasra	93.80	Semi-Critical	**Ballia**	**Rasara**	66.63	Safe	Improved
11	**Bijnaur**	Nehtaur (Aaku)	94.51	Critical	**Bijnor**	**Aaku nehtaur**	87.75	Semi-Critical	Improved
12	**Bijnaur**	Seohara (Budhanpur)	113.38	Over Exploited	**Bijnor**	**Budhanpur Seohara**	74.78	Semi-Critical	Improved
13	**Bijnaur**	Noorpur	103.47	Over Exploited	**Bijnor**	**Noorpur**	96.24	Critical	Improved
14	**Budaun**	Quadar Chowk	92.47	Critical	**Budaun**	**Quadarchowk**	79.28	Semi-Critical	Improved
15	**Budaun**	Sahaswan	93.94	Critical	**Budaun**	**Sahaswan**	78.79	Semi-Critical	Improved
16	**Budaun**	Ujhani	91.03	Critical	**Budaun**	**Ujhani**	79.54	Semi-Critical	Improved
17	**Bulandshahar**	Debai	78.55	Semi-Critical	**Bulandshahar**	**Debai**	62.60	Safe	Improved
18	**Bulandshahar**	Pahasu	96.96	Critical	**Bulandshahar**	**Pahasu**	75.02	Semi-Critical	Improved
19	**Chitrakoot**	Karwi	112.27	Over Exploited	**Chitrakoot**	**Karwi**	93.85	Critical	Improved
20	**Etah**	Jalesar	120.36	Over Exploited	**Etah**	**Jalesar**	91.43	Critical	Improved
21	**Etah**	Nidhauli Kalan	95.61	Critical	**Etah**	**Nidholikalan**	83.89	Semi-Critical	Improved
22	**Fatehpur**	Airaya	96.80	Critical	**Fatehpur**	**Airayan**	74.92	Semi-Critical	Improved
23	**Fatehpur**	Bahua	95.39	Critical	**Fatehpur**	**Bahua**	71.40	Semi-Critical	Improved
24	**Fatehpur**	Dhata	92.38	Critical	**Fatehpur**	**Dhata**	71.49	Semi-Critical	Improved
25	**Fatehpur**	Haswa	92.60	Critical	**Fatehpur**	**Haswa**	74.96	Semi-Critical	Improved
26	**Fatehpur**	Malawan	96.57	Critical	**Fatehpur**	**Malwan**	73.13	Semi-Critical	Improved
27	**Fatehpur**	Telyani	94.08	Critical	**Fatehpur**	**Teliyani**	72.53	Semi-Critical	Improved
28	**Ghazipur**	Deokali	90.21	Semi-Critical	**Ghazipur**	**Deokali**	68.91	Safe	Improved
29	**Ghazipur**	Ghazipur	96.53	Critical	**Ghazipur**	**Ghazipur**	67.44	Safe	Improved
30	**Ghazipur**	Manihari	98.98	Critical	**Ghazipur**	**Manihari**	66.36	Safe	Improved
31	**Ghazipur**	Mohammadabad	99.58	Critical	**Ghazipur**	**Muhammadabad**	78.89	Semi-Critical	Improved
32	**Ghazipur**	Sadat	92.67	Semi-Critical	**Ghazipur**	**Sadat**	55.52	Safe	Improved
33	**Jaunpur**	Dobhi	94.89	Critical	**Jaunpur**	**Dobhi**	83.39	Semi-Critical	Improved
34	**Jaunpur**	Mariahu	85.87	Semi-Critical	**Jaunpur**	**Mariyahoo**	67.79	Safe	Improved
35	**Jaunpur**	Muftiganj	112.46	Over Exploited	**Jaunpur**	**Muftiganj**	95.83	Critical	Improved
36	**Kanpur Nagar**	Kalyanpur	134.77	Over Exploited	**Kanpur Nagar**	**Kalyanpur**	34.14	Safe	Improved
37	**Kasganj**	Kasganj	102.70	Over Exploited	**Kasganj**	**Kasganj**	99.19	Critical	Improved
38	**Kasganj**	Sahawar	103.29	Over Exploited	**Kasganj**	**Sahawar**	72.59	Semi-Critical	Improved
39	**Kasganj**	Soron	78.28	Semi-Critical	**Kasganj**	**Soron**	65.72	Safe	Improved
40	**Kaushambi**	Kara	91.14	Critical	**Kaushambi**	**Kara**	72.53	Semi-Critical	Improved
41	**Kaushambi**	Manjhanpur	96.07	Critical	**Kaushambi**	**Manjhanpur**	78.68	Semi-Critical	Improved
42	**Kaushambi**	Newada	91.99	Critical	**Kaushambi**	**Newada**	72.06	Semi-Critical	Improved
43	**Kaushambi**	Sirathu	102.69	Over Exploited	**Kaushambi**	**Sirathu**	88.29	Semi-Critical	Improved
44	**Lucknow**	Chinhat	107.08	Over Exploited	**Lucknow**	**Chinhat**	61.01	Safe	Improved
45	**Lucknow**	Sarojni Nagar	118.85	Over Exploited	**Lucknow**	**Sarojini nagar**	49.15	Safe	Improved
46	**Mahoba**	Charkhari	99.40	Critical	**Mahoba**	**Charkhari**	70.97	Semi-Critical	Improved
47	**Mahoba**	Kabrai	96.95	Critical	**Mahoba**	**Kabrai**	74.45	Semi-Critical	Improved
48	**Mathura**	Farah	92.73	Critical	**Mathura**	**Farah**	71.08	Semi-Critical	Improved
49	**Moradabad**	Bilari	129.85	Over Exploited	**Moradabad**	**Bilari**	95.55	Critical	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
UTTAR PRADESH									
S. No	District	Assessment Unit	Stage of Ground Water Extraction 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization 2017	Remarks
Improved									
50	Moradabad	Chhajlet	93.52	Critical	Moradabad	Chhijlet	72.74	Semi-Critical	Improved
51	Moradabad	Dilari	136.87	Over Exploited	Moradabad	Dilari	97.70	Critical	Improved
52	Muzaffarnagar	Charthawal	100.90	Over Exploited	Muzaffarnagar	Charthawal	95.11	Critical	Improved
53	Muzaffarnagar	Shahpur	96.75	Critical	Muzaffarnagar	Shahpur	84.73	Semi-Critical	Improved
54	Pratapgarh	Aspur Deosara	101.23	Over Exploited	Pratapgarh	Aspur deosara	80.57	Semi-Critical	Improved
55	Pratapgarh	Baba Belkhar Nath Dham	91.15	Critical	Pratapgarh	Baba belkhernath	81.74	Semi-Critical	Improved
56	Pratapgarh	Gaura	101.50	Over Exploited	Pratapgarh	Gaura	74.80	Semi-Critical	Improved
57	Pratapgarh	Lakshamanpur	120.91	Over Exploited	Pratapgarh	Lakshmanpur	76.81	Semi-Critical	Improved
58	Pratapgarh	Lalganj	132.32	Over Exploited	Pratapgarh	Lalganj	82.59	Semi-Critical	Improved
59	Pratapgarh	Mangaraura	104.81	Over Exploited	Pratapgarh	Mangraura	91.28	Critical	Improved
60	Pratapgarh	Patti	136.84	Over Exploited	Pratapgarh	Patti	95.06	Critical	Improved
61	Pratapgarh	Sadar	147.91	Over Exploited	Pratapgarh	Rampur sangramgarh	73.98	Semi-Critical	Improved
62	Allahabad	Baharia	123.44	Over Exploited	Prayagraj	Baheria	97.68	Critical	Improved
63	Allahabad	Dhanupur	125.99	Over Exploited	Prayagraj	Dhanupur	94.63	Critical	Improved
64	Allahabad	Holagarh	99.51	Critical	Prayagraj	Holagarh	71.30	Semi-Critical	Improved
65	Allahabad	Mauaima	127.90	Over Exploited	Prayagraj	Mau-aima	78.47	Semi-Critical	Improved
66	Rae Bareli	Saraini	92.22	Critical	Raibareli	Sareni	79.99	Semi-Critical	Improved
67	Rampur	Said Nagar	120.63	Over Exploited	Rampur	Said nagar	83.26	Semi-Critical	Improved
68	Rampur	Shahabad	102.12	Over Exploited	Rampur	Shahabad	78.49	Semi-Critical	Improved
69	Rampur	Saur	117.39	Over Exploited	Rampur	Swar	81.59	Semi-Critical	Improved
70	Saharanpur	Ballia Kheri	101.94	Over Exploited	Saharanpur	Baliakheri	88.97	Semi-Critical	Improved
71	Saharanpur	Deoband	106.72	Over Exploited	Saharanpur	Deoband	91.90	Critical	Improved
72	Saharanpur	Nanauta	125.38	Over Exploited	Saharanpur	Nanauta	93.90	Critical	Improved
73	Saharanpur	Punwarka	93.29	Critical	Saharanpur	Puwarka	67.88	Safe	Improved
74	Saharanpur	Rampur Maniharan	107.94	Over Exploited	Saharanpur	Rampur	92.85	Critical	Improved
75	Shambhal	Janawai	96.80	Critical	Sambhal	Junawai	78.00	Semi-Critical	Improved
76	Shambhal	Sambhal	107.72	Over Exploited	Sambhal	Sambhal	98.15	Critical	Improved
77	Shamli	Thana Bhawan	92.05	Critical	Shamli	Thana bhawan	74.86	Semi-Critical	Improved
78	Sonbhadra	Ghorawal	88.53	Semi-Critical	Sonbhadra	Ghorawal	55.24	Safe	Improved
79	Unnao	Sikandar Sirausi	93.10	Semi-Critical	Unnao	Sikandar sirausi	66.46	Safe	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
UTTAR PRADESH									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
Deteriorated									
1	**Agra**	Bah	84.18	Safe	**Agra**	**Bah**	83.98	Semi-Critical	Deteriorated
2	**Aligarh**	Gangiri	89.88	Safe	**Aligarh**	**Gangiri**	75.06	Semi-Critical	Deteriorated
3	**Aligarh**	Jawa Sikandairpur	68.36	Safe	**Aligarh**	**Jawan**	80.20	Semi-Critical	Deteriorated
4	**Aligarh**	Khair	88.35	Safe	**Aligarh**	**Khair**	77.30	Semi-Critical	Deteriorated
5	**Aligarh**	Lodha	121.20	Safe	**Aligarh**	**Lodha**	74.58	Semi-Critical	Deteriorated
6	**Ambedkar Nagar**	Baskhari	79.26	Safe	**Ambedkar Nagar**	**Baskhari**	74.00	Semi-Critical	Deteriorated
7	**Ambedkar Nagar**	Bhiti	89.42	Safe	**Ambedkar Nagar**	**Bhiti**	89.09	Semi-Critical	Deteriorated
8	**Ambedkar Nagar**	Jalalpur	73.47	Safe	**Ambedkar Nagar**	**Jalalpur**	88.04	Semi-Critical	Deteriorated
9	**Ambedkar Nagar**	Katehari	80.81	Safe	**Ambedkar Nagar**	**Katehari**	74.03	Semi-Critical	Deteriorated
10	**Amroha**	Gangeshwari	85.36	Safe	**Amroha**	**Gangeshwari**	87.69	Semi-Critical	Deteriorated
11	**Faizabad**	Bikapur	86.40	Safe	**Ayodhya**	**Bikapur**	83.47	Semi-Critical	Deteriorated
12	**Faizabad**	Milkipur	87.14	Safe	**Ayodhya**	**Milkipur**	85.62	Semi-Critical	Deteriorated
13	**Baghpat**	Khekra	98.49	Critical	**Bagpat**	**Khekra**	104.46	Over Exploited	Deteriorated
14	**Banda**	Baberu	51.79	Safe	**Banda**	**Baberu**	74.33	Semi-Critical	Deteriorated
15	**Banda**	Jaspura	70.36	Safe	**Banda**	**Jaspura**	83.91	Semi-Critical	Deteriorated
16	**Banda**	Naraini	36.00	Safe	**Banda**	**Naraini**	76.79	Semi-Critical	Deteriorated
17	**Barabanki**	Bani Kodar	72.56	Safe	**Barabanki**	**Banikodar**	80.40	Semi-Critical	Deteriorated
18	**Bareili**	Alampur Jafarabad	59.28	Safe	**Bareilly**	**Alampur zafarabad**	79.58	Semi-Critical	Deteriorated
19	**Bareili**	Fatehganj	89.90	Safe	**Bareilly**	**Fatehganj**	74.21	Semi-Critical	Deteriorated
20	**Budaun**	Asafpur	91.94	Semi-Critical	**Budaun**	**Asafpur**	97.06	Critical	Deteriorated
21	**Budaun**	Islamnagar	96.87	Critical	**Budaun**	**Islamnagar**	114.16	Over Exploited	Deteriorated
22	**Budaun**	Jagat	71.93	Safe	**Budaun**	**Jagat**	84.67	Semi-Critical	Deteriorated
23	**Budaun**	Miaon	52.62	Safe	**Budaun**	**Mion**	83.65	Semi-Critical	Deteriorated
24	**Budaun**	Salarpur	75.23	Safe	**Budaun**	**Salarpur**	87.70	Semi-Critical	Deteriorated
25	**Bulandshahar**	Anup shahar	62.75	Safe	**Bulandshahar**	**Anupshahar**	72.38	Semi-Critical	Deteriorated
26	**Bulandshahar**	Arnia Khurd	75.06	Safe	**Bulandshahar**	**Arnia khurd**	88.53	Semi-Critical	Deteriorated
27	**Bulandshahar**	Danpur	93.92	Critical	**Bulandshahar**	**Danpur**	105.52	Over Exploited	Deteriorated
28	**Bulandshahar**	Lakhaothi	83.77	Safe	**Bulandshahar**	**Lakhaoti**	72.88	Semi-Critical	Deteriorated
29	**Bulandshahar**	Siana	94.17	Semi-Critical	**Bulandshahar**	**Siyana**	105.55	Over Exploited	Deteriorated
30	**Bulandshahar**	Unchagaon	92.33	Semi-Critical	**Bulandshahar**	**Unchagaon**	95.55	Critical	Deteriorated
31	**Chitrakoot**	Manikpur	46.46	Safe	**Chitrakoot**	**Manikpur**	70.66	Semi-Critical	Deteriorated
32	**Chitrakoot**	Mau	77.90	Safe	**Chitrakoot**	**Mau**	79.87	Semi-Critical	Deteriorated
33	**Chitrakoot**	Pahari	37.04	Safe	**Chitrakoot**	**Pahari**	78.42	Semi-Critical	Deteriorated
34	**Chitrakoot**	Ramnagar	77.29	Safe	**Chitrakoot**	**Ram nagar**	83.15	Semi-Critical	Deteriorated
35	**Etah**	Aliganj	82.81	Safe	**Etah**	**Aliganj**	88.26	Semi-Critical	Deteriorated
36	**Etah**	Jaithara	75.63	Safe	**Etah**	**Jaithara**	77.34	Semi-Critical	Deteriorated
37	**Etah**	Shitalpur	76.27	Safe	**Etah**	**Sheetalpur**	89.35	Semi-Critical	Deteriorated
38	**Farrukhabad**	Barhpur	76.60	Safe	**Farrukhabad**	**Barhpur**	88.72	Semi-Critical	Deteriorated
39	**Farrukhabad**	Kamalganj	84.39	Safe	**Farrukhabad**	**Kamalganj**	78.47	Semi-Critical	Deteriorated
40	**Farrukhabad**	Mohamadabad	74.52	Safe	**Farrukhabad**	**Mohammdabad**	89.13	Semi-Critical	Deteriorated
41	**Farrukhabad**	Nawabganj	84.37	Safe	**Farrukhabad**	**Nawabganj**	80.76	Semi-Critical	Deteriorated
42	**Farrukhabad**	Shamsabad	85.04	Safe	**Farrukhabad**	**Shamsabad**	70.98	Semi-Critical	Deteriorated
43	**Firozabad**	Madanpur	89.87	Safe	**Firozabad**	**Madanpur**	84.68	Semi-Critical	Deteriorated
44	**G.B. Nagar**	Dankaur	97.93	Semi-Critical	**G.B.Nagar**	**Dankaur**	99.84	Critical	Deteriorated
45	**Ghaziabad**	Muradnagar	67.93	Safe	**Ghaziabad**	**Muradnagar**	88.23	Semi-Critical	Deteriorated
46	**Ghazipur**	Saidpur	88.64	Safe	**Ghazipur**	**Saidpur**	89.95	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
UTTAR PRADESH									
S. No	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2013	Categorization 2013	District	Assessment Unit	Stage of Ground Water Extraction (%) in 2017	Categorization 2017	Remarks
Deteriorated									
47	**Hamirpur**	Gohand	66.48	Safe	**Hamirpur**	**Gohand**	72.43	Semi-Critical	Deteriorated
48	**Hamirpur**	Maudaha	55.38	Safe	**Hamirpur**	**Maudaha**	80.22	Semi-Critical	Deteriorated
49	**Hamirpur**	Rath	46.91	Safe	**Hamirpur**	**Rath**	77.60	Semi-Critical	Deteriorated
50	**Hamirpur**	Sarila	71.67	Safe	**Hamirpur**	**Sarila**	78.83	Semi-Critical	Deteriorated
51	**Hapur**	Dholana	83.55	Safe	**Hapur**	**Dhaulana**	85.40	Semi-Critical	Deteriorated
52	**Hathras**	Sikandra Rao	88.54	Safe	**Hathras**	**Sikandrarao**	88.58	Semi-Critical	Deteriorated
53	**Jhansi**	Babina	83.23	Safe	**Jhansi**	**Babina**	77.80	Semi-Critical	Deteriorated
54	**Jhansi**	Bangra	74.51	Safe	**Jhansi**	**Bangra**	77.61	Semi-Critical	Deteriorated
55	**Jhansi**	Baragaon	80.66	Safe	**Jhansi**	**Baragaon**	74.42	Semi-Critical	Deteriorated
56	**Jhansi**	Mauranipur	77.65	Safe	**Jhansi**	**Mauranipur**	75.42	Semi-Critical	Deteriorated
57	**Kannauj**	Chhibramau	82.20	Safe	**Kannauj**	**Chibramau**	82.32	Semi-Critical	Deteriorated
58	**Kannauj**	Gograpur	86.16	Safe	**Kannauj**	**Gugrapur**	83.79	Semi-Critical	Deteriorated
59	**Kannauj**	Kannauj	87.50	Safe	**Kannauj**	**Kannauj**	84.43	Semi-Critical	Deteriorated
60	**Kanpur Dehat**	Akbarpur	69.04	Safe	**Kanpur Dehat**	**Akbarpur**	79.73	Semi-Critical	Deteriorated
61	**Kanpur Dehat**	Malsa	84.22	Safe	**Kanpur Dehat**	**Malasa**	82.28	Semi-Critical	Deteriorated
62	**Kanpur Dehat**	Rasulabad	84.72	Safe	**Kanpur Dehat**	**Rasoolabad**	89.73	Semi-Critical	Deteriorated
63	**Kanpur Dehat**	Sarwan Khera	81.23	Safe	**Kanpur Dehat**	**Sarvan khera**	75.75	Semi-Critical	Deteriorated
64	**Kanpur Nagar**	Bidhnu	64.88	SAFE	**Kanpur Nagar**	**Bidhnoo**	84.00	Semi-Critical	Deteriorated
65	**Kanpur Nagar**	Bilhaur	88.33	SAFE	**Kanpur Nagar**	**Bilhaur**	84.29	Semi-Critical	Deteriorated
66	**Kanpur Nagar**	Chaubepur	86.58	SAFE	**Kanpur Nagar**	**Chaubeypur**	109.89	Over Exploited	Deteriorated
67	**Kanpur Nagar**	Ghatampur	89.83	Semi-Critical	**Kanpur Nagar**	**Ghatampur**	93.99	Critical	Deteriorated
68	**Kanpur Nagar**	Parara	64.77	Safe	**Kanpur Nagar**	**Patara**	80.67	Semi-Critical	Deteriorated
69	**Kanpur Nagar**	Sarsol	87.58	Semi-Critical	**Kanpur Nagar**	**Sarsaul**	90.41	Critical	Deteriorated
70	**Lalitpur**	Bar	55.88	Safe	**Lalitpur**	**Bar**	73.47	Semi-Critical	Deteriorated
71	**Lalitpur**	Birdha	72.83	Safe	**Lalitpur**	**Birdha**	73.82	Semi-Critical	Deteriorated
72	**Lalitpur**	Jakhora	65.80	Safe	**Lalitpur**	**Jakhaura**	84.17	Semi-Critical	Deteriorated
73	**Lalitpur**	Madaora	74.00	Safe	**Lalitpur**	**Madaora**	71.60	Semi-Critical	Deteriorated
74	**Lalitpur**	Mahroni	61.82	Safe	**Lalitpur**	**Mehrauni**	85.06	Semi-Critical	Deteriorated
75	**Lalitpur**	Talbehat	35.19	Safe	**Lalitpur**	**Talbehat**	79.45	Semi-Critical	Deteriorated
76	**Mainpuri**	Jagir	89.81	Safe	**Mainpuri**	**Jageer**	74.86	Semi-Critical	Deteriorated
77	**Mainpuri**	Mainpuri	87.97	Safe	**Mainpuri**	**Mainpuri**	76.75	Semi-Critical	Deteriorated
78	**Meerut**	Hastinapur	70.64	Safe	**Meerut**	**Hastinapur**	71.56	Semi-Critical	Deteriorated
79	**Meerut**	Machhra	99.21	Critical	**Meerut**	**Machhra**	114.91	Over Exploited	Deteriorated
80	**Meerut**	Mawana Kalan	86.35	Safe	**Meerut**	**Mawana**	88.10	Semi-Critical	Deteriorated
81	**Meerut**	Sarurpur	57.45	Safe	**Meerut**	**Sarurpur**	72.04	Semi-Critical	Deteriorated
82	**Mirzapur**	City	82.91	Semi-Critical	**Mirzapur**	**City**	95.94	Critical	Deteriorated
83	**Moradabad**	Kundarki (Dengapur)	84.99	Safe	**Moradabad**	**Dingerpur**	87.90	Semi-Critical	Deteriorated
84	**Moradabad**	Mundapandey	75.77	Safe	**Moradabad**	**Munda pandey**	88.62	Semi-Critical	Deteriorated
85	**Moradabad**	Moradabad	80.34	Safe	**Moradabad**	**Moradabad**	72.46	Semi-Critical	Deteriorated
86	**Muzaffarnagar**	Muzaffarnagar	76.92	Safe	**Muzaffarnagar**	**Muzaffar nagar**	88.79	Semi-Critical	Deteriorated
87	**Allahabad**	Saidabad	72.86	Safe	**Prayagraj**	**Saidabad**	88.65	Semi-Critical	Deteriorated
88	**Shamli**	Shamli	93.81	Critical	**Shamli**	**Shamli**	110.44	Over Exploited	Deteriorated
89	**Sonbhadra**	Dudhi	81.12	Safe	**Sonbhadra**	**Duddhi**	89.65	Semi-Critical	Deteriorated
90	**Varanasi**	Kashi Vidyapith	76.45	Safe	**Varanasi**	**Kashi viddyapeeth**	75.13	Semi-Critical	Deteriorated
91	**Varanasi**	Sevapuri	82.50	Safe	**Varanasi**	**Sewapuri**	85.45	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
UTTARAKHAND									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
Improved									
1	**Udham Singh Nagar**	Kashipur	98.86	Critical	**Udham Singh Nagar**	Kashipur	85.53	Semi-Critical	Improved

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
UTTARAKHAND									
S. No	**District**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2013**	**District**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
Deteriorated									
1	**Haridwar**	Bhagwanpur	82.63	Safe	**Haridwar**	Bhagwanpur	75.84	Semi-Critical	Deteriorated
2	**Nainital**	Haldwani	69.83	Safe	**Nainital**	Haldwani	73.08	Semi-Critical	Deteriorated

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2017 AND 2013)									
UT. OF CHANDIGARH									
S.No	**UT**	**Assessment Unit**	**Stage of Ground Water Extraction 2013**	**Categorization 2017**	**Categorization 2017**	**Assessment Unit**	**Stage of Ground Water Extraction (%) in 2017**	**Categorization 2017**	**Remarks**
1	**Chandigarh**	Chandigarh	0	0	**Safe**	Chandigarh	89	Semi-Critical	Deteriorated

APPENDICES

Appendix A
Government resolution on constitution of Central Level Expert Group for overall re-assessment of ground water resources of the country, 2017

(TO BE PUBLISHED IN THE GAZETTE OF INDIA PART-I, SECTION -I)

No. T-13014/1/2017-GW
Government of India
Ministry of Water Resources, River Development, Ganga Rejuvenation
******

Shram Shakti Bhawan, Rafi Marg
New Delhi, Dated: 18th May, 2017

RESOLUTION

Sub: **Constitution of Central Level Expert Group for overall re-assessment of ground water resources of the country, 2017.**

The last assessment of state-wise annual replenishable ground water resources for the entire country has been made as on 31st March 2013 based on the Methodology, Ground Water Resources Estimation Committee (GEC) -97. Since then there have been changes in ground water scenario in many places of the country. Accordingly, a Central Level Expert Group is hereby constituted for over-all supervision of the re-assessment of ground water resources (As on 31st March, 2017) in the entire country. The composition and terms of reference of the Expert Group are as follows:-

1) **Composition:**

(i).	Chairman, CGWB	Chairman
(ii).	Member(RM), CWC	Member
(iii).	Member (WP&P), CWC or representative	Member
(iv).	Member (SM&L), CGWB	Member
(v).	Member (SAM), CGWB	Member
(vi).	Member (ED&MM), CGWB	Member
(vii).	Member (RGI), CGWB	Member
(viii).	Additional Director General (Stat), MOWR,RD&GR	Member
(ix).	Chief General Manager, NABARD	Member
(x).	Director, NIH, Roorkee or representative	Member
(xi).	Representative of NITI Aayog	Member
(xii).	Joint Secretary, Ministry of Agriculture & Farmers Welfare	Member
(xiii).	Joint Secretary, Ministry of Environment, Forests & Climate Change	Member
(xiv).	Joint Secretary, Ministry of Rural Development (Watershed Development Programme)	
(xv).	Joint Secretary, Ministry of Drinking Water Supply & Sanitation	Member
(xvi).	Joint Secretary, Ministry of Urban Development	Member
(xvii).	Representative of IIT, Delhi (Water Resources Section) Civil Engineering Department	Member
(xviii).	Chief Engineer (HQ), NWDA or representative	Member
(xix).	Technical Expert (WM), NRAA, Ministry of Agriculture & Farmers Welfare	Member
(xx).	Representative of India Meteorology Department	Member
(xxi).	Representative of Geological Survey of India	Member
(xxii).	Secretary In-Charge, Water Resources, Uttar Pradesh	Member
(xxiii).	Secretary In-Charge, Water Resources, Punjab	Member
(xxiv).	Secretary In-Charge, Water Resources, Maharashtra	Member
(xxv).	Secretary In-Charge, Water Resources, Andhra Pradesh	Member
(xxvi).	Secretary In- Charge, Water Resources, Rajasthan	Member
(xxvii).	Secretary In- Charge, Water Resources, Madhya Pradesh	Member
xxviii).	Secretary In- Charge, Water Resources, Gujarat	Member
(xxix).	Secretary In- Charge, Water Resources, West Bengal	Member
(xxx).	Representative of Department of Civil Engg., Indian Institute Science (IISc), Bangalore	Member
(xxxi).	Member (TT&WQ), CGWB	Member Secretary

The committee may co-opt any other Member(s), if necessary.

2) **Terms of Reference: –**

(i) To ensure the assessment of annual replenishable ground water resources of the States in coordination with the respective state level committees for the reference year 2017. The Committee will work on ground water assessments in accordance with the methodology and will adopt improved procedures and practices wherever possible for the sake of achieving greater accuracy of assessment(s).

(ii) To supervise the estimation of status of utilization of the annual replenishable ground water resource as on 31st March 2017 of the States to be carried by the respective State level committees.

(iii) To prepare a National level report on assessment of ground water resources and status of its utilization as on 31st March, 2017.

(iv) To work towards integration of ground water and surface water data with a view to facilitating planning for constructive/integrated use of water resources.

(v) Any other aspect relevant to the terms referred to above.

3) **Time frame:-**

The Committee will submit its report within one year.

4) **Expenditure**

Expenditure on account of TA/DA to official Members of the Expert Group will be met from the source from which they draw their salaries and that of non-official Members (if any), will be borne by the Central Ground Water Board.

This issues with the approval of Hon'ble Minister (WR,RD&GR) .

(Ashok Gupta)
Director (GW)
dirgw-mowr@nic.in

ORDER

Ordered that the Resolution be published in the Gazette of India for general information.

Ordered that a copy of the Resolution published be communicated to this Ministry for record.

(Ashok Gupta)
Director (GW)

To

The Manager,
Government of India Press,
Faridabad (Haryana).

Copy to:

1. PS to Minister (WR,RD&GR)
2. PS to MoS (WR,RD&GR)
3. Sr. PPS to Secretary (WR,RD&GR).
4. PPS to Joint Secretary (A&GW)
5. All members concerned.
6. Chairman, CGWB, Faridabad
7. Member (TT&WQ) and Member Secretary of the CLEG-2017, CGWB, Faridabad for information and necessary action.

Copy also to:

NIC for uploading the Resolution on Ministry's website under GW Section.

(Ashok Gupta)
Director (GW)

Appendix B
Approvals of ground water assessment reports (as on 31st march 2017) by the State Level Committees

Andhra Pradesh

Minutes of 2nd State Level Committee Meeting for Re-Estimation of Ground Water Resources for the State of Andhra Pradesh as on March, 2017

The 2nd State Level Committee Meeting for Re-Estimation of Ground Water Resource as on March, 2017 was held on 16.11.2018 at 11.00 Hrs. in the Conference Hall, 4th Block, Secretariat, Amaravati under the Chairmanship of Sri Shashi Bhushan Kumar, I.A.S., Secretary, Water Resources Department, Government of Andhra Pradesh.

At the outset Sri D. Subba Rao, Regional Director, CGWB, SR & Member-Secretary welcomed Chairman and all the Members of the Committee to the Meeting and briefed on the Re-Estimation of Ground Water Resource in Andhra Pradesh as on March, 2017.

Dr. K. Venugopal, Director, Ground Water and Water Audit (GW&WA) Department, Government of Andhra Pradesh briefed on modus operandi of ground water resource estimation as on 2017 and felt that the resources computations by using new software (APGRACE) will definitely be helpful for quick and more accurate computations in the years to come.

Sri N. Srinivas, Dy. Director, Ground Water and Water Audit Department, Govt. of Andhra Pradesh made a detailed presentation on the Ground Water Resources of Andhra Pradesh and explained the item-wise variations with previous estimates. He also shown the web based software applications developed on resource estimation following GEC 2015 methodology. The Annual extractable groundwater resources for the base year 2017-18 is 20,153 MCM (which is 1,673 MCM i.e 9.1% more than the previous estimates) and the Groundwater extraction for all uses is 8,897 MCM (which is 793 MCM, i.e 9.8% more than the previous estimates). The stage of groundwater extraction is 44% (31% in command area and 56% in Non Command area). The SLC observed that there is a reduction in over-exploited mandals (61 to 45 i.e 16 mandals) and increase in ground water resource availability to the tune of 1673 MCM, which is due to interventions taken up by Government of Andhra Pradesh in ground water conservation. Also estimated the availability of 21,031 MCM of in-storage groundwater resources in Andhra Pradesh for the same period and the total groundwater availability is 41,184 MCM (20,153+21,031)

Sri M.Siva Prasada Rao, Joint Commissioner, Rural Development pointed out that there is decrease in over exploited mandals in Chittoor and Anantapur districts, while there is marginal increase in overexploited mandals in other districts. Sri Srinivas, Deputy Director clarified that this is due to variations in rainfall pattern and local hydrogeological conditions at local scale.

Sri Shashi Bhushan Kumar, I.A.S., Chairman of the SLC interacted at length on resource estimates and recharge attributes as on 2013 and 2017. He also suggested to include comparative figures in respect of recharge due to rainfall, applied irrigation, canal seepage, tanks & ponds, water conservation structures as on 2013 & 2017 in final report.

Dr. P.S. Raghavaiah, I.F.S., Commissioner, CADA, Sri A.G. Mallikarjuna Reddy, Chief Engineer, Minor Irrigation, Sri TVNAR Kumar, Chief Engineer, Hydrology, Dr. K. Chandrasekhar, Professor & Head, Agronomy, ANGRAU, Guntur and P. Subramanyeswara Rao, Industries Department, also participated in the deliberations. The suggestions made by Dr. N.C. Mondal, Scientist, NGRI, were also taken note of by the Committee for incorporating in the final Report.

During the course of deliberations, the Chairman of the Committee opined that there are the limitations in ground water science and suggested for making use of improved technology in developing user friendly web based applications so as to reach common man and for the benefit of the end user.

Sri D. Subba Rao, Member-Secretary expressed that ongoing irrigation projects/lift irrigation projects along with the activities under Neeru-Chettu programme will definitely improve the ground water resources in the State to a considerable extent by 2020.

The Committee appreciated the efforts put in by Director and Officers of Ground Water & Water Audit Department, Government Andhra Pradesh in completing the assessment in a time bound manner using new web based software.

After brief deliberations, the SLC approved the draft Re-estimates of Ground Water Resources as on March, 2017, with the decision to incorporate the suggestions made by August Members in the final Report.

(Dr.K.Venu Gopal)
Director
Ground Water and
Water Audit Department

(D. Subba Rao)
Regional Director,
CGWB, Southern Region)
HYDERABAD.

(Shashi Bhushan Kumar, I.A.S)
Secretary, Water Resources Department,
Government of Andhra Pradesh & Chairman, SLC

Arunachal Pradesh

MINUTES OF THE MEETING OF STATE LEVEL COMMITTEE
FOR
RECONCILIATION OF DYNAMIC GROUND WATER RESOURCES ASSESSMENT OF ARUNACHAL PRADESH, 2017

Date: 19.09.2018

Venue: Finance Conference Hall, 3rd Floor, Block-2, Civil Secretariat, Itanagar

A meeting of State Level Committee for reconciliation of Dynamic Ground Water Resources of Arunachal Pradesh, 2017, was convened on 19.09.2018 at Finance Conference Hall, 3rd Floor, Block-2, Civil Secretariat, Itanagar. The meeting was chaired by Shri. G. S. Meena, Commissioner, Water Resources Department, Govt. of Arunachal Pradesh and the following members were present (Attendance sheet attached):

i) Shri. L. Angu, Chief Engineer (W/Z), Water Resources Department, Govt. of Arunachal Pradesh, Itanagar.

ii) Shri Gyanandra Mani, General Manager, NABARD, Itanagar

iii) Shri. J. Rime, Director, Horticulture, Govt. of Arunachal Pradesh, Itanagar.

iv) Shri. G. Borang, Superintending Engineer (TW & GW), Water Resources Department, Govt. of Arunachal Pradesh, Itanagar.

v) Shri T. Taloh, Superintending Engineer (E/Z), Pubic Health Engineering & W.S.S Department, Govt. of Arunachal Pradesh, Itanagar.

vi) Shri. Tasso Butung, Asst. Director, Agriculture Department, Govt. of Arunachal Pradesh, Naharlagun.

vii) Shri R. K. Kalita, Scientist D & OIC , CGWB, SUO, Naharlagun

viii) Dr. D. J. Khound, Asst. Hydrogeologist, CGWB, NER, Guwahati

Shri. G. Borang, Superintending Engineer (TW & GW), Water Resources Department, Govt. of Arunachal Pradesh, Itanagar welcome all the members of the committee.

The GEC 15 methodology and findings of Dynamic Ground Water Resources of Arunachal Pradesh was presented by Dr. D, J. Khound, Asst. Hydrogeologist, CGWB, NER, Guwahati. The salient features of his speech are:

A. The computation of Dynamic Ground Water Resources, as on March 2017, for Arunachal Pradesh has been carried out jointly by WRD, Govt. Of Arunachal Pradesh and CGWB, SUO, Naharlagun based on GEC Methodology, 2015 and the following parameters have been considered:

i) The resource computations are done for the **ground water year 2016-17**

ii) The ground water resource estimation of the state is done considering district as the smallest administrative unit for resources computation due to lack of block-wise data. The area suitable for ground water recharge has been delineated based on Hydrogeomorphological map of the state. There is no poor water quality area reported from the state of Arunachal Pradesh, hence it is not considered.

iii) Since there is no major or medium irrigation project in the state, the entire state has been taken as non-command area.

iv) Inflow components: Inflow components assessed in the present estimation are: recharge from other sources, recharge from surface irrigation scheme and recharge from groundwater irrigation schemes.

Recharge from surface water irrigation scheme: Data considered for the assessment of this component is MIC (Minor Irrigation Census) 2006-07 as MIC 2013-14 district wise data not available. The kharif crop considered for the assessment is paddy and return flow factor is 0.45 and for rabi crop return flow factor is 0.25 as the water level is below 10mbgl.

a) Recharge from groundwater irrigation: There is no groundwater based irrigation scheme and hence recharge from groundwater based irrigation for the state is considered nil.

Recharge from tanks and ponds, recharge from hydraulically connected streams, recharge from water conservation structures, lateral and vertical flow could not be estimated due to lack of data.

Outflow Components

iv) **Ground Water Extraction:**

b) **Domestic extraction:** Domestic extraction is estimated by consumptive use method considering per capita consumption is 60 lpd. The population data of census 2011 is projected to 2017 and groundwater dependency data is collected from Census 2011.

c) **Irrigation Extraction**: There is no groundwater based irrigation scheme and hence groundwater extraction for irrigation for the state is considered nil.

d) **Industrial Extraction**: Industrial extraction is estimated for food and beverage industry only. The data is obtained from CGWA data base of NOC

e) **Evaporation and transpiration loss**: One of the important outflow components of groundwater balance equation is evapotranspiration loss. Since evapotranspiration data is not available, evaporation and transpiration is estimated as per method provided in GEC 15 methodology.

Contour map is prepared for DTW 3.5mbgl. It is considered that evaporation can take place if the DTW level is equal or less than 1mbgl. Moreover, transpiration can take place if the DTW is within 3.5mbgl. Evaporation and transpiration rate is considered 1mm/day as there is no field study report available. The evaporating and transpiration areas are estimated from DTW contours.

f) Lateral flow across assessment unit boundary and vertical inter aquifer flow could not be estimated due to lack of data.

Rainfall Recharge:

v) The recharge from rainfall has been computed using the **Rainfall infiltration factor method and also by water balance equation** (where DTW data available). As most of the area of the state is covered by consolidated and semi-consolidated formations the Rainfall infiltration factor considered is 0.22. The monsoon recharge estimated by these two methods were compared by prevent difference (PD). After comparison it is found that Water Level Fluctuation Method could be adopted for only one assessment unit, i.e., East Siang district where PD factor is -2.95% and for rest of the districts monsoon rainfall recharge estimated by rainfall infiltration factor method is adopted.

Non-monsoon rainfall recharge is estimated for all the districts by rainfall infiltration factor method as the normal non-monsoon rainfall is more that minimum threshold value.

Rainfall data is obtained from IMD and Rural Works Department, Govt. of Arunachal Pradesh.

vi) **Total annual ground water recharge** has been obtained by subtracting resultant flows (evaporation and transpiration loss) from rainfall recharge and the value is added with recharge from sources.

vii) Environmental flow/ecological flow/unaccounted natural flows: In this assessment base flow could not be estimated due to lack of stream data. As such 10% of total annual groundwater recharge is considered as environmental flow if the monsoon rainfall recharge is estimated by rainfall infiltration factor method and 5% for water level fluctuation method.

vii) Annual extractable groundwater resources: Annual extractable groundwater resource is obtained after deducting the environmental flow/unaccounted natural discharge from the total annual recharge.

vii) Allocation of groundwater for domestic uses up to 2025: The domestic allocation of groundwater up to 2025 is obtained by projecting the population to 2025 and multiplied with per capita consumption of 60lpcd and load on groundwater.

viii) **Net annual ground water availability for future use is** obtained after deducting the allocation of groundwater for future use plus gross groundwater extraction for irrigation and industrial use from annual extractable groundwater resource.

ix) **Stage of extraction** has been calculated using the following equation

Stage = (100* Gross Groundwater extraction for all uses) / Annual extractable resource

x) **Categorisation** has been made on the basis of the stage of Ground water development. Since the Groundwater development for all the Districts is far below 70 % the entire district have been categorised as safe and the result is validated.

xi) **Allocation for domestic and industrial water supply** has been estimated up to the year 2025 based on the projected population for the year 2025 using 2011 population data and the decadal growth rate. The fractional load on ground water has been taken as 1.

The Dynamic Ground Water Resources, for the State, as estimated, is as under:

a) Total Annual Ground Water Recharge: 292938ham or 2.93BCM

b) Annual extractable resource: 267362ham or 2.67BCM

c) Gross Ground Water extraction for all uses: 747.5 ham or 0.0075 BCM

    i) Irrigation Draft: Nil

    ii) Annual Domestic Draft: 731ham or 0.0073 BCM

d) Annual allocation for Domestic use: 1893.51ham or 0.1894BCM

e) Net availability of GW for future use: 265454.20ham or 2.65BCM

f) Stage of ground water development: 0.28%

The comparison of the figures with the last reconciled data of 2013 shows that there is a decrease in total annual ground water recharge by 150062ham or – 1.5 BCM in the 2016-17 estimate. This difference in resource may be attributed to the revised ground water resource methodology. In this method evaporation and transpiration are additional outflow components which were not considered in 2013 GW resource assessment. Moreover, the monsoon recharge estimated by rainfall infiltration factor method also reduces the recharge.

The potential resource of water logged and shallow water table area is also estimated in the present assessment.

The dynamic resources of confined and semi-confined aquifers could not be estimated in the present assessment as there are no piezometers or monitoring wells tapping the confined aquifers.

The draft report was circulated among the members in advance.

After briefing the Report a discussion was held among the members.

Shri L. Angu, Chief Engineer (W/Z), Water Resources Department opined that reduction of dynamic groundwater resources in the present assessment based on GEC2015 methodology, is not physical reduction of groundwater resources but reduction due to adoption of new groundwater resource estimation method. Other members supporting him pointed out that there is no dramatic change of rainfall pattern in the state and also the extraction of groundwater is almost same.

Shri L. Angu, Chief Engineer (W/Z), Water Resources Department, also urged to strengthen the groundwater monitoring network in the state. He expressed that dynamic resources of both confined and unconfined aquifers should be periodically monitored. Although stage of groundwater extraction in the state is under safe category, the Himalayan state has been witnessing the affect of climate change on surface water resources. The rapid rate of urbanization in some districts of Arunachal Pradesh may cause acute water crisis in future. Therefore, he expressed the view that for periodic monitoring of groundwater resources, piezometers should be constructed and for real time monitoring telemetric AWLR should be fitted and this technical upgradation of monitoring system should be accomplished under the provisions of National Hydrology Project. The Hon'ble Chairman of the Committee is and other members supported the proposal.

The Hon'ble chairman emphasized that spring study should be taken up in a big way. Many springs of the state are dried out. The reasons for spring drying should be analyised and remedial measures like springshed development programme should be taken up to rejuveiate the springs.

The Committee approved the Dynamic Ground Water Assessment Report, 2017 of Arunachal Pradesh with the above observations. Shri. R. K. Kalita. Scientist-D CGWB, SUO, Naharlagun offered Vote of Thanks.

(G.S. Meena)
Commissioner,
Water Resources Department,
Govt. of Arunachal Pradesh,
&
Chairman,
State Level Committee for
Dynamic Ground Resources Assessment

(L. Angu)
Chief Engineer (W/Z),
Water Resources Dept,
Govt. of Arunachal Pradesh,
& Member

(G. Mani)
General Manager,
NABARD, Itanagar,
& Member

(J. Rime)
Director
Dept. Of Horticulture
Govt. of Arunachal Pradesh,
& Member

(T. Taloh)
Superintending Engineer (E/Z)
Public Health Engg. & W.S.S Dept,
& Member

(G. Borang)
Superintending Engineer
Water Resources Department
(GW & TW), Itanagar
Govt. of Arunachal Pradesh,
& Member

(Tasso Butung)
Assistant Director
Agriculture Department
Govt. of Arunachal Pradesh
Naharlagun
& Member

(R. K. Kalita)
Scientist-D
Central Ground Water Board
State Unit Office
Naharlagun

Assam

MINUTES OF THE MEETING OF STATE LEVEL COMMITTEE

FOR

RECONCILIATION OF DYNAMIC GROUND WATER RESOURCES ASSESSMENT OF ASSAM, as on March 2017

Date: 18.02.2019

Time: 13 hrs.

Venue: Office Chamber of the Secretary, Irrigation Department, Block-B, IInd Floor, Assam Secretariat, Dispur, Assam

A meeting of State Level Committee for reconciliation of Dynamic Ground Water Resources of Assam was convened on 18.02.2019 at Office Chamber of the Secretary, Irrigation Department, Block-B, IInd Floor, Assam Secretariat, Dispur, Assam. The meeting was chaired by Sri. Mahendra Mohan Boro, Secretary, Irrigation Department, Govt. of Assam

The Regional Director, CGWB, NER, Guwahati & Member Secretary, State Level Committee for Ground Water Resource Estimation, Assam welcomes all the members of the committee.

Sri B. Ray, Scientist – D, CGWB, NER on behalf of the RD, CGWB, NER with the permission of the Chair presented the report before the committee where he explained the changes/ improvements recommended in the revised methodology i.e. GEC 2015 based on which the dynamic ground water resource for the state of Assam (as on March 2017) and separately for Kamrup urban area are estimated. He also discussed in detail on the methodology of resource estimation, various factors utilized / considered as per norm or otherwise, constrains of non-availability of various field data, source of various field data utilized for resource calculation etc. At last he summarized the whole findings and discuss with a comparative status of ground water resource as on 2013 and 2017 as well as reasons for the difference.

After thorough discussion all the members of the State Level committee agreed and accepted upon the figures in the draft report of Dynamic Ground Water Resources as assessed for the state of Assam (as on 31st March, 2017).

Approved
18/2/2019

(Mahendra Mohan Boro)
Secretary
Irrigation Department,
Govt. of Assam
&
Chairman, State Level Committee for
Dynamic Ground Resources Assessment

Secretary to the Govt. of Assam
IRRIGATION DEPARTMENT
Dispur, Guwahati - 6

Bihar

Minutes of 2nd State Level Committee (SLC) held on 09.01.2019 in the Conference Hall, UdhyogVibhag, VikashBhawan, Patna for approval of Ground Water Resources Estimation of Bihar (2017)

2nd Meeting of State Level Committee (SLC) was held on 09.01.2019 in the Conference Hall, UdhyogVibhag, VikashBhawan, Patna under the Chairmanship of Principal Secretary, Minor Water Resources Department, Government of Bihar for approval of Ground Water Resources Estimation of Bihar (2017). The list of participants is given in Annexure I.

The meeting commenced with the welcome address by Shri A K Agrawal, Regional Director, CGWB, MER, Patna. A presentation was delivered by Dr Indranil Roy, Scientist-C, CGWB, MER, Patna on Ground Water Resources Estimationof Bihar (2017), based on GEC 2015methodology. The discussions were held on the results of Ground Water Resources Estimation 2017 of Bihar. The salient features of the estimation are as follows.

No. of Assessment Units	**534 CD blocks**
Dynamic GW Resources (BCM)	
Annual Ground Water Recharge	31.41
Total Natural Discharges	2.42
Annual Extractable Ground Water Resource	28.98
Current Annual Gross Ground Water Extraction for 'All Users'	13.27
Current Annual GW Draft for Irrigation	10.78
Current Annual GW Draft for Domestic	1.83
Current Annual GW Draft for Industrial Uses	0.66
Stage of GW Extraction (%)	45.77%
Net GW Availability for "Future Use"	16.95
No. of Block Categorised Under	
Safe	432
Semi-critical	72
Critical	18
Over exploited	12

The results of the estimation and categorisation of blocks, where the 102 blocks have been categorized as other than 'Safe' were agreed upon and approved by the Committee. District-wise summary of blocks categorized as other than 'Safe' in Bihar State based on Groundwater Resource Assessment (2017) is given below.

District-wise summary of blocks categorized as other than *'Safe'* in Bihar

Sl.	Name of District	Total No of Blocks	Over Exploited	Critical	Semi-Critical	Total
1.	Begusarai	18	0	2	1	3
2.	Bhojpur	14	0	2	4	6
3.	Buxar	11	0	0	2	2
4.	East Champaran	27	0	0	1	1
5.	Gaya	24	2	1	6	9
6.	Gopalganj	14	3	0	6	9
7.	Jehanabad	7	1	3	3	7
8.	Katihar	16	0	1	7	8
9.	Madhepura	13	0	0	6	6
10.	Muzaffarpur	16	2	0	4	6
11.	Nalanda	20	1	4	6	11
12.	Nawada	14	0	1	2	3
13.	Patna	23	2	3	3	8
14.	Purnia	14	0	0	3	3
15.	Samastipur	20	0	0	1	1
16.	Saran	20	0	1	3	4
17.	Sitamarhi	17	0	0	1	1
18.	Siwan	19	0	0	6	6
19.	Vaishali	16	1	0	7	8
	STATE TOTAL		12	18	72	102

Chhattisgarh

MINUTES OF THE MEETING OF THE STATE LEVEL COMMITTEE FOR RE-ESTIMATION OF GROUND WATER RESOURCE.

Held on 06/12/2018

A meeting of the State Level Committee for re-estimation of Ground Water Resources (SLC) for approval of 'Dynamic Ground Water Resources of Chhattisgarh as on March 2017' was held in the office of the Secretary, Water Resources, Govt of Chhattisgarh on 6th December 2018 at 12:00 hours. The meeting was chaired by Secretary, Water Resources Department, Govt. of Chhattisgarh. The meeting was attended by representatives from Central Ground Water Board (CGWB), Water Resources Department, Ground Water Survey, Department of Agriculture and National Bank for Agriculture and Rural Development (NABARD), Public Health Engineering Department and Department of Industries. The list of members attended the meeting is appended in Annexure-I. The major outcomes of the meeting are given below.

At the outset, Secretary Water Resources and the Chairman of the State Level Committee for re-estimation of Ground Water Resources, welcomed all the members and requested the Regional Director, CGWB to give a brief introduction and objectives of the meeting for the re-assessment of ground water resources of Chhattisgarh state.

1. Shri A. K. Biswal, Head of the Office, Central Ground Water Board, NCCR, Raipur as the member secretary for the committee gave a brief introduction with importance of the ground water resource estimation and objectives of the meeting for the re-assessment of ground water resources of Chhattisgarh state. Subsequently, with the permission of Chair, he handed over the session to Shri A.K.Patre, Scientist D, CGWB for presenting the present scenario of Ground Water Resources in Chhattisgarh state assessed based on data base for March 2017

2. Shri A.K.Patre informed that in every three years the ground water resources of Chhattisgarh state are re-estimated as per new methodology suggested. The recent estimations have been carried out jointly by CGWB and State Ground Water Survey taking 2016-17 as the base year and the new methodology adopted is GEC '2015' while the earlier resources for 2013 was estimated based on GEC '97'. In the assessments, administrative block was taken as unit of assessment and command & non-command area in block was

taken as sub unit. The stage of ground water extraction of the state is 44.37% with 22 blocks falling under Semi-Critical and 2 blocks under Critical category in Chhattisgarh. He also explained the comparative scenario of Dynamic Ground Resources of Chhattisgarh from 1990 to 2013.

3. Secretary, Water Resources & the Chairman of the Committee pointed out that about 84% of ground water being utilized for irrigation purposes. Hence, the more thrust should be given on optimal utilization of ground water and its Artificial Recharge for enhancing the ground water availability in the state. He emphasized that being the Water Resource Department of the state, the management of water is on the top priority. He suggested that A GIS based artificial recharge data base be prepared to know the impact of Artificial Recharge projects implemented in the state. A suitable measure should be taken up for further development in Critical and Semi-Critical blocks accordingly. The Asstt. General Manger, NABARD informed that the impact assessment of Artificial Recharge can be done through NEPCon consultancy services. Shri H. R. Kutare, ENC, WRD requested to Chair that the budget provisions be kept specially for Artificial recharge in coming financial year 2019-20. In support, Shri A.K. Biswal, Head of the office, CGWB informed that under the NAQUIM, the Aquifer Management Plan has been prepared for few blocks of Chhattisgarh state, which will help in the feasibility of Artificial recharge to ground water and the final report will be submitted shortly to the state.

4. The Secretary, Water Resources invited opinion from all members of the committee on estimation carried out. In response, Shri T. G. Kosaria, ENC PHED informed that the PHED experienced with sustainability and scarcity of ground water in rural water supply for domestic uses and tube wells are getting dry during the lean period due to enormous ground water withdrawal for irrigation purposes near the same tube wells. The additional Director agriculture opined that where there are blocks falling under safe category, additional ground water potential can be created. The Secretary advised that the reports of such villages will be submitted by PHED so that the necessary action may be taken towards the management of ground water for domestic purposes.

5. The Secretary, Water Resources express their willingness towards enactment of Model Bill of Chhattisgarh State shortly to regulate and control on ground water uses in the state.

6. **All the members of State Level Committee for Re-estimation of Ground Water Resources of Chhattisgarh as on March 2017 has appreciated the work carried out by State Ground Water Department, Govt. of Chhattisgarh & Central Ground Water Board, Govt. of India for bringing out the report on "*Dynamic Ground Water Resources of Chhattisgarh as on March 2017*" which will be helpful for proper development and management of ground water resources in the state of Chhattisgarh and finally the committee approved the report.**

The meeting ended with thanks to the chair.

Biswal

A.K.Biswal
Head of the Office, CGWB & Member
Secretary of the Committee

Shri. Avinash Champawat
Secretary, Water Resources, Govt of CG
& Chairman of the Committee

Delhi

GOVERNMENT OF NCT of DELHI
DEPARTMENT Of URBAN DEVELOPMENT
10th LEVEL, C-WING, DELHI SACHIVALAYA
I.P. ESTATE, NEW DELHI
Ph-011-23392343

F.No. 16(554)/UD/W/2015/137 – 154 Dated: 28/01/2019

Minutes of the Third Meeting of the State Ground Water Co-ordination Committee for Re-Estimation of Ground Water Resources - 2017 held on 11th January, 2019.

The list of officers attended the meeting is enclosed as Annexure-'A'

The Third meeting of the State Ground Water Co-ordination Committee for Re-Estimation of the Ground Water Resources (as on March, 2017) for NCT, Delhi was held on 11th January, 2019 at 11.00 A.M. in the Conference Room of the Principal Secretary, Urban Development, Govt. of NCT, Delhi. The meeting was chaired by Sr. S.S. Gill, Special Secretary, Urban Development, Govt. of NCT, Delhi. At the outset Special Secretary, Urban Development welcomed all the participants. Thereafter, he requested Central Ground Water Board to initiate the Agenda Items for the said meeting.

List of participants is annexed.

A brief presentation on Re-Estimation of Ground Water Resources as on March, 2017 for NCT, Delhi was made by Shri P R Gupte, Senior Hydrogeologist, CGWB. Shri Gupte informed the committee that re-estimation has been done mostly as per the old data available to CGWB except from few departments who submitted the latest data. All available data updated as per the latest information available on website of the concerned state departments of GNCT. Shri S K Juneja, Officer In-charge, State Unit Office, Delhi requested the concerned State water related Departments to co-operate by providing data and time to CGWB for next re-assessment (as on March 2020).

Committee members were made aware of the Aquifer System of Delhi. Further, background of Resources Estimation, its importance and changes in previous methodology i.e. GEC, 1997 and new methodology i.e. GEC, 2015 was briefed. Re-estimation of Ground Water Resources as on March, 2017 has been done as per the new methodology GEC, 2015 for 33 tehsils and non revenue area-nazul land area. Accordingly, the present assessment has been done for Dynamic fresh & saline and also for Static fresh and saline Ground Water Resources. Following points have been taken into consideration for current re-estimation:

- It was also mentioned that though as per GEC, 2015, Delhi qualifies for adoption of Urban Methodology but all tehsils of Delhi does not fit into the criteria of Urban Area, as envisaged in GEC 2015 methodolgy, except for few tehsils of North-East, East, Shahdara & parts of Central & South-East districts of NCT Delhi. It is observed that the most of the NCT Delhi natural recharge is taking place at many places through its large open areas, parks etc.

Except for few tehsils of East Delhi, Shahdra, North- East districts, which are densely urbanized, for the rest of NCT Delhi usual rainfall infiltration factor as per GEC recommendations for non urban areas, is adopted. Moreover another recommendation of GEC, 2015 for urban areas about 50% of piped water supply loss reported by water supply agency may be taken as recharge to the ground water is not considered, mainly on account of not getting authenticated figures about piped water supply loss and difficulties to apportion such loss judiciously into 34 assessment units of NCT Delhi.

- Similarly another recommendation of GEC, 2015 for Urban areas, difference between actual demand and supply by surface water source to be considered as withdrawal from ground water resources not considered due to lack of reliable figures for 34 assessment units from concerned State Govt. department.

- GEC, 2015 methodology emphasizes estimation of Exploitable GW Resources and In-Storage Resources aquifer-wise wherever aquifer geometry has been established. Further, categorization of assessment units is to be done based on GW Quantity and there will be GW Quality tag wherever the ground water of poor quality on account of salinity, arsenic or fluoride is reported. Accordingly, groundwater resources for saline areas are computed separately. Moreover, assessment units where marginal quality groundwater is extracted along with fresh water, mainly for irrigation, are tagged as 'Saline'. Similarly, the assessment units where fluoride has been reported in groundwater monitoring of May 2017, are tagged for Fluoride.

- As per recommendation of GEC 2015, only fresh Dynamic GW Resources are taken into consideration for Categorization / Development planning as it gets replenished every year. Changes in static or in-storage resources reflect impacts of ground water mining. Such resources may not be replenishable annually and may be allowed to be extracted only during exigencies with proper recharge planning in the succeeding excess rainfall years.

- For NCT Delhi, for the computation of Dynamic resources water level fluctuation zones identified as per 10 years water level data is taken into consideration. Similarly for Static resources computation of soft rock- alluvium aquifer, depth zones of soft rock / weathered – fractured up to hard rock at depth or maximum of 100 m below pre-monsoon water level, as per NAQUIM report considered. Similarly for Hard Rock Static resources aquifers up to 100 m depth below pre-monsoon water level are considered.

- Area having saline groundwater is identified on basis of Isocon Map (avg Electrical Conductance) of groundwater samples over last 10 year. Saline groundwater resources of such areas computed separately. Saline ground water resources, estimation for saline areas of

12 tehsils namely Alipur, Model Town, Narela Kanjhawala, Rohini, Saraswati Vihar, Dwarka, Kapashera, Patel Nagar, Punjabi Bagh, and Rajouri Garden tehsils computed separately.

- Similarly, areas having shallow groundwater level below 5 m are identified on basis of decadal (2007-16) average Pre-monsoon water level map and potential recharge from such areas is computed separately for each assessment unit.
- Similarly, flood prone areas are identified and due recharge from flood computed separately.
- NCT Delhi gets Solid Waste irrigation from parts of Yamuna Canal. However, overall Canal Command in unit assessment area is smaller than 100 ha; It is termed as non-command area for GWR estimation.
- Computation of Fresh Dynamic Ground Water Resources of NCT, Delhi has been done as per GEC 2015 Methodology. Total Annual Extractable Ground Water Recharge is estimated to be 30090.5 ham and total Ground Water Extraction is 35990.4 ham. Overall stage of groundwater development for NCT Delhi as whole is 119.6 % and categorized as Over Exploited whereas tehsil / assessment unit wise, out of 34 assessment units, (33 Tehsils of 11 Districts & one Non Revenue Area), 3 are categorized as Safe, 7 as Semi Critical, 2 as Critical and 22 as Over Exploited.
- Computation of Static/In-storage Ground Water Resources of NCT, Delhi as on March, 2017 for fresh ground water resources is estimated as 225194 ham and Saline ground water resources is estimated as 268459 ham.

In the meeting it was enquired about the change in Ground Water Resources in present and last assessment and whether both can be compared as there is change in methodology adopted. Further committee members also enquired about the changes in water level behavior if there is no change in overall ground water development in comparison to last assessment. It was explained though there is change in the methodology however overall there is no change in ground water development in comparison to the assessment done in year 2013, though water levels are declining in some parts of Delhi. It was explained that since stage ground water development reflects the ratio of existing ground water extraction for all uses and annual extractable ground water resources, which over the last decade estimate varies from 113% to 125 %, which indicated that there is no change in the overall development but additional development beyond 100 % since long is mining through Static Resources and it is reflecting as declining ground water levels in parts of NCT Delhi.

Since GEC, 2015 methodology emphasized that the prescribed time line should be strictly followed for carrying out the resources assessment and finalization of the report, Shri S S Gill, Special Secretary, Urban Development suggested that the CGWB should start coordinating with concerned State Departments for the data required for resources estimation from April, 2019 so that next assessment could be completed on time without delay. Moreover, it was agreed that concerned State Ground Water (DJB & DPCC) should establish their groundwater monitoring network in NCT Delhi, coordinating with CGWB. In this regard CGWB will provide the location of their network stations (about 80 Nos.), so that Delhi Jal Board can plan to construct new peizometers to fill the data gaps.

Committee approved the work undertaken by CGWB for Re-estimation of Ground Water Resources as on March, 2017 for NCT, Delhi and it was decided that CGWB would finalize the report and send it to the Principal Secretary, Urban Development, GNCTD for approval.

The meeting ended with the vote of thanks to the Chair.

(Chandra Shekhar)
Dy. Secretary (Water)

F.No. 16(554)/UD/W/2015/ 137-154

Dated: 28/01/2019

Copy to: -

1. The Commissioner, Department of Industries, 419, Udyog Sadan, FIF, Patparganj, Delhi-110092.
2. The Chief Executive Officer, Delhi Cantonment Board, Sadar Bazar, Delhi Cantt.-10.
3. The Member (Water Supply), Delhi Jal Board, Varunalaya, Phase-II, Jhandewalan, New Delhi.
4. The Member (Engineering), Delhi Development Authority, Vikas Sadan, INA, Delhi.
5. The Chief Engineer (Civil-I), NDMC, Palika Kendra, Sansad Marg, New Delhi.
6. The Chief Engineer, Zone –I, I&FC Deptt. L.M. Bund, office complex, Shastri Nagar, Delhi-31.
7. The Chief Engineer, Zone –II, I&FC Deptt. L.M. Bund, office complex, Shastri Nagar, Delhi-31.
8. The Chief Engineer, South DMC, Dr. S.P.M. Civic Centre, JLN Marg, Minto Road, New Delhi.
9. The Chief Engineer, North DMC, Dr. S.P.M. Civic Centre, JLN Marg, Minto Road, New Delhi.
10. The Chief Engineer, East DMC, Patparganj Industrial Area, Delhi.
11. The Director, Environment Deptt., 6th level, C-Wing, Delhi Secretariat, New Delhi.
12. The Joint Director (Agriculture), Development Department, 11th level, MSO Building, ITO, New Delhi.
13. The General Manager, NABARD, NABARD Tower, 24 Rajender Place, New Delhi.
14. The Superintending Engineer (RWH), Delhi Jal Board, Varunalaya, Phase-II, Jhandewalan, New Delhi.
15. The Garrison Engineer (Utility), Water Supply, MES, Delhi Cantonment Board, Delhi.
16. The Office In charge, State Unit Office, Central Ground Water Board, West Block-2, Wing-3, Sector-1, R.K. Puram, New Delhi-110066.

Copy for information to: -

1. PS to Pr. Secretary, UD, 9th Level, C-Wing, Delhi Secretariat, New Delhi.
2. PA to Special Secretary, UD, 9th Level, C-Wing, Delhi Secretariat, New Delhi.

Dy. Secretary (Water)

Goa

MINUTES OF THE STATE LEVEL COMMITTEE FOR ASSESSMENT OF GROUNDWATER RESOURCES OF GOA STATE HELD ON 25.01.2019

The meeting of the "State Level Committee for Assessment of Ground Water Resources of Goa State" as on March 2017 was held on 25.01.2019 at 11.30 hrs in the Conference Hall of the Chief Engineer, Water Resources Department, 2nd Floor, Sinchai Bhavan, Porvorim-Goa. Shri. Sanjay Gihar IAS, Secretary, Water Resources Department, Government of Goa chaired the meeting.

The State Level Committee headed by the Secretary, Water Resources as the Chairman was constituted by the Government of Goa vide Order U. No. Pr. Secy (WRD) 2845, dt. 01/08/2017 for reconciliation and approval of the Ground Water Resources.

The meeting was attended by the following members:

Shri. Sanjay Gihar, IAS	Secretary, Water Resources, Govt. of Goa	Chairman
Shri. S.T. Nadkarni	Chief Engineer, WRD, Govt. of Goa	Member
Shri. P.B. Badami	S.E.- I, WRD, Govt. of Goa	Member
Shri. B.V. Pujari	S.E (CPO), WRD, Govt. of Goa	Member
Shri. W.R. Kerkar	S.E.- V, PWD, Govt. of Goa (Rep. of CE(PHE)	Member
Shri. R.L. Ashilekar	A.M, IDC, Goa(Rep. of Dept. of Industries)	Member
Kum.Neumani M. Rodrigues	S.O. DPSE, Porvorim(Rep. of Dir. of DPSE)	Member
Shri. Akshay G. Potekar	Dy. Director, DIIC	Member
Dr. A. Subburaj	Head of the Office, CGWB, SWR, Bangalore	Member Secretary
Shri. A. Suresha	Scientist 'D' & OIC, CGWB, SUO, Belagavi	Invitee
Dr. J. Davithuraj	Scientist 'B', CGWB, SUO, Belagavi	Invitee
Shri. J. Sivaramakrishnan	AHG, CGWB, SWR, Bangalore	Invitee

Shri. S.T. Nadkarni, Chief Engineer, Water Resources Department welcomed the Secretary and members of the Committee and introduced them to the Chairman of the Committee. He gave a brief note on the Assessment of Dynamic Groundwater Resources of Goa. Dr. A. Subburaj, Member Secretary & Head of the Office, Central Ground Water Board, SWR, Bangalore made a detailed presentation on the Dynamic Groundwater Resources of Goa assessed as on March 2017. The

Dynamic Resources were estimated based on the Guidelines of Ministry of Water Resources, RD & GR, Government of India.

Shri. Sanjay Gihar, IAS, Secretary and the Chairman of the Committee while commenting on the status of Ground Water Resources enquired about the monitoring of chemical quality and its suitability for drinking water needs and also the methodology for the Ground Water Resource estimation, base year of estimation and data collection. Dr. A. Subburaj, Member Secretary, briefed about the methodology adopted, estimation of Annual Extractable Ground Water Resources, Ground Water Draft, Stage of Ground Water Extraction, etc.

Further, Shri. S.T. Nadkarni, Chief Engineer stated that, the bore wells are not successful in the state of Goa, so people in the state opt for dug-cum-bore wells hence, there is a rise in number of dug-cum-bore wells as compared to the previous ground water resource estimation i.e. of 2013.

Members of the Committee is of the opinion that the network of observation wells should be increased in the state for which, the Chief Engineer informed that Water Resources Department will take it up under National Hydrology Project.

After presenting the Dynamic Ground Water Resources of Goa, the Member Secretary presented the In-storage Ground Water Resources (Static Ground Water Resources) assessed as on March 2017 and also briefed upon the depth of the commonly developed aquifers adopted in different talukas.

Chief Engineer informed CGWB that the data and maps on the extension of the salinity intrusion in Goa State will be shared with CGWB.

All the points raised by the Committee Members were clarified and the Members of the Committee agreed on the Dynamic Ground Water Resources and Static Ground Water Resources estimated for the Goa with 2017 as base year

The Committee approved the Dynamic Ground Water Resources and In-Storage Ground Water Resources (Static Ground Water Resources) of Goa assessed as on March 2017, after the deliberations.

The reconciled and approved Ground Water Resources of the State of Goa are as follows:

I. Dynamic Ground Water Resources in Goa State (As On March, 2017)

- Annual Extractable Ground Water Resources – 16033 Ha.m.
- Existing Ground Water Extraction for All uses – 5371 Ha.m.
- Stage of Ground Water Extraction in Goa State – 34%

II. In-storage Ground Water Resources (Static Ground Water Resources) in Goa State (as on March, 2017)

- Fresh In-Storage Ground Water Resources (Phreatic) – 14649 Ha.m.
- Fresh In-Storage Ground Water Resources (Fractured) – 7772 Ha.m.

Total Availability of Dynamic & Static Fresh Ground Water Resources in Goa State (as on March, 2017) – 38454 Ha.m.

The Meeting ended with thanks to the Chair.

(Sanjay Gihar, IAS)
Secretary (WR) & Chairman

Gujarat

Minutes of the meeting of the State Level Committee on Ground Water Resource Assessment of Gujarat as on March 2017 on 26.02.2019 at 12.30 Hrs in the Committee Room of N, WR, WS & K Department, Block No-9/4, Secretariat, Gandhinagar

A meeting of the State Level Committee of Ground Water Resource Assessment was held under the Chairmanship of the Special Secretary (WR), Narmada Water Resources, Water Supply and Kalpsar Department on 26.02.2019 at 12.30 Hrs in the Committee Room of N, WR, WS & K Department, New Sachivalaya, Block – 9/4, Gandhinagar. Following members of the State Level Committee attended the meeting.

1	Shri K A Patel – Special Secretary(WR), Narmada , Water Resources, Water Supply & Kalpsar Department	Chairman
2	Shri A D Kanani, Chief Engineer (Panchayat) & Additional Secretary, Narmada, Water Resources, Water Supply & Kalpsar Department	Member
3	Shri J P Parmar, The Managing Director, Gujarat Water Resources Development Corporation Ltd.	Member
4	The Director (Agriculture), Directorate of Agriculture, Gandhinagar] Shri R. P. Rajput Joint Director (Agri)	Member Representative
5	Shri Barin S Mehta, Joint Secretary, Industries & Mines Department, Gandhinagar	Member
6.	Dr.R.C.Jain, Adviser (Ground Water),GWRDC Ltd.	Special Invitee
6	Shri D P Pati, Regional Director, CGWB, WCR, Ahmedabad	Member Secretary

The list of all officers along with the members of State Level Committee is given in Annexure - I

The minutes of the meeting are as follows.

1. Shri D P Pati, Regional Director, CGWB, WCR, Ahmedabad welcomed all the members present in the meeting. With the permission of the Chair, Shri B. Mohapatra, Sr. Hydrogeologist, made presentation regarding the Assessment of the Dynamic Ground Water Resources of Gujarat as on March 2017 including the methodology adopted (GEC 2015) for computation.
2. As opined by the Managing Director, GWRDC Ltd. during the previous meeting, a comparison between previous assessment i.e GWRA-2013 (based on GEC-97 methodology) and the current assessment i.e GWRA-2017 (Based on GEC-2015 methodology) was presented in view of the change in the methodology adopted for the current assessment, this will be incorporated in the report.
3. The Additional Secretary and Chief Engineer (Panchayat), N, WR, WS & K department, GoG suggested that since the over exploited talukas fall in the North Gujarat area and Kachchh region, studies may be carried out to identify the area suitable for Artificial Recharge so that AR projects can be taken up to arrest further decline in water level in these talukas.

4. Dr. R.C. Jain, informed that such a study was already carried out by the Task Force constituted by the State Govt. in 2009.Final report of the same was submitted in 2011.This may require updating based on the updated ground water scenario and surface water sources considered for recharge. It was decided to have a presentation of the task force report on a convenient date.
5. Dr. R C Jain, Advisor (GW). GWRDC Ltd., stressed on the fact that since Gujarat is characterized by arid to semi-arid climate a large volume of surface water is lost through evaporation. Hence proper planning may be done in order to divert surplus available surface water to recharge groundwater so that over exploited areas can be benefited and evaporation loss can be minimized.
6. He also informed that one pilot study has been taken up for Artificial Recharge Project in the Saraswati River Bed at Madhupavdi near Siddhpur Taluka of Patan District during 2011-12 to divert surplus surface water for ground water recharge particularly in water stressed north Gujarat area. Feasibility of replication of the same in other suitable areas needs to be examined.
7. A presentation was also made on Dynamic ground water resources of the urban areas of Gujarat having more than 10 lakhs population namely, Ahmedabad, Rajkot, Surat and Vadodara, which will be modified in view of the observations made.
8. Assessment of the Dynamic Ground Water Resources of Gujarat state as on March 2017 was approved by the State Level Committee.
9. The Meeting ended with vote of thanks to the Chair by Dr. A K Jain, Scientist-D.

3/4

Haryana

Minutes of Meeting of State Level Committee for approval of Dynamic Ground Water Resource Estimation Report-2017 of Haryana State held under the Chairpersonship of Additional Chief Secretary to Government of Haryana, Agriculture & Farmers Welfare, Haryana on 30.4.2019 at Haryana New Civil Secretariat Bhawan, Sector-17, Chandigarh

1.0 A meeting for approval of Dynamic Ground Water Resource Estimation Report- 2017 prepared jointly by the Ground Water Cell, Agriculture & Farmers Welfare Department and Central Ground Water Board, North Western Region, Chandigarh was held under the Chairpersonship of Smt. Navraj Sandhu, IAS Additional Chief Secretary, Depratment of Agriculture and Farmers Welfare, Government of Haryana on 30.4.2019 at New Secretariat, Sector-17, Chandigarh. The list of Participants is enclosed as Annexure I. Sh. Ajit Balaji Joshi, IAS, Director General Agriculture and Farmers Welfare co-chaired the meeting.

2.0 At the outset, the Chairperson welcomed all the participants. Sh. Anoop Nagar, Regional Director, CGWB, NWR explained in brief the preparation of the report. Sh. S.K. Mohiddin, Sr. Hg, CGWB, NWR made a presentation giving in detail the Ground water resources estimation as on March, 2017 (Annexure-2). The summary of the report was thoroughly deliberated as detailed below:

1. The Net ground water availability is 9.13 BCM and ground Water extraction is 12.5 BCM. Thus an overdraft of 3.37 which is being extracted from static resources. It is suggested to make farmers aware of the ground condition and to promote water conservation on large scale. The In-storage ground water resources available upto 300 mt depth may also be takenup on priority and it may be projected that how many years the in-storage resources will sustain further if the present condition of over-extraction continues.

2. It was decided to prepare the list of blocks where ground water extraction is morethan 200% and immediate attention is required to arrest the declining trend in these blocks. For that, the issue may be takenup with Central Government to provide enough funds for promotion of micro-irrigation in these blocks through appropriate schemes.

3. For fresh Ground water resources available in saline areas a scheme may be formulated in this aspect and it is agreed to promote conjunctive use of fresh surface water and saline ground water to solve the problem of water logging in saline areas. The fresh surface water thus saved may be diverted to the areas where ground water is over-exploited. Industries shall be encouraged to use saline water for industrial purposes. Cropping patter may also be changed to grow more salt tolerant crops in saline areas.

4. It was opined that the real time monitoring of ground water levels through Automatic Water Level recorders and early estimation of ground water resources through a software. It was opined by the Chairperson that CGWB should develop such a software for resources estimation quickly. An algorithm based software required to be developed or if any organization has already developed this software, the same be procured for next assessment of the resources. Automatic water levels recorders as well as draft monitoring devices need to be fitted in Public Health Engineering tubewells to estimate ground water withdrawal from these tubewells, devices may also be used to regulate the pumping hours of tubewells.

5. There are some blocks which are located along the Yamuna river are categorized as Over-exploited and a realistic assessment of ground water recharge from the river Yamuna may be takenup in these blocks.

6. Director General, Department of Agriculture and Farmers Welfare desired that a list of departments from which data for assessment of resources need to obtained may be prepared so that the departments may be requested to update the data annually especially ground water draft and industrial draft which is very important in assessment of the resources withdrawal.

7. Deliberation was made regarding categorization of newly created 12 blocks for details are not available , it was decided that after compilation of further data matter may be takenup.

   The Resources and categorization was approved and accepted by the State Level Committee for Ground Water Resources estimation in Haryana State.

The meeting ended with a vote of thanks to the Chair.

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Annexure I

In the Chair, Smt. Smt. Navraj Sandhu, IAS Additional Chief Secretary, Depratment of Agriculture and Farmers Welfare, Government of Haryana.

The List of other officers present in the meeting:-

S. no	Name	Designation/organization
1.	Sh. Ajit Balaji Joshi, IAS	Director General, Agriculture and Farmers Welfare, Government of Haryana
2.	Sh. Anoop Nagar	Regional Director, CGWB, NWR, Chandigarh and Member Secretary, State Level Committee on GWRE
3.	Subhash Chander	En-in-Chief, HSIIDC
4.	Sh. Asheem Khanna	Chief Engineer, PHED, Haryana
5.	Sh. Rakesh Kumar	Chief Hydrologist, Ground Water Cell, Department of Agriculture and Farmers Welfare, Government of Haryana
6.	Sh. J.P. Singh,	Executive Engineer, HSPCB
7	Sh. Sanjay Kumar	HOD, CCSHAU, Hissar
8.	Sh. Narender Kumar	CEO, SLNA, DVMP, Rural Development Department
9.	Sh. Pankaj Mahaya	WDS, GWC, Department of Agriculture and Farmers Welfare, Government of Haryana
10.	Sh. B.S. Duggal	TE (Agri), SLNA DVMP, Rural Development Department
11.	Sh. Vinod Kaushik	Additional Director (Tech), Industries & Commerce Department
12.	Sh. Sanjeev Kumar	Executive Engineer, O/o CE (Project), I & WR Dept. PKL
13.	Sh. Suresh Kumar,	Senior Manager, HSIIDC
14.	Sh.Anil Sabharwal	Executive Engineer, Irrigation Department
15.	Raj Kiran Johri	AGM, NABARD
16.	Sh. Rajesh Yadav	CADA, Haryana
17.	Sh. Neeraj Pandit	Department of Agriculture and Farmers Welfare
18.	Sh. Suresh Kumar	Department of Mining, Haryana
19.	Sh. Deepak Kumar	Sr. Geologist, Mines & Geology, Department of Mining, Haryana
20.	Sh. Sumit	SDO, Irrigation & WR, Department, Haryana
21.	Sh.Anil Sharma	HSCARDBPKL
22.	Sh. S.K. Mohiddin	Sr. Hydro-geologist, Central Ground Water Board (CGWB), NWR, Chandigarh
23.	Sh. Arpan Banerji	Jr.Hg, CGWB, Chandigarh
23.	Sh. Aditya Sharma	Sr. Technical Assistant, Central Ground Water Board (CGWB), NWR, Chandigarh

Himachal Pradesh

Minutes of 5th Meeting of State Level Committee on Ground Water Resource Estimation of Himachal Pradesh as on March, 2017 held on 09.04.2019 at 11:30 A.M. in Committee Room, Armsdale Building, H.P. Secretariat, and Shimla 2.

The 5th Meeting of State Level Committee on Ground Water Resource Estimation of Himachal Pradesh as on March, 2017 was held on 09.04.2019 at 11:30 A.M. in Committee Room, Armsdale Building, H.P. Secretariat, Shimla-2. The list of participants are provided as Annexure – I.

At the beginning of the meeting, Dr. O.N. Tiwari, Regional Director, CGWB, NHR welcomed Sh. Onkar Chand Sharma, Principal Secretary (I&PH) cum Chairman and other Members of Committee. Then Agenda 1 has been discussed and presented:

Agenda 1: The agenda of the meeting is to approve the "Dynamic Ground Water Resource Estimation of Himachal Pradesh as on March, 2017". Shri Vipin Kumar, Scientist 'B' from CGWB, NHR, Dharamshala presented Power Point Presentation on above agenda which was compiled jointly by CGWB, Dharamshala and I&PH Department (Using GEC-2015 Methodology).

- The Principal Secretary, I&PH asked for the back ground information to i.e. members and minutes of the meeting starting from 15 years.
- Principal Secretary, I&PH suggested for incorporation of overall scenario of World and India to get the realistic idea of GW scenario in Himachal Pradesh.
- Principal Secretary, I&PH, suggested that data about Ground Water draft, particularly the data on water tanks and ponds from Indaura and Nurpur Valley does not seems to be accurate.
- The data related to water storage tanks and ponds should be collected from Rural Development and Forest Department. The Principal Secretary, I&PH advised to Engineer in Chief, I&PH write a letter for collection of the above data for concerned departments.
- The Principal Secretary I&PH, advised the area in valley areas in Chamba and Kangra should be increased for Ground Water Resource Estimation.
- The Principal Secretary, I&PH, advised the graphical presentation of Ground Water Resource Estimation starting from 2009 – 2017 volume wise should be incorporate and explain how the rate of extraction is going up or downs.
- Finally **The Principal Secretary, I&PH, has approved the "Dynamic Ground Water Resource Estimation of Himachal Pradesh as on March, 2017".**

The meeting ended with vote of thanks.

Jharkhand

MINUTES OF THE FINAL STATE LEVEL COMMITTEE MEETING(2nd Meeting) FOR RE-ESTIMATION OF GROUND WATER RESOURCES FOR JHARKHAND STATE AS ON MARCH- 2017 HELD ON DATED 18/12/2018

The final meeting of the State level committee for re-estimation of ground water resources as on March-2017 was held in the Conference hall of Water Resources Department, Govt. of Jharkhand at 15.30 hrs on **18/12/2018**. The meeting was chaired by Shri A.K.Singh, Additional Chief Secretary, Water Resources Deptt., Govt. of Jharkhand who is also the Chairman of the committee. On getting permission from the Chairman, Shri Nagesh Mishra, Chief Engineer(Monitoring), Water Resources Department, Govt. of Jharkhand requested Shri Goutam Kr. Roy, Sc-D & OIC, State Unit Office to start the meeting. After welcoming all the members and invitees to the meeting , Shri Roy briefed about the ground water estimation methodologies and subsequent improvement incorporated in each methodologies with time and GEC-2015 in particular. He also deliberated on the data shared from different department for carrying out the estimation. Shri G.K.Roy, briefed about status of present ground water resource estimation-2017 and changes experienced with respect to resource estimation 2013. A presentation on Ground Water Resources Assessment- 2017 (Dynamic and In-storage) was made by Dr. Indranil Roy, Scientist-C, CGWB MER, Patna before the committee members. During the presentation various points were raised by the members about the assessment and were discussed in detail. The committee members finally agreed upon the following points/issues-

1. In present estimation a total numbers of 260 administrative units have been assessed. These 260 administrative blocks/ units of assessment represent 260 sub units of command / non-command area
2. Total Replenishable Ground Water Resource as on March 2017 has been assessed as ***6.21 BCM***. Considering natural discharge of ***0.52 BCM***, net annual ground water availability for the state of Jharkhand has been assessed as ***5.69 BCM***. The total annual ground water draft in the state of the Jharkhand has been assessed as ***1.58 BCM*** with Irrigation draft of ***0.80 BCM***, industrial draft of **0.22 BCM** and ***0.56 BCM*** is drawn to meet up the drinking water demand. The average Stage of Ground Water Extraction as on March 2017 is **27.73 %.** The net ground water available for future irrigation is ***4.70 BCM***. Monsoon has got an overwhelming control over recharge of

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Ground Water in Jharkhand state. Monsoon rainfall contributes about 84.52% of total recharge and non-monsoon rainfall contributes another 6.65% of the total recharge. Only 8.83% of the total recharge is from the sources other than rainfall like recharge as return seepage from irrigation and seepage from water harvesting structures

3. The committee members observed that most of the blocks have been assessed using RIF(Rainfall Infiltration Factor) method (176 blocks) in comparison to WLF(Water Level Fluctuation) method (84 blocks). It indicated comparative insignificance of trend component in categorisation of blocks.

4. Based on categorisation of the blocks, 245 blocks have been categorised as safe while other 15 blocks fall into different categories. Three blocks namely Bermo (160.59 %), Dhanbad(105.56%) , Jharia(123.41%) fall into over-exploited category with stage of ground water extraction more than 100 %, Baghmara (91.10%) and Topchanchi(99.50%) fall into critical category while other 10 blocks namely Chandrapura, Chas, Baliapur , Golmuri-cum-Jugasalai , Mandu, Patratu, Ramgarh, Kanke, Khelari, and Silli fall in semi-critical category

5. Present exercise resulted into changes in block-wise categorization reflecting temporal variation in ground water recharge/discharge/draft pattern. Earlier estimation (2013) categorized 16 blocks other than 'Safe' out of 260 assessed blocks. In contrast, present estimation categorized 15 blocks other than 'Safe' out of 260 assessed administrative units. High stage of development is due to urbanisation and industrialisation in Bermo, Chas, Ramgarh, Jamshedpur, Kanke blocks and due to mining activity in Dhanbad, Jharia, Baghmara, Baliapur, Topchachi, Chandrpura, Khelari, Mandu and Patratu blocks. High stage of ground water development in Ormanjhi and Silli blocks are due to higher agricultural activities.

6. On completion of the presentation, Shri A.K.Singh, Additional Chief Secretary enquired about the contribution of rainfall towards ground water recharge in the state of Jharkhand which was replied suitably. Shri Singh pointed out that what action plan has been prepared for the blocks with grim ground water situation. It was informed that the action plan does not fall in the purview of this committee. However it was informed by Shri T.B.N.Singh, Scientist-D and Shri G.K.Roy, Scientist-D

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that artificial recharge action plan for Jugsalai block has been finalised by CGWB and action plan for Bermo block is under finalisation.

The committee members agreed upon quality tagging of Fluoride and Arsenic affected blocks along with resources assessment of the blocks of the Jharkhand state.

The meeting ended with vote of thanks to the Chair and to the Committee Members

7.1.19

(Arun Kumar Singh)
Additional Chief Secretary,
W.R.D. Ranchi

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Karnataka

Minutes of the State Level Committee meeting for Estimation of Dynamic Ground Water Resources of Karnataka State held on 05-02-2019 at Vikas Soudha, Bangalore

The Meeting of the State Level Committee constituted vide Government Order No. No.MID 27AaJaAa 2014 Bangalore, dated the 18th January 2018 for reconciliation of the Ground Water Resources as on March, 2017 was held on 05-02-2019 in Room No. 422, Vikasa Soudha, Bangalore. The meeting was chaired by **Shri. C. Mruthunjayaswamy, Secretary, Water Resources (MI), Govt. of Karnataka,** and was attended by the following Members:

S.No	Name & Designation (Sri/Smt)	Department/Organisation
1	C. Mruthunjayaswamy, Secretary	Water Resources (MI), G.O.K & Chairman of the State Level Committee
2	Dr. A. Subburaj, Regional Director	Central Ground Water Board, SWR, Govt. of India, Bangalore & Member Secretary of the Committee
3	V. Govindaraj, Deputy Secretary	Minor Irrigation, Bangalore, G.O.K
4	K.H. Raju, C.E	North Zone, Minor Irrigation, G.O.K
5	M. Ravendrappa, C.E	South Zone, Minor Irrigation, G.O.K
6	B.K. Shivakumar, Joint Director	Dept. of Industries & Commerce, G.O.K
7	Surendra Babu R, D.C.E	KUWS & P, Bangalore, G.O.K
8	Shyama Sundar, SE (I/c)	WRDO, Bangalore, G.O.K
9	M. Narayana, A.E.E	WRDO, Bangalore, G.O.K
10	G. Jayanna, Deputy Director	Ground Water Directorate, Bangalore, G.O.K
11	K.V.R. Choudhary, Sr. Geologist	District Ground Water Office, Mysuru, G.O.K
12	Shafiulla, Geologist	District Ground Water Office, Bellary, G.O.K
13	Dr. Prasanna Kumar, Geologist	District Ground Water Office, Bangalore, G.O.K
14	Nagaraja. H.M, Geologist	Ground Water Directorate, Bangalore, G.O.K
15	Dr. M.A. Farooqi, Scientist 'D'	CGWB, SWR, Bangalore, G.O.I, Bangalore
16	T. Rajendiran, Scientist 'D'	CGWB, SWR, Bangalore, G.O.I, Bangalore
17	M. Muthukannan, Suptg. Hydrogeologist	Central Ground Water Board, SWR, GOI, Bangalore
18	J. Sivaramakrishnan, AHG	Central Ground Water Board, SWR, GOI, Bangalore
19	T.S. Anitha Shyam, Scientist 'D'	Central Ground Water Board, SWR, GOI, Bangalore
20	Dr. Anantha Kumar Ars, Scientist 'D'	Central Ground Water Board, SWR, GOI, Bangalore

Shri. V. Govindaraj, Deputy Secretary, Minor Irrigation welcomed the Chairman and members of the State Level Committee. Members of the Committee introduced themselves to the Chairman.

Dr. A. Subburaj, Regional Director, Central Ground Water Board (CGWB), SWR, Bangalore briefed about the exercise on estimation of Ground Water Resources and its methodology. Further, he informed the committee, that the present ground water resource estimation is jointly carried out by Ground Water Directorate (GWD), Government of Karnataka and CGWB, SWR, Bangalore. Inputs in the Resource Estimation exercise were collected by the District Geologists of Ground Water Directorate and incorporated.

Dr. A. Subburaj further presented a detailed methodology on how the Dynamic Ground Water Resources and Static/Instorage Ground Water Resources were re-assessed and also the highlights of the methodology (GEC-2015), norms and the values considered in the estimation. The resources were estimated Watershed wise with 310 assessment Units (Command and Non Command together) which is later apportioned to taluk to help the administrators. Based on this exercise, the following categories are arrived.

Over Exploited	–	45
Critical	–	08
Semi Critical	–	26
Safe	–	97
Total	–	**176**

All the points raised on the resource estimation exercise by the committee members were clarified. Chairman and the members of the Committee unanimously accepted and approved the Dynamic Ground Water Resources and Static/Instorage Ground Water Resources of Karnataka as on March, 2017.

The ground water resources and categorization of the taluks are furnished below:-

Dynamic Ground Water Resources

PARTICULARS	As on March, 2017
Annual Extractable Ground Water Resources (HAM)	14,79,318
Existing ground water draft for irrigation (HAM)	9,38,674
Existing ground water draft for domestic and industrial water Supply (HAM)	94,978
Existing ground water draft for all uses (HAM)	10,33,652
Stage of ground water extraction (%)	70
Number of Over Exploited Taluks	45
Number of Critical Taluks	08
Number of Semi-Critical Taluks	26
Number of Safe Taluks	97

Instorage/Static Ground Water Resources in Karnataka State (As On March, 2017)

- Fresh In-Storage Ground Water Resources - Phreatic – 30,04,551 ham
- Fresh In-Storage Ground Water Resources - Fractured – 5,41,651 ham

Total Availability of Fresh Ground Water Resources in Karnataka State (As On March, 2017) – 50,25,520 ham

The meeting ended with the thanks to the Chair.

(C. Mruthunjayaswamy)
Secretary, Water Resources (M.I)
& Chairman of the Committee

Kerala

File No.GW1/307/2018-WRD

Minutes of Review Meeting on Estimation of Dynamic Ground Water Resources of Kerala as on March, 2017 (GEC 2015 Methodology)

The meeting of the Review Meeting on estimation of Dynamic Ground Water Resources of Kerala as on March,2017 was held on 06.06.2018 at 11 00 hrs at the Chamber of Secretary (Water Resources), Government of Kerala. Smt. Tinku Biswal IAS, Secretary (Water Resources), Government of Kerala chaired the meeting. The following members / invitees attended the meeting.

#	Name & Designation	Organization	Status
1	Sh. V. Kunhambu, Regional Director	Central Ground Water Board, KR	Member Secretary
2	Sh. John Kurian, Former CGM	NABARD	Invitee
3	Sh. John Koshy, Executive Engineer	KWA	Member
4	Sh. Joshy K.A., CE (Irrigation & Admin)	Irrigation	Member
5	Sh. Jayakumaran Nair, Deputy Director	Industries & Commerce	Member
6	Sh. A. G. Gopakumar, Senior Hydrogeologist	GWD	Member
7	Dr C.P. Priju, Scientist	CWRDM	Member
8	Smt. Anitha Shyam, Scientist D	Central Ground Water Board, KR	Invitee
9	Dr. N. Vinayachandran, Scientist D	Central Ground Water Board, KR	Invitee
10	Dr V.S. Joji, Scientist D	Central Ground Water Board, KR	Invitee
11	Smt. Mini Chandran, Scientist D	Central Ground Water Board, KR	Invitee
12	Sh. K Balakrishnan, Scientist D	Central Ground Water Board, KR	Invitee
13	Smt. Rani V. R., Scientist C	Central Ground Water Board, KR	Invitee

At the outset, Smt. Tinku Biswal IAS, Secretary, Water Resources Department, Government of Kerala & Chairperson of the committee welcomed the members and opened the meeting with remarks on Re-estimation of Dynamic Ground Water

File No.GW1/307/2018-WRD

Resources of Kerala as on March 2017 based on GEC Methodology (2015).The Chairperson stressed the need of Re-estimation of Dynamic Ground Water Resources of Kerala as on March, 2017 based on GEC Methodology (2015) on time. Sh. V. Kunhambu, Regional Director explained in brief regarding the various works carried out in connection with the Re-estimation of Dynamic Ground Water Resources of Kerala. The Regional Director appraised the various initiatives carried out by the Regional office of CGWB. The various actions initiated by the office of Regional Director, CGWB, KR include

- Constituted Ground Water Resource Estimation Cell of CGWB, KR,
- Data on ground water draft for irrigation and industries since 2013 sought from SGWD and Performa circulated to all the district offices, under intimation to Director, GWD,
- Sent letter to IMD for latest rainfall data, and
- Block wise GIS layers made available in the Region.

Thereafter the agenda items were taken up for discussion.

Agenda No. 1.1

Appraisal of communications received by Ground Water Resources Estimation Cell CGWB, KR

The Regional Director, CGWB communicated that the Estimation Cell received data on ground water draft for irrigation and industries since 2013 from six district offices of SGWD (Idukki, Palakkad, Kozhikode, Kannur, Malappuram and Kasaragod districts). The Secretary, WR directed that the remaining 8 districts should submit the data by 15th June, 2018.

(Action: CGWB / SGWD)

Agenda No. 1.2

The Regional Director, CGWB appraised the committee about the various data requirement for estimation viz. water level data since 2013 from SGWD, rainfall data, MI census data block-wise, details of canal command areas, base flow data, existing water supply schemes and benefitted population. The Secretary, WR directed the concerned Dept. to provide data to CGWB by 15th June, 2018.

(Action: CGWB /SGWD / IMD / Irrigation Dept. / KWA)

Agenda No. 1.3

The Secretary (WRD) desired that SGWD to organize one day workshop and all the district officers or officers dealing GEC to attend the workshop. CGWB should provide faculty for deliberations on Ground Water Estimation based on GEC 2015

File No.GW1/307/2018-WRD

Methodology. This workshop is to be organised at the earliest.

(Action: SGWD /CGWB)

Agenda No. 1.4

It is also decided either one officer each from CGWB and SGWD may sit for one day at CGWB office and finalise the district part of report or CGWB team of 3 officers and SGWD team of 3 officers dealing with GEC sit together and finalise GEC report for all the districts. This action makes completion of report by 15.07.2018 since the GEC 2017 is to be finalized by 31.07.2018.

(Action: CGWB / SGWD)

The meeting ended with thanks to the Chair.

Madhya Pradesh

Minutes of meeting of State Level Committee for "Ground Water Resources Estimation" held on 18.3.2019

The meeting of the State Level Committee for Ground Water Resources Estimation was held in the Conference room C-408, 4th floor VB-II, Vallabh Bhawan, Bhopal on 18th March,2019 at 15:00 hrs. The meeting was chaired by Sh. M. Gopal Reddy, IAS, Additional Chief Secretary, Water Resources Department, Govt of Madhya Pradesh. The list of officers attended the meeting is enclosed in Annexure-I.

Sh. P K Jain, Head of Office, CGWB, NCR, Bhopal welcomed the participants of the meeting. With permission of chair, Dr. S C Paranjape, Sc D, CGWB, NCR, Bhopal made presentation on "Ground Water Resources Assessment of Madhya Pradesh as on March 2017". The gist of Ground Water Resource Assessment 2017 is given below:

1	Area of state	3,08,252 Sq km
2	Total Number of Districts	51
3	Total Number of Blocks	313
4	Annual Extractable Ground Water Resource (Dynamic)	3447990 Ham
5	Existing Gross Ground Water Extraction for Irrigation	1742362Ham
6	Existing Gross Ground Water Extraction for Domestic & Industrial water Supply	147900 Ham
7	Existing Gross Ground Water Extraction for all uses	1890262 Ham
8	Provision for domestic, and industrial requirement supply up to year 2025	172000Ham
9	Net Ground water Availability for future irrigation development	1533628 Ham
10	Stage of Ground water Development	54.82%
11	Number of Safe Blocks	240
12	Number of Semi-Critical Blocks	44
13	Number of Critical Blocks	7
14	Number of Over Exploited Blocks	22

The ground water resources were discussed thoroughly by the members of the committee & after discussions, the report of Ground Water Resources Assessment as on March 2017 was approved.

The meeting ended with a vote of thanks to the chair.

Approved

26\3\19
(M. Gopal Reddy)
Additional Chief Secretary
Govt. of M.P.
Water Resource &
Public Relation Department

P K Jain
28/3/19
(P K Jain)
Head of office &
Member Secretary of SLC

Maharashtra

MINUTES OF THE MEETING OF STATE LEVEL COMMITTEE FOR GROUND WATER RESOURCE ASSESSMENT OF MAHARASHTRA AS ON MARCH 2017

The Meeting of the State Level Committee (SLC) for Ground Water Resource Estimation as on March 2017 was held under the Chairmanship of Shri. Sham Lal Goyal (IAS), Additional Chief Secretary, Water Supply and Sanitation Department (WSSD), Govt. of Maharashtra, Mumbai on 11th February 2017 at 15.00 Hrs. The meeting was held at the Committee Room, Water Supply & Sanitation Department, G.T. Hospital, New Building, 7th Floor, Lokmanya Tilak Marg, Mumbai to finalize and approve the Ground Water Resource Estimation - 2017 (GWRE-2017) of Maharashtra. The resource estimation has been jointly carried out by Ground Water Surveys & Development Agency (GSDA), Pune and Central Groundwater Board (CGWB), Nagpur. The list of members and special invitees who attended the meeting is enclosed (Enclosure-I).

At the outset, Dr. P.K. Jain, Superintending Hydrogeologist and Convenor, Central Ground Water Board, Central Region, Nagpur welcomed Shri. Sham Lal Goyal, Additional Chief Secretary & Chairman of the SLC and also other Members of the Committee. He informed that the whole exercise was expedited and completed due to the personal efforts and monitoring by Shri Shekhar Gaikwad, IAS, Director, GSDA, Pune.

Dr. P.K. Jain gave an opening remark and briefly outlined GEC-2015 Methodology and also stated that the overall scenario of the State has not changed much with respect to previous assessment and handed over the further proceedings to GSDA for detailed presentation of GWRE-2017. Dr. I.I. Shah, Additional Director, GSDA, Pune informed that as per GEC 2015water level trend has been delinked from the categorisation of the unit, therefore the no. of talukas/blocks under poor quality,semi-critical, critical and over exploited has increased from 29 to 82.

Dr. Vijay Pakhmode, Deputy Director, Research & Development, GSDA, Pune made a presentation on the outcome of the GWRE-2017 to the committee. He informed that the ground water assessment of Maharashtra was carried out using the software developed by GSDA in MS Access as per the revised guidelines of GEC-2015 Methodology. The various data inputs required for assessment has been collected from various departments like IMD, Revenue Department, Water Resources Department, Water Conservation Department, MSEB, Agriculture Department, Zilla Parishad, Dept. of Industries, Urban Local Bodies etc. The data entry is carried out at district level followed by first scrutiny at GSDA Deputy Director office, second scrutiny at GSDA Directorate level. Besides this, a number of internal meetings were held for district-wise reconciliation of data and estimations by CGWB with GSDA during October 2018, December 2018 and January 2019 at GSDA, Dy.Director office at Nagpur & Directorate office at Pune.

The issue of estimation of in-storage and static ground water resources of shallow and deeper aquifer was also discussed. It was stressed by Dr. Shah that in Maharashtra. 92% of the area is occupied by hard rock aquifers wherein the sustainability of the deeper aquifer resources is very limited. He also stressed that during the drought years, there is severe water scarcity even in villages falling in Safe category areas,which contradicts the presence of instorage and static resource estimations.Thus it is not possible for the State Govt to estimate the instorage and static ground water resources. Due to these reasons, the estimation of in-storage and static ground water resources of shallow and deeper aquifer was not carried out earlier since 1988.

He further informed that the ground water resource estimation of Mumbai and Mumbai Suburban districts could also not be done due to paucity of data for estimation of recharge and draft components.

The Chairman of the SLC appreciated the efforts of GSDA and CGWB in finalising e GWRA 2017. After deliberations by various Members, the **Dynamic Ground Water Resource Estimation of Maharashtra 2017 was finally approved** by the State Level Committee for its further submission to the National Level Committee. The meeting ended with the vote of thanks by Shri Rahul R. Shende, AHG, CGWB, CR, Nagpur.

Manipur

MINUTES OF THE MEETING OF STATE LEVEL COMMITTEE FOR RECONCILIATION OF DYNAMIC GROUND WATER RESOURCES ASSESSMENT OF MANIPUR AS ON MARCH 2017

Date: 06.03.2019 **Time: 10.00 hrs.**

Venue: Office Chamber of the Secretary, Water Resources Department, New Secretariat Building, Imphal, Manipur

A meeting of State Level Committee for reconciliation of Dynamic Ground Water Resources of Manipur was convened on 06.03.2019 in the Office Chamber of the Secretary, Water Resources Department (Manipur), New Secretariat Building, Imphal, Manipur. The meeting was chaired by Jacintha Lazarus, Secretary, WRD, Govt. of Manipur and members present is enclosed as Annexure-I.

The Regional Director, CGWB, NER, Guwahati & Member Secretary, State Level Committee for Ground Water Resource Estimation, Manipur welcomes all the members of the committee.

Dr. S S Singh, Scientist- C, CGWB, NER on behalf of the RD, CGWB, NER with the permission of the Chair presented the report before the committee where he explained the changes/ improvements recommended in the revised methodology i.e. GEC 2015 based on which the dynamic ground water resource for the state of Manipur (as on March 2017) was estimated. He also discussed in detail on the methodology of resource estimation, various factors utilized / considered as per norm or otherwise, constrains of non-availability of various field data, source of various field data utilized for resource calculation etc. At last he summarized the whole findings and discussed the comparative status of ground water resource as on 2013(as per GEC 1997) and 2017 (as per GEC 2015) as well as reasons for the difference.

After thorough discussion all the members of the State Level Committee has agreed and accepted upon the figures in the draft report of Dynamic Ground Water Resources as assessed for the state of Manipur (as on 31st March, 2017).

(Jacintha Lazarus)
Secretary
Water Resources Department,
Govt. of Manipur
&
Chairman, State Level Committee for
Dynamic Ground Resources Assessment (Manipur)

Secretary (WR)
Government of Manipur

Meghalaya

Minutes of the Fifth Meeting of the State Level Ground Water Resource Re-estimation Committee, Meghalaya State

The Officer In charge. CGWB, SUO, Shillong on behalf of the Regional Director, CGWB, NER & Member Secretary, State Level Committee on Ground Water Resource Re-estimation, Meghalaya State convened the Fifth meeting for scrutiny and reconciliation of the Ground Water Resources, 2017 for the state of Meghalaya.The above meeting was held on 17th January, 2018 at 14 :00 Hrs in Committee Room III, Secretariat Building, Shillong under the chairmanship of Shri P Sampath Kumar, Commissioner & Secretary, Govt. of Meghalaya, Water Resources, Shillong. The following members were present in the meeting

1. Secretary and Commissioner, Water Resources, Govt. of Meghalaya, Shillong.
2. Representative of Chief Engineer, Water Resources, Govt. of Meghalaya. Shillong.
3. Representative of the Director, Agriculture Department, Govt. of Meghalaya, Shillong.
4. Representative of the Chief Engineer, Public Health Engineering Department, Govt. Of Meghalaya
5. Representative of the Director, Soil & Water Conservation, Govt. of Meghalaya, Shillong.
6. Representative of the Chief Conservator of Forest (SF & E), Forest & Environment Deptt, Govt. of Meghalaya, Shillong
7. General Manager, NABARD, Shillong.
8. Representative of Regional Director, CGWB, NER, Guwahati

Shri P Sampath Kumar, Commissioner and Secretary, Govt of Meghalaya, Water Resources welcomed all the members and advised Shri T Chakraborty, OIC,CGWB, Shillong representing Regional Director, CGWB, NER representative of Member Secretary to initiate the meeting.

Shri T Chakraborty gave the background information on Ground water resources of Meghalaya and its importance. Further he discussed the new methodology for calculating Ground Water Resources for the state of Meghalaya. District wise resources for the whole state were presented along with stage of development in each district.

Shri T Chakraborty, explained the reasons for changes in dynamic ground water resources estimated between 2013 and 2017. After thorough discussion the committee members were satisfied with the figures of dynamic ground water resources of Meghalaya for 2017.

All the members of the committee agreed and accepted upon the figures on the draft report of Dynamic Ground Water Resources Assessment of Meghalaya (as on 31st March 2017) presented in the meeting.

The meeting ended with a vote of thanks to the chair.

(T.Chakraborty)
Officer-In-Charge
CGWB, SUO, Shillong
For Member Secretary, SLGWRRC

Mizoram

Minutes of the First meeting of the State Level Committee for Re-estimation of Ground Water Resources of Mizoram

The Regional Director, CGWB, NER & Member Secretary, State Level Committee for Re-estimation of Ground Water Resources of Mizoram has convened a meeting of the committee for scrutiny and reconciliation of the Dynamic Ground Water Resources of Mizoram, 2017.

The first meeting of the State Level Committee held on 8th February, 2019 at 10:00 Hrs in the chamber of the Commissioner & Secretary, PHED, Govt. of Mizoram, Secretariat Building, Aizawl. The meeting was conducted under the Chairmanship of Shri K. T Beicho, Commissioner & Secretary, PHED, Govt. of Mizoram. The following members were present

1. Shri Lalmuanzova, Engineer In Chief, PHED, Govt. of Mizoram
2. Shri C Lalremsiama, Chief Engineer, PHED, Zone II, Govt. of Mizoram.
3. Sajeeb Kr Das, Suptd. Engineer, Irrigation & WR, Govt. of Mizoram
4. Shri C Lalnithanga, Dy Director, Agriculture Dept, Govt. of Mizoram
5. Shri Z. D Laltanpuia, Sr Scientist, DST, Govt. of Mizoram
6. Shri G L Meena, Regional Director, Central Ground Water Board, North Eastern Region, Guwahati.

Shri K. T Beicho, Commissioner & Secretary, Govt. of Mizoram, PHED welcomed the members and with his permission, the meeting started with a presentation on draft report of Dynamic Ground Water Resources Assessment of Mizoram (As on March, 2017) by Shri T Chakraborty, Sc-D, Central Ground Water Board, State Unit Office, Shillong.

During discussion, Shri K. T Beicho, Chairman of the committee enquired about how the rainfall infiltration recharge factor was decided and reasons for increase in recharge. Shri T Chakraborty, Scientist D has informed about the norms provided in GEC 2015. He has also informed that this time MIRSAC has provided the data on block-wise area having slope more than 20%. It was found that there is a decrease in area having slope more than 20% comparison to area utilized for assessment in earlier estimations. He also explained that earlier recharge area was calculated from toposheets but now MIRSAC analyzed the data from DEM. This is the reason for increase in ground water recharge.

Shri Lalruatkima, Hydrogelogist, PHED informed that PHED is having regular water level data from a few stations, but those data were not considered for WLFM estimation. Shri T Chakraborty, Scientist D replied that the water data provided by PHED are spot values only and not representative for a larger area due to the terrain conditions; that's why these data cannot be used for resource estimation by WLFM. Shri T Chakraborty also commented that though these data was not used for recharge estimation by WLFM but it may become helpful for Climate change studies, so the practice of water level monitoring should continue.

Shri K. T Beicho, Commissioner & Secretary, Govt. of Mizoram, PHED enquired about the potential recharge from springs. Shri T Chakraborty, Scientist D explained that PHED had supplied the block wise number of springs and discharge were considered from studies conducted by CGWB.

It was recommended during the meeting that PHED will try to geo-tag the springs and collect all relevant data, especially discharge data for pre-monsoon and post-monsoon periods.

All the members of the committee agreed and accepted upon the figures on the draft report of Dynamic Ground Water Resources Assessment of Mizoram (as on 31st March, 2013) presented in the meeting.

The meeting ended with a vote of thanks to the chair.

8/2/19

(Shri K. T Beicho)
Commissioner & Secretary,
PHED, Govt. of Mizoram,

8/2/19

(Shri G L Meena)
Regional Director
CGWB, NER, Guwahati

Copy to:

1. The Commissioner & Secretary, PHED, Govt. of Mizoram
2. Engineer In Chief, PHED, Govt. of Mizoram
3. Chief Engineer, PHED, Zone I, Govt. of Mizoram
4. Chief Engineer, PHED, Zone II, Govt. of Mizoram
5. Chief Engineer, PHED, HQ, Govt. of Mizoram
6. Chief Engineer, IWRD, Govt. of Mizoram
7. DGM, NABARD
8. Director, Directorate of Agriculture, Govt. of Mizoram
9. Director, Directorate of Industries, Govt. of Mizoram
10. CSO, DST, Govt. of Mizoram

Nagaland

MINUTES OF THE MEETING OF STATE LEVEL COMMITTEE FOR RECONCILIATION OF DYNAMIC GROUND WATER RESOURCES OF NAGALAND (as on March, 2017)

Date: 29.11.2018

Venue: Office Chamber of the Commissioner & Secretary (G&M), Civil Secretariat, Kohima

Second meeting of State Level Committee for reconciliation of Dynamic Ground Water Resources of Nagaland as on March 2017, was convened on 29.11.2018 at the Office Chamber of Commissioner & Secretary (G&M), Civil Secretariat, Kohima. The meeting was chaired by Shri. Alun Hangsing, Secretary, Geology & Mining Department, Govt. of Nagaland and the following members were present (Attendance sheet attached):

i) Shri Newmai Asangbow, Geologist, DGM
ii) Shri. Nitovi Cishi, Joint Director, DGM
iii) Shri. Kekhriezavi Lea, DGM
iv) Er. Razouvolie Kelio, WRD
v) Ms Amentoli Anar, Under Secretary, DGM
vi) Er. Sobu Angami, EE (WRD)
vii) Shri Biplab Ray, Scientist D, CGWB, NER, Guwahati
viii). Dr. S.S. Singh, Scientist C (AHG), CGWB, NER, Guwahati
ix) Ms. Wonjano Mozhui, Scientist B, CGWB, NER, Guwahati

Estimation of Dynamic Ground Water Resources of Nagaland as per GEC 2015 Methodology and results was presented by Miss Wonjano Mozhui. All the members approved the Dynamic Resource Estimation report. Further, the Chairman of the committee suggested that data available with all the line departments of the state should be incorporated for maximum accuracy in the next re-estimation of Ground Water Resources.

(Alun Hangsing)
Secretary,
Geology & Mining Department,
Govt. of Nagaland,
&
Chairman,
State Level Committee for
Dynamic Ground Resources Assessment

Secretary
to the Govt. of Nagaland
G.&.M...... Department

Odisha

State Level Committee (SLC) for Assessment of Ground Water Resource of Odisha-2017

Venue: Conference Hall, Department of Water Resources,
Rajiv Bhawan, Govt. of Odsiha, Bhubaneswar
Date: March 20, 2019

Minutes of Meeting

The meeting of State Level Committee (SLC) for finalization and approval of the draft computations of Ground Water Resource Estimation of Odisha-2017 was held under the Chairmanship of Shri Pradeep Kumar Jena, IAS, Principal Secretary, Water Resources, Government of Odisha and Chairman, State Level Committee (SLC) for Assessment of Ground Water Resource of Odisha-2017 in the conference hall of Department of Water Resources, Rajiv Bhawan, Govt. of Odsiha, Bhubaneswar on 20.03.2019. The list of participants is given in the annexure-1.

At the outset, Dr. Utpal Gogoi, Regional Director, CGWB, SER, Bhubaneswar and Member Convener, SLC welcomed the Chairman and the members of the SLC. He appraised the gathering about the background of Ground Water Resource Estimation of Odisha-2017 and also about the new methodology i.e. GEC 2015 adopted for computation of the draft figures.

Shri P K Mohapatra, Scientist-D, CGWB, SER, Bhubaneswar made a presentation on the GEC 2015 methodology, norms and parameters adopted for the Ground Water Resource Estimation of Odisha-2017. He apprised the SLC that the estimation was jointly carried out by the CGWB, SER, Bhubaneswar and the Directorate of Ground Water, Department of Water Resources, Government of Odisha and the computations had gone through several rounds of validation to arrive at the draft figures.

The following points are discussed and decisions were taken in the meeting.

1. Shri P K Mohapatra, Scientist-D, CGWB, SER along with Shri B K Sahoo, Scientist-D, CGWB, SER presented the draft findings of the computations of total ground water resources (sum of dynamic and in-storage ground water resources) of Odisha 2017. The draft figures are unanimously approved by the State Level Committee and are as follows.

Dynamic Ground Water Resource	Total Annual Ground Water Recharge	:	1673807.66	Ham
	Total Annual Natural Discharge	:	116718.88	Ham
	Annual Extractable Ground Water Recharge	:	1557088.78	Ham
	Current Annual Ground Water Extraction for Irrigation Use	:	528223.55	Ham
	Current Annual Ground Water Extraction for Industrial use	:	13788.26	Ham
	Current Annual Ground Water Extraction for Domestic use	:	114754.70	Ham
	Current Total Annual Ground Water Extraction for all uses	:	656766.51	Ham
	Stage of Ground Water Extraction	:	42.18	%
	Annual GW Allocation for Domestic Use as on 2025	:	130427.04	Ham
	Net Ground Water Availability for future use	:	884649.93	Ham
	Safe blocks	:	303	
	Semi-critical blocks	:	05	
	Saline blocks	:	06	
	Instorage Ground Water Resource	:	2256864.75	Ham

Any further modifications of these figures at the reconciliation stage after scrutiny by the Central Level Expert Group will be accepted and incorporated suo moto. No further approval of the SLC will be required in this regard.

2. Being informed about the six fully and 36 partially salinity affected blocks in the coastal tract of the state, the Chairman wanted to know about the factors responsible for this quality issue and the possible measures that can be adopted for its prevention and remediation. To this, Shri P K Mohapatra, Scientist-D, CGWB, SER apprised that the salinity problem in these areas is geogenic in nature and has been there since geological past. Further he apprised that the nature of disposition of saline zones in all the affected blocks vary from one another and in most of the blocks alternate zones of fresh and saline aquifers are available. However precautionary measures may be taken to restrict the pumping in the region closer to coastal tract to avoid saline ingress of sea water into fresh water aquifers.

3. Ground Water Resource Estimation of Odisha-2017 figures show that out of 314 assessment units (blocks), 309 blocks (fresh: 303 and saline: 06) are categorized as safe having stage of ground water extraction (SOGWE) less than 70% and five are categorized as semi critical having SOGWE more than 70%. There are 44 blocks which have SOGWE between 60% and 70%. It has also been informed to the August gathering that extraction of ground water for irrigation purpose is the major factor for driving the SOGWE in the upward direction. At this point, the

Chairman desired that quadrant analysis may be carried out to identify the blocks falling under low recharge and high extraction category for taking up remedial measures in those areas on priority. He also advised that analysis of historical data pertaining to recharge and draft may be carried out for all the blocks having SOGWE more than 60%. He suggested slowing down the construction of deep tube wells for irrigation purposes in these blocks to prevent the ground water situation in these blocks from becoming grim in future. He also advised the GWD, Odisha to prepare action plan on improving the ground water situation in these 55 blocks (five semi-critical blocks, 44 blocks with SOGWE between 60% and 70% and six salinity affected blocks).

4. The Chairman desired to know the amount of ground water being extracted by the industrial sector and its impact on ground water regime. To this Shri P K Mohapatra, Scientist-D, CGWB, SER apprised that the annual extraction of ground water for industrial use accounts for around 2.1% of the total annual ground water extraction. Further the Chairman emphasized that the figure of extraction of ground water for industrial use for the entire state may not give the actual picture of the impact of industries on ground water regime as these industries are limited to a few pockets in the state. Hence he advised to take up micro level study in the four industrial clusters viz. Talcher-Angul, Kalinga Nagar, Jharsuguda and Khorda to ascertain the impact of industrialization on ground water regime.

5. Further the Chairman advised that different water conservation measures including rain water harvesting and artificial recharge to ground water should be pursued on large scale in the semi-critical blocks on priority basis followed by the blocks where SOGWE is between 60% and 70% to augment the ground water storage and to prevent these areas from becoming water scare in future. The GWD, Odisha will prepare action plan and DPR for these blocks.

The meeting ended with a vote of thanks to the Chair.

11/04/2019

(Pradeep Kumar Jena, IAS)

Principal Secretary,
Department of Water Resources
Government of Odisha, Bhubaneswar
and
Chairman, State Level Committee (SLC)
for Assessment of Ground Water Resource of Odisha-2017

Punjab

Minutes of 2nd Meeting of State Level Committee for approval of Dynamic Ground Water Resource Estimation Report-2017 held under the Chairmanship of Principal Secretary, Irrigation, Government of Punjab on 13.1.2019 at Punjab Civil Secretariat II, Sector-9, Chandigarh

1.0 Second meeting for approval of Dynamic Ground Water Resource Estimation Report- 2017 prepared jointly by Water Resources Department, WRED, SAS Nagar, Punjab and Central Ground Water Board, NWR, Chandigarh was held under the Chairmanship of Sh. Sarvjit Singh, Principal Secretary, Irrigation, Government of Punjab on 13.3.2019 at Punjab Civil Secretariat II, Sector-9, Chandigarh. The list of Participants is enclosed as Annexure I.

2.0 At the outset, the Chairman welcomed all the participants. Sh. Anoop Nagar, Regional Director, CGWB, NWR explained the summary of the report prepared and modified as per the suggestions given in the first meeting of the committee held on 7-12-2018 presented as Annexure-II. The summary of the report was thoroughly deliberated by the members. Sh. Sarvjit Singh Principal Secretary, Chairman of the Committee while discussing the details of the of the report and advised for incorporating the following recommendations in the report.

1. The terminology used as Stage of Ground Water Development should be changed to Stage of Ground water extraction as percentage of total ground water percolation.

2. Ground water availability per unit area may be termed as Average Ground Water percolation in meters per unit area. Accordingly, the draft per unit area may be written as Average draft/discharge from unit area.

3. In the slide where total ground water resources which include both In-storage and Dynamic ground water resources have been mentioned, it was opined by Sh. Harminder Singh, Chief Engineer, WRED, Punjab to mention total ground water availability for different aquifers along with depth detail which was agreed by the chairman.

4. It was explained during the deliberations that the approximate extensions of the three aquifers i.e. Aquifer-I the depth of which is approximately available upto 100m, Aquifer –II which extends from approximately from 100 to 200 m depth and Aquifer –III which extends from 200 m to 300 m depths. It was advised by the chairman that the same details should also be mentioned.

5. The high level of ground water extraction was also deliberated and it is opined that the report should also incorporate that if the present rate of extraction continues, the ground water resources may exhaust in 20 to 25 years period. Ground water resources available in saline areas should also be mentioned prominently so that the proper planning may be done to utilize these resources also. to mention total ground water availability
6. As the Resource Estimation is based on norms and certain assumptions, it was deliberated that same is mismatching in some blocks where ground water extraction computed is more than the ground water recharge/percolation which is basically due to the real different situation on the ground. It was opined that the detailed studies shall be takenup jointly by WRED, Government of Punjab, Agriculture Department, Government of Punjab and CGWB,

Government of India to ascertain the representative field values for the adopted parameters in the present computation.

7. In some blocks, the ground water resources have been estimated as Over-exploited, but the 50% of area of these blocks have shallow water levels where water levels are less than 5m, these blocks have been categorized as 'Safe' Block. The recommendation of the Technical Sub-committee in this matter is accepted and it is decided to keep these blocks as "Safe, Category.

The Report was approved and accepted by the State Level Committee for Ground Water Resources estimation in Punjab State.

The meeting ended with a vote of thanks to the Chair.

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Tamil Nadu

Minutes of the State Level Committee Meeting on Dynamic Groundwater Resources Estimation of Tamilnadu State as on March 2017 was held on 22nd Feburary 2019 at 11.00 AM in the PWD, Conference Hall, Secretariat, Chennai- 600009.

The State Level Committee Meeting was held on **22nd Feburary 2019 at 11.00 AM in the PWD, Conference Hall, Secretariat, Chennai- 600 009** to validate and approve the Dynamic Groundwater Resources Estimation of Tamilnadu as on march 2017. The Principal Secretary to Government, PWD, the Chairman and the Convenor of the State Level committee chaired the meeting. The Chairman – Cauvery Technical Cell, The Regional Director, CGWB, Members of the Committee, Special invitees and representatives from various departments attended the meeting and shared their valuables suggestions. The Chief Engineer, SG&SWRDC and the Member Secretary of the Committee proposed and requested the Principal Secretary to Government, PWD, Chennai and the Chairman of the Committee to preside and conduct the meeting. The list of delegates is enclosed in Annexure – I.

At the outset, the Chairman welcomed all the members of the State Level committee meeting and appraised about the importance of groundwater and the resource assessment in Tamil Nadu. In his speech, he stated that Tamil Nadu is the only State in India where the groundwater resource assessment is carried out in revenue firka wise as assessment unit and praised the work done by the State Groundwater department and the Central Ground Water Board, Chennai.

Sh. C. Paul Prabhakar, The Regional Director, Central Ground Water Board, South Eastern Coastal Region, Chennai appreciated the efforts of WRD, SG&SWRDC & CGWB Officers for finalizing the Dynamic Groundwater Resources Estimation as on march 2017. He stated that the groundwater resource assessment was mainly done on the basis of rainfall recharge, Water Level fluctuation in the existing observation wells and piezometers, well details, cropping details etc., As per Ground Water Assessment as on march 2017, total assessment units are 1166 Firkas. When compared to the previous assessment, 27 units are increased from 1139 to 1166 Firkas. This assessment has been done on the latest Groundwater methodology approved by Ground Water Resources Estimation Committee – 2015. He stated that data collected for the Groundwater resource assessment from various departments has found to be a very big task for the State ground water department.

Dr. M.Senthilkumar, Senior Hydrogeologist from Central Ground Water Board, Chennai highlighted the salient aspects of new methodology of groundwater estimation 2015 (GEC'2015) and also briefed about the changes made with that of the previous GEC'97 Methodology.

Dr. K.S. Kadiravan, Deputy Director (Geology), SG&SWRDC has presented the salient features of the Computation made in the dynamic resource estimation as on 2017. He stated that data collected for the Groundwater Resource Assessment from various departments have been effectively used and analyzed properly. During the presentation, District wise status of firkas, Migration of firkas from that of the previous 2013 Resource Assessment, Recharge and extraction details, poor quality/ saline firkas, quality tagged (presence of fluoride more than the permissible limit) firkas etc.,

In reply to the query raised by the representative from Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB), about the new methodology in evaluating the Groundwater

Resources Assessment in Urban areas. Regional Director, CGWB replied that new methodology incorporates urban areas also and the Chairman, Cauvery Technical Cell also informed that the water level fluctuation method takes care of urban area assessment unit (Chennai District).
The Chairman enquired about the status of Groundwater Extraction in western belt areas i.e., in Salem, Namakkal and Coimbatore Districts etc., in this Resource Assessment Studies, The Deputy Director, SG&SWRDC has replied that most of the western belt is overexploited and the status remained the same to that of previous computations exists.

The representative from TWAD Board, Chennai has raised issue of Groundwater Quality affected in the assessed units in the State in this Resource Assessment, to this the Deputy Director replied that based on the new (GEC 2015) Methodology, the parameter namely fluoride affected areas in the assessment units (more than 1.5 mg/l) had been separately indicated/tagged in this resource assessment and accordingly 78 firkas were identified and quality tagging were made in the status of firka and also informed that the respective quality ranges of parameter values will also be incorporated in the report.

The Chairman of the Committee has enquired about the status of few of the firkas, that moved from over-exploited to semi-critical status and if any remedial measures to be suggested to this the Regional Director, CGWB has replied that this is mostly attributed to the bifurcation of firkas, the number of wells available in that portion of firkas, rainfall received and the data of cropping pattern, geomorphology, drainage pattern etc. In some areas the farmers have adopted micro-irrigation and has implemented change in cropping pattern and other areas have come under surface water irrigation.

All the members of State Level committee meeting technically approved the Dynamic Groundwater Resources Estimation - 2017.

Then, the meeting came to an end with vote of thanks by the Special Secretary to Government, PWD Chennai.

Principal Secretary to Government
PWD, Chennai
&
The Chairman of the Committee

Telangana

Minutes of 2nd State Level Committee Meeting for Re-Estimation of Ground Water Resources for the State of Telangana as on March, 2017

The 2nd State Level Committee Meeting for Re-Estimation of Ground Water Resource as on March, 2017 was held on 04.08.2018 at 11 00 Hrs. in the Board of Chief Engineers' Conference Hall, Jalsoudha, Erramanzil, Hyderabad under the Chairmanship of Sri Vikas Raj, I.A.S., Principal Secretary, I&CAD, Government of Telangana.

At the outset, Sri D. Subba Rao, RD, CGWB, SR & Member-Secretary welcomed all the Members and Chairman of the Committee to the Meeting and briefed on the Re-Estimation of Ground Water Resource in Telangana, which was carried out based on GEC methodology 2015 and thanked all line Departments for providing the required data well in time.

Dr. Pandith Madhnure, Director, GWD, briefed on the ground water issues its manifestation and remedies in the state. He informed that ~1818 villages are categorized Over- exploited villages asper present estimations, declining water level trends in 60 % & 45 % wells during pre and post monsoon season in the last 10 year, deep water level (>20m) in 10 % of area during premonsoon season of 2017. Geogenic contamination by fluoride in~10% of state area decline in sustainability of wells groundwater commercial zation etc. He expressed that artificial recharge to ground water in the Over Exploited/Critical Mandals is the need of the hour as it helps to arrest depletion of the ground water resource and to mitigate fluoride problem.

Principal Secretary, I&CAD & Chairman of the SLCC suggested to study "Fluoride concentration variation over a period of time in ground water by collecting required inputs from NGRI. He enquired into the impact studies of ARS structures constructed under MGNREGS, other programme etc. He also asked to evaluate the viability of the same so that construction of more number of structures can be explored after assessing the impact. He is instructed Rural development Department to share the data & coordinated with Ground water

Department. Chairman of the Committee felt that special attention should be paid to Over Exploited Mandals under MGNREGS to augment the ground water levels and instructed to take water conservation & ARS measure in these Mandal on priority by utilizing the Aquifer mapping reports of CGWB.

Sri P. Jyothi Kumar, Dy. Director, GWD, made a presentation on present Groundwater resources estimation of the State as well that of Hyderabad Urban area. It was informed that state is divided in to 502 watersheds for which resources are computed and same were apportioned on village/Mandal/levels. The net ground water availability is 437 TMC, gross groundwater extraction is 285 TMC with overall Stage of extraction of 65%.

It was informed that out of 584 Mandals in the State, 70 Mandal falls in OE, 67 In critical, 169 in semi critical & remaining 278 in safe category. Out of 502 watersheds, 29 falls in OE, 59 under Critical, 165 under Semi-Critical and 249 under Safe category. Ground water resource were estimated in Mission Kakatiya implemented 9 basins which indicates that on an average net 14% increase in recharge is observed and net ground water extraction is decreased by 8% In Kaleshwaram project implemented mandals, net groundwater availability is 75 TMC, Gross Groundwater extraction is 55 TMC with stage of Groundwater extraction of 73%.

During the course of deliberations, the Principal Secretary, I&CAD and Chairman of the Committee suggested for making use of improved technology in identifying the aquifers in an effective way, where bore wells upto 300 m depth can be constructed to tap the resource; more practically in Hyderabad urban areas.

Sri N.C. Mandal, NGRI enquired about the methodology adopted in the re-estimation of the resource. Dr. P.N. Rao, CGWB and Dr. Pandith Madhnure, GWD answered his queries on the methodology adopted.

Sri P. Prakash, TRAC, Hyderabad, suggested for making use of remote sensing technology in delineating potential fractures for tapping the resource in an effective manner and requested for data sharing amongst members.

Sri M. Srinivasa Rao, Professor & Head, Osmania University, Hyderabad, requested for dissemination of data, which will be beneficial to the Research Scholars of the University.

Sri D. Subba Rao, Member-Secretary; expressed that major irrigation projects will only cater to the water requirements and felt that by 2020; after completion of Kaleswaram project, the ground water resource will improve to a considerable extent. The Committee appreciated the efforts by Director and Officers of Ground Water Department, Telangana; in completing the assessment in a time bound manner.

After brief deliberations, the SLCC approved the draft re-estimates of Ground Water Resources as on March, 2017; with the decision to incorporate the suggestions made by August Members in the final Report.

(Vikas Raj, I.A.S)
Principal Secretary &
(Chairman SLCC on GEC)
I&CAD Department
Government of Telangana
4/8/2018

VIKAS RAJ, IAS,
Prl. Secretary to Govt.,
I & CAD Dept.
Telangana Secretariat
Hyderabad-500 ...

LIST OF MEMBERS/REPRESENTATIVES ATTENDED THE MEETING:

1. Sri D. Subba Rao, Regional Director, CGWB
2. Dr. Pandith Madhnure, Director, GWD, Telangana
3. Dr. P.N. Rao, Suptdg. Hydrogeologist, CGWB
4. Sri K. Laxma, Jt. Director, GWD, Telangana.
5. Sri G. Shankar Naik, CE, Irrigation (Hydrology & Investigation), Govt. of Telangana
6. Sri N.C. Mandal, Scientist, CSIR-NGRI, Hyderabad
7. Sri V. Ajay Kumar, Dy. C.E MI (GB), Minor Irrigation Dept. Govt. of Telangana
8. Sri D.J. Weslee, Jt. Commissioner, Rural Development Dept. Govt. of Telangana
9. Sri M. Mallikarjuna Swamy, Rural Development Dept. Govt. of Telangana

Tripura

MINUTES OF THE FIRST MEETING OF THE STATE LEVEL COMMITTEE HELD ON 5TH FEBRUARY, 2019 IN THE CONFERENCE HALL NO.III, SECRETARIAT, AGARTALA FOR ASSESSMENT OF THE DYNAMIC GROUND WATER RESOURCES (2017) FOR THE STATE OF TRIPURA

The meeting of State Level Committee (SLC) for Assessment of Dynamic Ground Water Resources of Tripura was held on 5th February, 2019 in the Conference Hall No.III, Secretariat, Agartala under the chairmanship of Shri Manoj Kumar, IAS, Principal Secretary, PWD (WR) Department, Govt. of Tripura.

The list of Members attended the meeting are:

1. Shri Manoj Kumar, IAS, Principal Secretary, PWD (WR) Department, Govt. of Tripura,
2. Shri B.K. Debbarma, Chief Engineer, PWD (WR)Department, Govt. of Tripura
3. Shri Swapan Kumar Das, Chief Engineer, RD Department, Govt. of Tripura
4. Shri Sunil Kumar, General Manager/OIC, NABARD, Tripura
5. Shri Rajesh Datta, DGM, NABARD
6. Shri Sagar Sobhan Debnath, Chief Engineer, Agriculture Department, Tripura
7. Shri Tapan Chakraborty, Scientist-D, OIC Shillong, CGWB
8. Smt Durba Ganguli, S.E, PWD(WR)
9. Smt. Sutirtha Paul, Geologist, Industries & Commerce Department
10. Shri Rajib Majumdar, E.E PWD(DWS)
11. Shri Subrata Kr Malakar, E.E Agriculture Department
12. Smt. Ritu K Oraon, Scientist-B, CGWB SUO Agartala
13. H. Veikhone Sophia Kay, Scientist-B, CGWB SUO Agartala

The Chairman welcomed all the members present and appraised the purpose of the meeting. The meeting started with the introduction of the Members. On behalf of the Regional Director, CGWB, NER, Shri. T Chakraborty, Scientist-D briefed the committee members about GEC'15 methodology and difference between GEC 2015 and GEC 97 methodology. Then estimation of dynamic ground water resources of Tripura for 2016-17 was presented.

During discussion, Shri Manoj Kumar, IAS, Principal Secretary PWD (WR) asked whether more groundwater extraction structures can be constructed since the stage of extraction is low. Shri T Chakraborty, Scientist-D replied that more structures can be constructed.

Shri T Chakraborty, Scientist -D told that since NAQUIM works were completed in Tripura, so as per methodology resource estimation for all the aquifers have to be done and for that piezometric head (water level) of deeper aquifers from deep tube wells are needed to be measured.

He also said that it won't be possible for CGWB to monitor water level from deep tube wells and he cited constrains for that.

Shri Manoj Kumar, IAS, Principal Secretary PWD(WR) replied that since it is important to monitor deeper aquifer, CGWB should monitor at least 10 blocks and rest may be measured by PWD (DWS).

Shri Rajib Majumdar, EE (DWS) replied that they need a hands on training on how to monitor water level from Deep tube wells.

Shri Manoj Kumar, IAS, Principal Secretary PWD(WR) asked CGWB to help in this regard and proposed that 5-6 engineers from PWD (DWS) may get this training from CGWB and who in turn can teach others so that at least one Deep tube well from each block can be measured.

Shri T Chakraborty, Scientist- D replied that CGWB, Agartala is already monitoring a few piezometers in and around Agartala, so when DWS engineers are ready, OIC, SUO, Agartala will definitely arrange a hands on training on monitoring in one of the piezometer and CGWB will try to monitor piezometric head from a few more deep tube wells.

After a thorough discussion, the Chairman motion the approval of the report on Dynamic Ground Water resources of Tripura, 2017 prepared by CGWB and the report was approved by the Committee

14/02/19

(Ritu K Oraon)
Jr. Hg(Scientist-B)
CGWB, SUO-Agartala
For Member Secretary, SLC

14/4/19

(Shri. Manoj Kumar)
Principal Secretary PWD (WR)
Government of Tripura,
&
Chairman,
State Level Committee (SLC)

14/2/19

(Shri B.K Debbarma)
Chief Engineer PWD (WR)
Govt. of Tripura & Member

14/02/2019

(Shri Swapan Kumar Das)
Chief Engineer, (RD Department)
Govt. of Tripura & Member

14/2/2019

(Shri Sunil Kumar)
General Manager/OIC
NABARD & Member

18-02-19

(Shri Rajesh Datta)
DGM, NABARD

18.02.2019

(Shri. Sagar Sobhan Debnath)
Chief Engineer (Agriculture Dept.)
Govt. of Tripura & Member

(Shri. Tapan Chakraborty)
Scientist-D, OIC Shillong
Central Ground Water Board

14/2/19

(Smt Durba Ganguli)
S.E, PWD (WR)
Government of Tripura

18.02.19

(Smt. Sutirtha Paul)
Geologist
Industries & Commerce Dept

14/2/19

(Shri Rajib Majumdar)
E.E PWD (DWS)
Govt of Tripura

(Shri Subrata Kr Malakar)
E.E Agriculture Dept
Govt of Tripura

15/02/19

(H Veikhone Sophia Kay)
Jr.Hg (Scientist-B)
CGWB, SUO-Agartala
SUO Agartala

Uttar Pradesh

भूजल संसाधन आकलन रिपोर्ट (31–03–2017 के आँकड़ों पर आधारित) के अनुमोदन हेतु प्रमुख सचिव, लघु सिंचाई एवं भूगर्भ जल विभाग, उ0प्र0 शासन की अध्यक्षता में राज्य स्तरीय भूजल आकलन समिति की दिनांक 28–03–2019 को आहूत बैठक का कार्यवृत्त।

बैठक में उपस्थित अधिकारियों का विवरण संलग्न है।

बैठक के प्रारम्भ में प्रमुख सचिव, लघु सिंचाई एवं भूगर्भ जल विभाग, उ0प्र0 शासन का अभिनन्दन करते हुए निदेशक, भूगर्भ जल विभाग द्वारा अवगत कराया गया कि प्रदेश में विकासखण्डवार भूजल संसाधनों का आकलन किया जाता है। भारत सरकार के दिशा–निर्देशों के अनुक्रम में 31–03–2017 के आँकड़ों के आधार पर भूगर्भ जल विभाग, उ0प्र0 तथा केन्द्रीय भूमि जल बोर्ड द्वारा संयुक्त रूप से भूजल संसाधन आकलन रिपोर्ट तैयार की गयी है, जिस पर 'राज्य स्तरीय भूजल आकलन समिति' की स्वीकृति अपेक्षित है। उन्होंने यह भी बताया कि पहली बार भूजल संसाधनों का आकलन 'GEC-1984' की मेथोडोलाजी के आधार पर, विगत आकलन वर्ष–2013 में भूजल संसाधनों का आकलन 'GEC-1997' की मेथोडोलाजी के आधार पर तथा वर्तमान में भूजल संसाधनों का आकलन 'GEC-2015' की संस्तुतियों के आधार पर किया गया है। श्री रविकान्त सिंह, सीनियर हाइड्रोजियोलाजिस्ट, भूगर्भ जल विभाग एवं डा0 सिराज खान, वैज्ञानिक–डी, केन्द्रीय भूमि जल बोर्ड द्वारा भूजल संसाधन आकलन रिपोर्ट से सम्बन्धित प्रस्तुतीकरण में विस्तृत जानकारी उपलब्ध करायी गयी, जिसमें वर्ष–2017 के आँकड़ों पर आधारित रिपोर्ट पर विस्तृत चर्चा की गयी। प्रस्तुतीकरण में बताया गया कि उत्तर प्रदेश के 820 विकासखण्डों तथा 10 शहरी क्षेत्रों का भूजल संसाधन आकलन किया गया, जिसमें 91 विकासखण्ड/शहरी क्षेत्र अतिदोहित, 48 विकासखण्ड क्रिटिकल तथा 151 विकासखण्ड सेमी–क्रिटिकल श्रेणी में वर्गीकृत किये गये हैं।

विगत वर्षों की रिपोर्ट तथा वर्तमान प्रस्तावित रिपोर्ट में ग्राउण्ड वाटर रिचार्ज एवं ड्राफ्ट में आयी कमी के बारे में श्री हिमांशु, स्वारा द्वारा चाही गयी जानकारी के सम्बन्ध में निदेशक, भूगर्भ जल विभाग द्वारा अवगत कराया गया कि रिचार्ज की गणना करते समय 'GEC-2015' के अनुसार वर्षा के आँकड़ों को 10% तक कम किया गया, जिसके कारण रिचार्ज की मात्रा में कमी आयी एवं ड्राफ्ट के सम्बन्ध में अवगत कराया गया कि लघु

सिंचाई के सेन्सेस के आँकड़ों को इस रिपोर्ट को तैयार करने हेतु आधार बनाया गया। मुख्य अभियन्ता, लघु सिंचाई विभाग ने अवगत कराया कि लघु सिंचाई के सेन्सेस के आँकड़ों में महत्वपूर्ण कमी दर्ज की गयी एवं क्षेत्रीय परिस्थितियों के अनुसार यूनिट ड्राफ्ट को validate एवं परिशोधित किया गया है।

उद्यान विभाग द्वारा अवगत कराया गया कि प्रदेश में भारी मात्रा में ड्रिप एव स्प्रिंकलर सिंचाई प्रणाली को वितरित किया गया है, जो कि ड्राफ्ट में आयी कमी का कारण होना चाहिए।

कृषि विभाग द्वारा सुझाव दिया गया कि रिचार्ज की मात्रा बढ़ाने हेतु खेतों की मेड़ों का ऊँचा किया जाये, जिससे भूजल रिचार्ज में बढोत्तरी होगी।

आई0एम0डी0 के प्रतिनिधि द्वारा अवगत कराया गया कि उनके द्वारा तहसील पर स्थित रेन–गॉज स्टेशनों के आँकड़ों को एकत्रित कर पूर जनपद हेतु validate करते हुए वेबसाइट पर अपलोड किया जाता है। रिपोर्ट तैयार किये जाने हेतु इन आँकड़ों का उपयोग किया गया है, जो कि उचित है।

निदेशक, भूगर्भ जल विभाग ने यह भी अवगत कराया कि घरेलू उपयोग के सम्बन्ध में भूजल का दोहन कितना हो रहा है, कहाँ हो रहा है, का आकलन करना काफी कठिन है। इस सम्बन्ध में घरेलू यूजर्स के लिए विचाराधीन भूजल एक्ट में प्राविधान किया गया है कि घरेलू यूजर्स को भी रजिस्टर्ड किया जायेगा, जिससे पता चल सकेगा कि क्षेत्र में कितने सम्बरसेबिल इत्यादि लगे हैं और उनसे लगभग कितना भूजल दोहन किया जाता है।

रिपोर्ट के प्रस्तुतीकरण के दौरान यह बात प्रकाश में आयी कि पश्चिमी उत्तर प्रदेश की स्थिति अन्य क्षेत्रों की अपेक्षा ज्यादा खराब है। अतः इस क्षेत्र पर विशेष ध्यान दिया जाना आवश्यक है।

केन्द्रीय भूजल परिषद के क्षेत्रीय निदेशक, श्री वाई0बी0 कौशिक द्वारा अवगत कराया गया कि ऐसे 10 शहरी क्षेत्रों, जिनकी आबादी 10 लाख से अधिक है, का भूजल आकलन प्रथम बार किया जा रहा है। इससे शहरी क्षेत्रों की स्थिति प्राप्त हो सकेगी। उनके द्वारा यह भी अवगत कराया गया कि उत्तर प्रदेश में एक्यूफर मैपिंग का कार्य चल रहा है, जब पूरे

Uttarakhand

No. 4(17)/CGWB/UR/Tech-18– 945

Government of India

Ministry of Water Resources RD & GR

Central Ground Water Board, Uttaranchal Region, 419A Balliwala

Kanwali Road, Dehradun – 248 001

Date: 31 DEC 2018

Minutes of the Meeting of the State Level Technical Co-ordination Committee (SLTCC) for approval of Assessment of Dynamic Ground Water Resources of Uttarakhand State (as on 31st March 2017).

First Meeting of the State Level Technical Co-ordination Committee (SLTCC) for finalization of Dynamic Ground Water Resources of Uttarakhand State as on March 2017, was held in the Conference Hall, Irrigation Department, Yamuna Colony, Dehradun on 7th December 2018 at 1100 Hrs. The list of participants in the Meeting is enclosed at Annexure-I.

At the outset, Dr. Waseem Ahmad, Head of Office, CGWB, Uttaranchal Region, Dehradun and Member Secretary of SLTCC welcomed all the committee members. It was informed that this time, the resources assessment was carried out by CGWB, UR, Dehradun alone as per the latest GEC-2015 Methodology. He has also emphasized the need for constitution of a *"Groundwater Resources Assessment Cell"* with members from Irrigation/Minor Irrigation Department. This is as per the mandate of the Ministry of Water Resources, RD and GR wherein the state-wise resources are to be estimated by the respective state government department. A detailed presentation on the assessment methodology and results was made by the Member Secretary. The following points were discussed during the meeting:

1. Sh. N.K. Yadav, Chief Engineer, Irrigation Department opined that some case studies may be carried out jointly by the CGWB and Irrigation Department for quantification of recharge in the alluvial areas as recharge is a very important component of the available groundwater resources of an area.
2. Sh. Karan Singh, Superintending Engineer, Uttarakhand Pey Jal Nigam opined that more dams and reservoirs need to be constructed in the foothill zones of Himalayas at suitable sites.
3. Smt. Neelima Garg, General Manager (HQ), Uttarakhand Jal Sansthan suggested that the industries and infrastructural units must implement artificial recharge schemes on a larger scale in Kashipur, Jaspur, Khatima blocks of U.S. Nagar district, Bahadrabad, Roorkee and Bhagwanpur blocks of Haridwar district and Haldwani block of Nainital district.

4. Sh. Alok Srivastava, Asst. Engineer, Minor Irrigation Department suggested that accurate well census data, canal data and rainfall data are required for a realistic estimation of dynamic groundwater resources.
5. As per the latest assessment, Total Annual Ground Water Recharge = 3.04 BCM, Total Annual Ground Water Extraction = 1.64 BCM, Annual Extractable Ground Water Resources = 2.80 BCM, Net Ground Water Availability for Future Use (up to 2025 AD) = 1.39 BCM and Stage of Ground Water Extraction = 57%, were approved by the committee members of the SLTCC.
6. The SLTCC members were apprised that out of 18 assessment units (blocks) in Dehradun (3), Haridwar (6), Udham Singh Nagar (7) and Nainital (2) districts, total 5 assessment units (Kashipur and Khatima in Udham Singh Nagar district, Bahadrabad and Bhagwanpur in Haridwar district and Haldwani in Nainital district) were categorized as Semi Critical. There are no Critical or Over Exploited blocks as per the latest assessment of Dynamic Ground Water Resources.

The Meeting ended with Vote of Thanks to the Chair.
This issues with the approval of the competent authority.

31|XII|18

(Dr. Waseem Ahmad)
Head of Office &
Member Secretary, SLTCC

Enclosure: Annexure-I
Distribution:

1. The Principal Secretary (Irrigation & Minor Irrigation) & Chairman of the SLTCC, Secretariat, 4 Subhash Road, Dehradun for kind information.
2. The Engineer In Chief & HOD, Irrigation Department, Yamuna Colony, Dehradun.
3. The Chief Engineer & HOD, Minor Irrigation, Laghu Sinchai Bhawan, Indraprastha Colony, Lane No. 3, Natthanpur Jogiwala, Dehradun.
4. The Chief General Manager, Uttarakhand Jal Sansthan, Nehru Colony, Dehradun.
5. The Managing Director, Uttarakhand Pey Jal Nigam, 11 Mohini Road, Dehradun.
6. The Director, Swajal Pariyojana, Opposite ISBT, Dehradun.
7. The Director, Agriculture Department, Nanda Ki Chowki, Dehradun.
8. The Director, Industries Department, Industrial Area, Patel Nagar, Dehradun.
9. The General Manager, NABARD, IT-42, Sahastradhara Road, Inside Doon IT Park, Govind Vihar, Dehradun.

Chandigarh

Minutes of 2nd Meeting of State Level Committee for approval of Dynamic Ground Water Resource Estimation Report-2017 held under the Chairmanship of Principal Secretary, Irrigation, Government of Punjab on 13.1.2019 at Punjab Civil Secretariat II, Sector-9, Chandigarh

1.0 Second meeting for approval of Dynamic Ground Water Resource Estimation Report-2017 prepared jointly by Water Resources Department, WRED, SAS Nagar, Punjab and Central Ground Water Board, NWR, Chandigarh was held under the Chairmanship of Sh. Sarvjit Singh, Principal Secretary, Irrigation, Government of Punjab on 13.3.2019 at Punjab Civil Secretariat II, Sector-9, Chandigarh. The list of Participants is enclosed as Annexure I.

2.0 At the outset, the Chairman welcomed all the participants. Sh. Anoop Nagar, Regional Director, CGWB, NWR explained the summary of the report prepared and modified as per the suggestions given in the first meeting of the committee held on 7-12-2018 presented as Annexure-II. The summary of the report was thoroughly deliberated by the members. Sh. Sarvjit Singh Principal Secretary, Chairman of the Committee while discussing the details of the of the report and advised for incorporating the following recommendations in the report.

1. The terminology used as Stage of Ground Water Development should be changed to Stage of Ground water extraction as percentage of total ground water percolation.

2. Ground water availability per unit area may be termed as Average Ground Water percolation in meters per unit area. Accordingly, the draft per unit area may be written as Average draft/discharge from unit area.

3. In the slide where total ground water resources which include both In-storage and Dynamic ground water resources have been mentioned, it was opined by Sh. Harminder Singh, Chief Engineer, WRED, Punjab to mention total ground water availability for different aquifers along with depth detail which was agreed by the chairman.

4. It was explained during the deliberations that the approximate extensions of the three aquifers i.e. Aquifer-I the depth of which is approximately available upto 100m, Aquifer –II which extends from approximately from 100 to 200 m depth and Aquifer –III which extends from 200 m to 300 m depths. It was advised by the chairman that the same details should also be mentioned.

5. The high level of ground water extraction was also deliberated and it is opined that the report should also incorporate that if the present rate of extraction continues, the ground water resources may exhaust in 20 to 25 years period. Ground water resources available in saline areas should also be mentioned prominently so that the proper planning may be done to utilize these resources also. to mention total ground water availability

6. As the Resource Estimation is based on norms and certain assumptions, it was deliberated that same is mismatching in some blocks where ground water extraction computed is more than the ground water recharge/percolation which is basically due to the real different situation on the ground. It was opined that the detailed studies shall be takenup jointly by WRED, Government of Punjab, Agriculture Department, Government of Punjab and CGWB, Government of India to ascertain the representative field values for the adopted parameters in the present computation.

7. In some blocks, the ground water resources have been estimated as Over-exploited, but the 50% of area of these blocks have shallow water levels where water levels are less than 5m, these blocks have been categorized as 'Safe' Block. The recommendation of the Technical Sub-committee in this matter is accepted and it is decided to keep these blocks as "Safe, Category.

The Report was approved and accepted by the State Level Committee for Ground Water Resources estimation in Punjab State.

The meeting ended with a vote of thanks to the Chair.

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Dadra & Nagar Haveli

MINUTES OF THE MEETING OF STATE LEVEL COMMITTEE (SLC) FOR GROUND WATER RESOURCE ESTIMATION OF UT OF DADRA & NAGAR HAVELI AS ON MARCH 2017

The Meeting of the State Level Committee (SLC) for Ground Water Resource Estimation as on March 2017 (GWRE-2017) was held under the Chairmanship of Shri Kannan Gopinathan, IAS, Collector, D&NH and Chairman of SLC for GWRE-2017 on 13th February 2017 at 12.00 Noon at Collectorate Office, Silvassa with following agenda:

1. Presentation on Ground Water Resources Assessment (2017) of UT of DNH.
2. Discussion followed by approval of GWRA (2017).
3. Any other item: With the permission of Chair.

The SLC has been constituted vide Order No. vide PWD-III/ASW/ GWRA/2013/SLC/DNH/2014/416/98 dated 19/03/18. The list of members attending the SLC meeting is enclosed (Annexure-I). The detailed discussions and decisions taken during the meeting is as follows:

AGENDA 1 & 2: Presentation followed by Discussion on Ground Water Resource Assessment (2017).

- At the outset, Dr. P.K. Jain, Superintending Hydrogeologist & Convenor, Central Ground Water Board, Central Region, Nagpur welcomed Shri Kannan Gopinathan, IAS, Collector & Chairman of the SLC and also all the Members of the Committee. Dr. Jain thanked the administration of D&NH for providing the data which has facilitated in completing the task within stipulated time.
- Shri Rahul R. Shende made a detailed presentation on "Ground Water Resource Estimation of UT of D&NH as on 2017". During the presentation, Shri Shende informed that the GWRE-2017 has been computed as per the revised guidelines of GEC-2015 Methodology. The resource estimation was completed by CGWB, Nagpur based on the historical data available with CGWB, Nagpur. Beside this various other data inputs required for assessment were also collected from various departments of D&NH viz., PWD (Civil, Irrigation & Road), District Panchayat, Agriculture, Planning & Statistics etc. The dynamic and static ground water resources as on 2017 for the UT of D&NH were discussed in detail.
- Dr. P.K. Jain, Suptdg. Hydrogeologist pointed out that the overall scenario of the UT has not changed much with respect to previous assessment and informed that the stage of ground water extraction in UT of D&NH has marginally reduced from 32.22% in 2013 to 31.34 % mainly due to increase in recharge from other sources during non monsoon season. He also informed that the situation in UT of D&NH is different from other parts of the country as the domestic draft is more than the irrigation draft. He further stressed that due to non-availability of ground water draft for industrial purpose, true ground water extraction could not be estimated. Hence in future ground water assessments, the data on industrial draft may be provided. Shri K. Gopinathan, Collector and Chairman of the committee ensured that the data on industrial draft will be made available to CGWA and accordingly he has issued instruction to PCC to collect Ground Water Extraction data of industries using Ground Water. He also informed that the detailed report will be submitted to DNH administration shortly after approval of the SLC and Central Level Expert Group Committee.

- Shri Kannan Gopinathan, IAS, Collector & Chairman of the SLC has appreciated the efforts put in by CGWB in estimation of GWRA-2017 and indicated that they will be helpful for further planning and management of ground water resources. He further indicated that UT of D&NH has been blessed with plenty of rainfall and has so far not faced drought like situation. However, the GWRA-2017 will provide an insight into the judicious use of dynamic nature of ground water resources.
- The Ground Water Resource Assessment of UT of D&NH as on 2017 has been approved by SLC for inclusion in the National Report to be issued by Govt. of India.

AGENDA 4: Any other item with the permission of Chair

- None

The meeting ended with a vote of thanks by Shri Rahul R. Shende, Assistant Hydrogeologist.

Shri Kannan Gopinathan, IAS District Collector, D&NH & Chairman of SLC for GWRE-2017	13/02/19 **Dr. P.K. Jain** Superintending Hydrogeologist & Convenor of SLC for GERE-2017

Lakshadweep

MINUTES OF MEETING OF THE U.T.LEVEL COMMITTEE ON GROUND WATER RESOURCE ESTIMATION FOR U.T OF LAKSHADWEEP HELD ON 13.2.2019

The meeting of the U.T .level Committee on Ground Water Resource Estimation for U.T of Lakshadweep was ~~is~~ held on 13.2.2019 at 13.15 hours in the Chamber of Secretary (Works) & Collector,U.T.of Lakshadweep on 13.02.2019.The meeting was Chaired by **Shri.Vijendra Singh Rawat,I A S Secretary (Works).** The following members attended the meeting.

1	Shri.C.N.Shajahan, Superintending Engineer,LPWD	Member
2	Shri.P.Abdul Samad,Director Planning & Statistics and Director,Agriculture	Member
3	Shri.K.Balakrishnan,Scientist, CGWB	Invitee
4	Shri C.Hidayathulla,Chemist,LPWD	Invitee
5	Dr K.R.Sooryanarayana Superintending Hydrogeologist, CGWB	Representing Regional Director as Member Secretary

The Chairman of the committee welcomed the Members and invitees for the meeting. At the outset, Shri K.Balakrishnan,Scientist, CGWB appraised the committee of the computation of the draft figures on the Dynamic ground water resources of Lakshadweep as on March 2017 and placed the same for the approval of the Committee. Chairman opened the discussion on the resource figures as per the agenda.

Agenda Item: Estimation of Dynamic ground water resources of U.T of Lakshadweep as on March 2017.

- Shri.K.Balakrishnan, Scientist Central Ground Water Board informed to the Committee that the dynamic ground water resources have been assessed as per the GEC 2015 methodology by CGWB with the data collected from different government departments of U.T of Lakshadweep and also the data collected by CGWB. He explained the arious steps involved in the methodology adopted for the estimation of resources and the final result of the computations were deliberated in detail by the Committee.
- The Committee was informed that the assessments carried out for all the inhabited islands except Bitra.
- Ground water draft for domestic uses in the islands have been updated based on the projected population, keeping 2011 census data as the base.
- As per the assessment carried out, the annual surplus ground water availability, available ground water resource and gross ground water draft for all uses in U T of Lakshadweep are 1072.6 Ha.m, 368.8 Ha.m and 238.0 Ha.m respectively.
- The stage of ground water extraction of U T of Lakshadweep is 65.7 %. Three islands are categorised as "Semi-Critical"namely Kavaratti, Agatti and Amini. Remaining islands are in "Safe" category.

Chairman has taken note of the stage of ground water extraction in the Kavaratti island, being the Capitol island and suggested to take up alternate use of water for construction activity in the island.

Chairman also advised to take-up rainwater harvesting on large scale to mitigate the issue. CGWB officers have endorsed this suggestion.

Shri.C.N.Shajahan, Superintending Engineer, LPWD informed that commissioning of new desalination plants will ease the dependency on ground water in the coming years.

The assessment of dynamic ground water resources of U.T of Lakshadweep as on 31.3.2017 is approved by the Committee.

The meeting ended with thanks to the Chair.

(Vijendra Singh Rawat,I A S)

Chairman

Secretary (Works)
U.T. of Lakshadweep
Kavaratti - 682 555

Puducherry

Minutes of the meeting of State Level Working Group committee on Re- assessment of dynamic ground water resources of U.T Puducherry as on March 2017 held on 31.12.2018 in the Chamber of Secretary (Agri) Secretariat, Puducherry.

Present:
Tvl:

1.	**A.Anbarasu, I.A.S. Secretary (Agri.)**	**- Chairman**
2.	**Dr.C.Paul Prabagar, Regional Director, CGWB, Chennai**	**- Member**
3.	**V.Shanmugasundaram, Chief Engineer, PWD, Puducherry**	**- Member**
4.	**Dr.B. Ramakichenin@ Balagandhi, Director of Agriculture &FW**	**- Member**
5.	**Dr.N.Ramesh, Chief Environmental Engineer, (Represented for Member Secretary, PPCC, Puducherry)**	**- Member**
6.	**Dr.S.Pethaperumal, Member Secretary, PGWA., Puducherry**	**- Member**
7.	**S. Manohar, Hydrogeologist, SGWU, Dept. of Agriculture**	**- Member Secretary.**
8.	**Dr. D. Gnanasundar, Scientist 'D' CGWB, Chennai.**	**- Sp.Invitee**
9.	**Dr.M.SenthilKumar, Scientist 'D' CGWB, Chennai.**	**- Sp.Invitee**

After introduction of new members to the committee, the Regional Director with the permission of the Chairman, presented the result of the Dynamic Ground Water Resources Re-assessment as on March 2017 of U.T. of Puducherry.

The Chairman asked the Regional Director to explain the content of the result on re-assessment of ground water. On behalf of the Regional Director Thiru. Dr. D. Gnanasundar, Scientist 'D' CGWB, Chennai, appraised that the ground water re – assessment is conducted once in two years jointly by the State Ground Water Unit, Department of Agriculture, Government of Puducherry and Central Ground Water Board, Ministry of Water Resources, Chennai to assess the availability of ground water in the U.T of Puducherry. The recent ground water report reveals that the Ground Water Resources Re-Assessment (GEC-2015) Methodology, the Puducherry Region is categorized as over exploited (102%), Karaikal Region as Safe (16 %), Mahe Region as safe (69%) and Yanam Region as Saline. During the discussion, the Chairman asked the reason for reduces in stage of development of Puducherry region. The Member Secretary of this committee appraised that, out of 6797 total numbers of tube wells in Puducherry region, 4233 number of shallow tube wells were changed over into deeper aquifer due to poor quality and the gradual decrease in the stage of development over the years is attributed to increase in recharge, measures taken up by the State Government to improve the ground water resource by artificial recharge measures viz., renovation of tanks, village ponds with recharge shafts, construction of check dams with recharge shafts and construction roof top of rain water harvesting structures in Government, industrial, institutional and Commercial buildings and also due to the reduction in extraction of water from agricultural tube wells due to urbanization.

The Chairman intervened by expressing his anguish on non-compliance of registration of the tube wells located within 6 Kms by the PGWA and stated that there are nearly 3000 tube wells along the coastal areas tapping shallow aquifers are left out from registration that should be registered immediately by enforcement. A team wearing uniform indicating enforcement cell from PGWA and visits each and every area and documented the metering in all tube wells in all sectors in co-ordination with Pondicherry Engineering College, then only the exact extraction of ground water will be identified. The Director of Agriculture, agreed to spare man power for the enforcement cell to PGWA.

After detailed discussion, the State Level Working Group Committee approved the "Dynamic Ground Water Resources Re-assessment as on March 2017" of U.T. of Puducherry unanimously. The ground water re-assessment was prepared and jointly assessed by CGWB, Government of India, South Eastern Coastal Region, Chennai and State Ground Water Unit, Department of Agriculture & Farmers Welfare, U.T. of Puducherry.

The Chief Environmental Engineer, representative of The Department of Science and Technology and Environment, Puducherry, has expressed that their department does not allow water based industries in Puducherry and the department has also implemented the water management works under Climate Change Programme to desilt the tanks, and village ponds and also told that the discharge from the industries are constantly monitored to prevent ground water pollution and the industries are issued license with one of the condition that to use the recycled water for gardening and toilet flush purposes and also requested to re-calculate the percentage of utilization of Groundwater by the Agricultural Sector, Drinking water and industrial sector, since the agricultural activities is reduced.

At the conclusion of the meeting the Member Secretary put forth the following recommendations for better water resource management.

- The farmers may be advised to use the water available in the tanks for irrigation activities to minimize the drawal of water from the tube wells during monsoon seasons while the water available in the tanks. It will reduce the load on ground water.
- The farmers may be advised to switch over the alternate crops other than the water intensive crops such as pulses during summer seasons.
- The Public Works Department prepare a master plan for setting up of surface water pumping stations on the major tanks to provide drinking water supply to the nearby villages during monsoon seasons when water available in the tanks.
- To control and regulate the extraction of Groundwater "The Pondicherry Groundwater (Control and Regulation) Act 2004 should be strictly enforced.
- To conserve water, subsidy assistance is extended to farmers for laying of underground pipeline to convey irrigation water without any loss and also for installation of drip/sprinkler irrigation systems should be continued.
- More Rainwater harvesting structures are provided in most of the Government buildings and instruction were given to industries and educational institutions to construct RWH structures and made it mandatory.
- The scheme of desilting of Village ponds and tanks to increase the water holding capacity and providing recharge shafts should be continued.
- To conserve water Precision farming scheme should be continued
- Bed dams across the rivers, effectively impound runoff water may be increased in numbers.
- Tail end regulators have been constructed in Karaikal region across the rivers which have effectively arrested the high tide water and recharging ground water may be explored further.

The committee unanimously agreed with the above recommendations and the Chairman suggested that the above recommendations may be referred to the line departments for effective implementation.

The Member Secretary thanked the Chairman and Committee members and Special invitees on participation, deliberations and effective suggestions.

Approved

Sd/-

SECRETARY TO GOVT.(AGRI.)
-CUM-
CHAIRMAN STATE LEVEL COMMITTEE

As approved by Secretary to Govt. (Agri) cum Chairman, State level committee

23/1/19
(S.MANOHAR)
Member secretary, State level committee
-cum-
Hydrogeologist-I, SGWU&SC
Department of agriculture and farmers welfare
Puducherry

Appendix C
Minutes of the meeting of the Central Level Expert Group for overall re-assessment of ground water resources of country, 2017

Speed Post/ email
CGWB/V3/10/2017/GWR Estimation 3896
Central Ground Water Board
Ministry of Water Resources, River
Development & Ganga Rejuvenation
Bhujal Bhawan, Faridabad

Dated: 29 APR 2019

Sub: Summary of record of the 3rd Meeting of Central Level Expert Group for Overall Re-Assessment of Ground Water Resources Assessment 2017

Sir,

Please find enclosed the Summary of records of the 3rd Meeting of Central Level Expert Group for Overall Re-Assessment of Ground Water Resources Assessment 2017 held under the Chairmanship of Chairman CGWB at Jamnagar House, New Delhi, on 23.04.2019 Hrs.

This issues with the approval of Chairman, CGWB.

Encl: as above

Yours faithfully
26/4/19
Dr. S Suresh
Sr. Hydrogeologist

Distribution as per list

Summary of record of the 3rd Meeting of Central Level Expert Group for Overall Re-Assessment of Ground Water Resources Assessment 2017

The 3rd meeting of the Central Level Expert Group (CLEG) for over-all assessment of the Ground Water Resources 2017 was held under the Chairmanship of Chairman CGWB at Jamnagar House, New Delhi on 23.04.2019 at 11:30 Hrs. The list of participants are provided as Annexure-I

Member (HQ) welcomed the participants for the meeting and requested Chairman to address the participants. Chairman, Central Ground Water Board (CGWB) welcomed all the members of the committee and informed the committee that Ministry of Water Resources, RD & GR has extended the tenure of the CLEG upto 30.04.2019. In some of the States, due to the various administrative reasons, the assessment has not yet been approved, however, the assessment has been made jointly by State GW Department and CGWB and CLEG may deliberate on the assessment made for various States. Chairman, advised for the presentation to commence.

A presentation was made on the assessment done by various States. It included the status of approval by SLC, compilation of resources at the National and State Level, the changes with respect to previous assessment and reasons for change provided by the respective States. The members of CLEG deliberated on the Ground water Resources Assessment -2017 (GWRA-2017) for each State and found that clarifications provided by the States were found tenable, however, the annual groundwater recharge in GWRA-2017 for West Bengal is found very high in comparison to 2013 assessment. The reasons for the changes in West Bengal was not found reasonable and adequate and further, SLC has also not approved the GWRA-2017 assessment. The Members also deliberated on the possibility of using the results of 2013 assessment pending SLC approval of GWRA- 2017 and issuing a corrigendum after the receipt of appropriate reasons for the change and approval from SLC. It was also found that by using the results of 2013 assessment for West Bengal, Total Annual Ground Water Recharge works out to be around 432 bcm. The following decisions were taken during the meeting:

1. The State GW agency and CGWB need to pursue the respective State Level Committees for early approval of the GWRA-2017 assessment, where SLC approval is still awaited.
2. The results of 2013 assessment in respect of West Bengal may be used in place of GWRA-2017 assessment for national compilation of GWRA-2017 with a rider that after approval of GWRA-2017 by SLC of West Bengal, a corrigendum may be issued separately, incorporating the results of GWRA-2017.
3. A letter may be sent to the Principal Secretary & Chairman, SLC, West Bengal from CLEG, seeking his personal intervention in expediting SLC approval.
4. The committee approved GWRA-2017, with the inclusion of 2013 figures instead of 2017 in respect of West Bengal, as mentioned in the point no 2.

Annexure I

List of Participants of the 3rd meeting of the Central Level Expert Group (CLEG)

S.No	Participants
1.	Shri K.C. Naik, Chairman , CGWB
2.	Dr. E. Sampath Kumar, Member, CGWB
3.	Shri G.C. Pati, Member, CGWB
4.	Shri Umakant, Joint Secretary, Department of Land Resources, Ministry of Rural Development
5.	Dr. C.P. Kumar, Scientist G, NIH Roorkee
6.	Dr. A.R. Khan, General Manager, NABARD, Mumbai
7.	Shri Gopal Sharan, Scientist-C, NITI Aayog
8.	Shri K. Venu Gopal, Director, Ground water and Water Audit Department, Vijayawada, Andhra Pradesh
9.	Shri B.K. Karjee, Chief Engineer (FMO) CWC, New Delhi
10.	Shri Bharat Bhusan Singla, Director, Water Resources Punjab
11.	Prof. B.R. Chahar,Civil Engineering Department, IIT Delhi
12.	Shri Mrigank Ghatak, Director, DGCO, Geological Survey of India, Delhi
13.	Shri Afroz Alam, SE-I, NWDA, New Delhi
14.	Shri Parmod Kumar, Dy. Director, Central Water Commission, New Delhi
15.	Shri G.P. Sharma, Suptg Hydrogeologist, Ground water Department , Jaipur
16.	Dr. Vijay Bhusan, Sr. Geologist, Ground water Surveys and Development Agency, Maharashtra
17.	Shri. N. Srinivasu, Dy. Director, A.P. Ground Water Department
18.	Shri Ravikant Singh, Sr Hydrogeologist, Ground water Department U.P
19.	Shri Atul Sood, Sr. Geophysicist, Water Resources & Environment Directorate (Water Resources Department), Punjab
20.	Shri Sanjay Marwaha, RD, CGWB Faridabad
21.	Shri Anoop Nagar, Regional Director, NWR, Chandigarh
22.	Shri Y.B. Kaushik, Regional Director, NR Lucknow
23.	Shri Amlanjyoti Kar, Suptdg Hg, CGWB ER Kolkata
24.	Dr. S. Suresh, Sr. Hg. , CHQ, CGWB, Faridabad
25.	Shri S.K. Sinha, Suptdg, Hydrologist, CHQ, CGWB, Faridabad
26.	Shri. S.K. Mohiddin, Sr Hydrogeologist, Scientist C, CGWB NWR Chandigarh
27.	Shri P. Sudhakar, Sc-D, CHQ, CGWB, Faridabad
28.	Dr. Seraj Khan, Sr Hydrogeologist, NR Lucknow
29.	Ms Parveen Kaur, Scientist B, CHQ, CGWB, Faridabad
30.	Ms Madhumanti Roy, Sc-B, CHQ, CGWB, Faridabad

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ABBREVIATIONS

ARDC	Agriculture Refinance and Development Corporation
CGWA	Central Ground Water Authority
CGWB	Central Ground Water Board
bcm	Billion cubic metre
CLEG	Central Level Expert Group for overall reassessment of ground water resource of the country
GEC-1997	Ground Water Resources Estimation Committee, 1997
GWRA- 2017	Ground Water Resources Assessment, 2017
GSDA	Ground Water Survey and Development Agency, Maharashtra
ham	Hectare metre
IMD	India Meteorological Department
LPA	Long Period Average
lps	Litres per second
m	Meter
m bgl	Meter below ground level
m ham	Million hectare metre
M.I.	Minor Irrigation
MOWR, RD & GR	Ministry of Water Resources, River Development & Ganga Rejuvenation Govt. of India
NABARD	National Bank for Agricultural and Rural Development
NAQUIM	National Aquifer Mapping & Management Programme
UT	Union Territory

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