June
2017

DYNAMIC GROUND WATER RESOURCES OF INDIA

(As on 31st March 2013)

Central Ground Water Board
Ministry of Water Resources, River Development &Ganga Rejuvenation
Government of India
Faridabad

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उमा भारती
UMA BHARTI

सत्यमेव जयते

जल संसाधन, नदी विकास
एवं गंगा संरक्षण मंत्री
भारत सरकार
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MINISTER OF WATER RESOURCES
RIVER DEVELOPMENT AND
GANGA REJUVENATION
GOVERNMENT OF INDIA
NEW DELHI - 110001

08 JUN 2017

MESSAGE

A scarce natural resource, water is fundamental to life, livelihood, food security and sustainable development. Ground water has emerged as the backbone of India's agriculture and drinking water security. Ground water levels are declining at an alarming rate due to excessive withdrawal. This situation calls for a prudent management of ground water resources of the country to ensure its sustainability. It is crucial that pragmatic ground water management decisions should be based on accurate assessment of the resources. Dynamic ground water resources are the measure of the replenishable ground water resources, its availability and utilization.

The dynamic ground water resources of India are assessed periodically by State Governments in association with Central Ground Water Board. The assessment of the resources forms the basis for categorization of different administrative units in the country as Safe, Semi-Critical, Critical, Over Exploited categories. The management and regulation of the ground water resources is dependent on this categorization.

I am hopeful that this report will warrant proper management of the ground water resources in the country and enlighten general public and stakeholders by providing authentic data on ground water resources. This may in turn motivate everyone to make optimum use of this resource for a balanced present and future.

(UMA BHARTI)

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भारत सरकार
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MINISTER OF STATE FOR WATER RESOURCES
RIVER DEVELOPMENT AND
GANGA REJUVENATION
GOVERNMENT OF INDIA
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Message

India with a geographical area of nearly 3.3 million square kilometers is home to 16% of the population of the world whereas it has only 4% of the total freshwater resources of the world. Moreover there is huge inequality in the distribution of water resources within the country. Ground water which is the primary source of drinking water in the country is also unevenly distributed. Nearly 70% of the ground water resources are confined to the Indo-Ganga Brahmaputra plains covering only 30% of the geographical area. In this scenario, the proper management and development of ground water resources assumes utmost importance.

Management of ground water resources requires a structured approach starting its usage monitoring of estimating the resources, monitoring of water levels and quality, analysing hazards to ground water regime and developing management strategies for their control.

The periodic estimation of dynamic ground water resources is a significant step in this direction. Central Ground Water Board (CGWB) and State Ground water Departments jointly carry out periodic assessment of ground water resources of the entire country. These assessments form the basis for planning ground water management interventions inter-alia artificial recharge, regulation of ground water use .The assessment report 'Dynamic Ground Water Resources of India (as on 31st March, 2013)' is the latest version of the state-wise resources.

I laud the efforts of CGWB and State Ground Water Departments in bringing out the report. I firmly believe that the report would serve as an excellent source material for all stakeholders involved in ground water management.

(Dr. Sanjeev Kumar Balyan)

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Vijay Goel

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GOVERNMENT OF INDIA

MESSAGE

Ground water resources play a vital role in sustaining the livelihood of many countries in the world. Its ubiquitous occurrence, reliability and availability in all seasons have made it the primary buffer against drought playing a pivotal role in ensuring the food security at all levels. The importance of ground water as a precious natural resource is evident from its contribution in meeting the water requirements of agriculture, industrial and domestic sectors in India. The increasing dependence on ground water as a reliable source of water has resulted in its large scale and often indiscriminate development in various parts of the country without due regard to the recharging of aquifers and other environmental factors.

The periodic ground water resource assessment carried out jointly by the State Ground Water Departments and the Central Ground Water Board brings out the level of stress on the available resources in various parts of the country. On the basis of ground water resource assessment, the various administrative units are categorized as safe, semi-critical, critical and over-exploited.

The assessment of ground water resources involves processing of huge amount of data generated by the Ground Water Departments at the State and Centre. The efforts made by the Central Ground Water Board and State Departments in bringing out this Report is highly commendable. I am confident that this Report will prove beneficial to all the stakeholders and general public.

(Vijay Goel)

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Foreword

Water is indispensable for life, but its availability and sustainability is not uniform in the country. Groundwater is an integral part of the hydrological cycle and is a valuable natural resource and primary source of water for agriculture, domestic, and industrial uses. The uncontrolled withdrawal of the resource for meeting the increased demands for agriculture, industries and domestic use has resulted in depletion of the groundwater. It is essential that groundwater be used and managed in a sustainable way in order to maintain present and future demands.

The groundwater resources of India are assessed following a well defined Groundwater Estimation Methodology, 1997. The assessment is carried out jointly by CGWB and State Groundwater Departments at periodical intervals under the overall guidance of Central Level Expert Group. The report 'Dynamic Groundwater Resources of India (as on 31st March 2013)' is a compilation of State-wise assessment.

I appreciate the work done by Central Ground Water Board in bringing out this publication on the status of ground water resources, availability and utilization in the country. The excessive development of ground water to meet the water demand is reflected in many parts of the country as declining water levels and deteriorating ground water quality. I am sure this report would provide greater opportunity to the administrators, planners and stakeholders for better groundwater management and regulation.

(Amarjit Singh)

Chairman
Central Ground Water Board
Ministry of Water Resources,
River Development & Ganga Rejuvenation
Government of India
Faridabad

Preface

Water is essential for life. Sustainable management of this scarce resource has become a challenge nowadays owing to increased demands of increasing population, growing urbanization and rapid industrialization combined with rising agricultural production. The assessment of ground water resources is carried out at periodic intervals to determine the ground water scenario in the country. Country wide assessment of ground water resources poses challenges in terms of data availability, acquisition and maintaining uniformity and comparability of the results. There is a strong link between the assessment and management which require continuous refinements in the ground water resources assessments.

In 2014, Ministry of Water Resources River Development & Ganga Rejuvenation, constituted a Central Level expert group for over all supervision of the re-assessment of the ground water resources of the India. The Dynamic ground water resources assessment as on 31st March 2013 has been carried out jointly by CGWB and state ground water departments following a well-defined guidelines and norms of Ground water resources estimation methodology, 1997. On the basis of these assessments, the administrative units such as Blocks/ Firkas/Mandals etc. are categorized as Safe, Semi-Critical, Critical and Over Exploited.

It is with this base, the present report was compiled. I extend my gratitude to Ms. Parveen Kaur, Scientist-B for her sincere efforts in compilation of this report. Assessment of ground water resources is essential for planning and management of ground water resources. I am sure this report will be very beneficial for the administrators, managers and stakeholders on various aspects of ground water.

DYNAMIC GROUND WATER RESOURCES OF INDIA

(As on 31st March, 2013)

AT A GLANCE

1.	Total Annual Replenishable Ground Water Resources	447 bcm
2.	Net Annual Ground Water Availability	411 bcm
3.	Annual Ground Water Draft	253 bcm
4.	Stage of Ground Water Development	62%

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

	Total No. of Assessed Units	6584
1.	Safe	4520
2.	Semi Critical	681
3.	Critical	253
4.	Over-Exploited	1034
5.	Saline	96

DYNAMIC GROUND WATER RESOURCES OF INDIA
(As on 31st March, 2013)

CONTENTS

EXECUTIVE 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 and 2011.

The assessment involves estimation of dynamic ground water resources or annual replenishable ground water resources (recharge), annual ground water draft (utilization) and the percentage of utilization with respect to recharge (stage of development). The assessment units (blocks/watersheds/mandals/talukas/firkas) are categorized based on stage of ground water development and long term water level trends. These assessments are carried out following the Ground Water Resources Estimation Methodology,1997 (GEC'97), with additional inputs from Ground water Estimation Methodology in Hard Rock Terrain (2004) and R & D Advisory Committee on Ground water estimation (2010).

The main source of replenishable ground water resources is recharge through rainfall which contributes to nearly 67% of the total annual replenishable resources. India receives about 120 cm of rain in a year.Most part of India receives rainfall mainly during SW monsoon. Major part of country including Northern, Central and Eastern India receives annual normal rainfall between 75 and 150 cm. Highest rainfall of more than 250 cm is recorded in the North Eastern States and along West Coast in the Konkan region whereas western Rajasthan receives about 30 cm of rainfall in an year.Monsoon (SW) rainfall in the year 2012 over the country, as a whole, was near normal. However, there was a marked spatial and temporal variability as the central and eastern/north-eastern parts of the country received normal rainfall while parts of south peninsula, western and some northern parts of the country received deficient rainfall. Rainfall deficiency over some meteorological subdivisions viz. West Uttar Pradesh, Haryana, Chandigarh & Delhi, Punjab, Gujarat Region, Saurashtra& Kutch, Madhya Maharashtra, Marathwada, North Interior Karnataka and Nagaland, Manipur, Mizoram & Tripura exceeded 25%.

The properties of rock formations have 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, which occupy almost two-third part of the country including peninsular India, on the other hand,are limited to weathered, jointed and fractured portions of the rocks.

The annual replenishable ground water resources have been assessed as 447 bcm. Keeping an allocation for natural discharge, the net annual ground water availability is 411 bcm. The annual ground water draft (as on 31st March, 2013) is 253 bcm. The average stage of ground water development for the country as a whole works out to be about 62%. The development of ground water in different areas of the country has not been uniform. Out of 6584 assessment units (Blocks/ Mandals/ Talukas/Firkas) in the country, 1034 units in various States have been categorized as 'Over-exploited' i.e. the annual ground water extraction exceeds the net annual ground water availability and significant decline in long term ground water level trend has been observed either in pre- monsoon or post- monsoon or both. In addition, 253 units are ‘Critical’ i.e. the stage of ground water development is above 90% and within 100% of net annual ground water availability and significant decline is observed in the long term water level trend in both pre-monsoon and post-monsoon periods. There are 681semi-critical units, where the stage of ground water development is between 70% and 100% and significant decline in long term water level trend has been recorded in either Pre-monsoon or Post-monsoon.4520 assessment units are Safe where there is no decline in long term ground water level trend. Apart from this, there are 96 assessment units, which has been categorised as ‘saline’ as major part of the ground water in phreatic aquifers isbrackish or saline.

There is no change in the overall stage of ground water development from 2011 to 2013. The over-exploited areas are mostly concentrated in three parts of the country:(i) north-western part of the country including parts of Punjab, Haryana, Delhi and Western Uttar Pradesh where though replenishable resources is abundant, there have been indiscriminate withdrawals of ground water leading to over-exploitation; (ii) 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) southern part of peninsular India including parts of Karnataka, Andhra Pradesh, Telangana and Tamil Nadu where due to poor aquifer properties, 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. Some of the suggestions to bring in further refinements in the ground water resources assessment are: (i) aquifer wise resources assessment, (ii) detailed aquifer characterization and parameter estimation; (iii) ground water assessment on a smaller assessment unit for better management of the resources; (iv) water balance studies taking into consideration all the hydro-meteorological components of the hydrological cycle; (v) refinement of factors and parameters for ground water resources assessment; (vi) site specific studies on quantitative evaluation of ground water management interventions and consequent changes in ground water assessment.

1

INTRODUCTION

Water is essential for life, living and livelihood. Sustainable development and efficient management of water is an increasingly complex challenge in India. Increasing population, growing urbanization and rapid industrialization combined with the need for raising agricultural production generates competing demandsfor 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. Technically, dynamic ground water refers to the quantity of ground water available in the zone of water level fluctuation, which is replenished annually. Hence, the sustainable development of ground water resources warrants precise 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, the National Water Policy, 2012 advocates direct use of rainfall, desalination and avoidance of inadvertent evapotranspiration for augmenting utilizable water resources. It also states that 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 ecosystem needs. Available water, after meeting the above needs should be allocated in a manner to promote its conservation and efficient use.

1.1Previous 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 67 M.ham and the utilizable ground water was worked out to be 35 M.ham, out of which 26 M.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 47 M.ham and the Net Recharge as 32 M.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. The ground water resource available for irrigation purpose was about 361 billion cubic meter. The Net Ground Water Draft from Irrigation uses was around 115 billion cubic meters 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 has been suggested, more commonly referred as GEC'97. While estimating the ground water resources in the hard rock terrains some limitations have been 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 and 2011 as base years. In 2004, the Annual Replenishable Ground Water Resources was 433 billion cubic meter (bcm). Keeping an allocation for Natural Discharge, the net annual ground water availability was 399 bcm and the annual ground water draft for all uses was of the order of 231bcm. The overall stage of ground water development for the entire country was 58%. In 2009, the annual replenishable ground water resources were 431 bcm. The net annual ground water availability of the country has been assessed as 396 bcm after deducting 35 bcm for natural discharge. Annual ground water draft of the country in 2009 was estimated as 243 bcm. The stage of ground water development for the entire country has been computed as 61%. In 2011, the annual replenishable ground water resources were 433 bcm. The net annual ground water availability of the country was assessed as 398 bcm after deducting 35 bcm for natural discharge. The annual ground water draft of the country as on March, 2011 was 245 bcm. The stage of ground water development for the entire country was computed as 62%. In

2011, assessment was carried out for 6607 assessment units (districts/blocks/mandals/taluks/firkas/valleys) in the country, out of which 1071 were categorized as 'Over-exploited', 217 as 'Critical', 697 as 'Semi-critical' units and 4530 as 'Safe' and 92 assessment units were categorized as 'Saline'.

1.2 Ground Water Assessment and Management Initiatives

The findings of the ground water resources assessment guide the planners and stakeholders to take appropriate management measures for optimal utilization and sustainability of the resource. 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.

A conceptual document entitled "Master Plan for Artificial Recharge to Ground water in India" has been prepared by CGWB. It envisages construction of 11 million Artificial Recharge structures of different types in urban and rural areas of the Country. 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 rain water harvesting. For regulation of groundwater extraction, certain groundwater stressed areas have also been 'notified' by the Central Ground Water Authority (CGWA).CGWB has initiated National Aquifer Mapping & Management Programme (NAQUIM) which envisages formulation of Aquifer Management Plans to ensure sustainability of the resources. Several State Govts 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 MNREGA. 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 to above, many efforts involving the direct stakeholders have yielded promising results. Community management of ground water resources has been quite effective in certain areas in the country. Some of the success stories are: 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), Water Conservation measures and efficient water use practices in Gujarat etc.

1.3 Re-assessment of Ground Water Resources (As on 31stMarch 2013)

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 resource. In 2014, 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 2013. The copy of the Government Resolution is given as **Appendix A.**

The ground water resources assessment for reference year 2013 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 **(Appendix B).** Central Level Expert Group provided the technical guidance in this regard. Based on the assessments provided by the respective State Level Committees, the National Level Report has been compiled. The report provides summary and analysis of groundwater resources in different States. The report was reviewed and deliberated upon during the meetings of CLEG held on 15.07.2016 and 23.08.2016, where it was approved. Minutes of the meetings and list of the participants who attended the meetings are given in **Appendix C and D.**

2

GROUND WATER RESOURCES ESTIMATION METHODOLOGY

Ground water resources of the country have been estimated based on the guidelines and recommendations of the Ground water estimation committee 1997(GEC-97). Previous such exercises on assessment of ground water resources of country have been carried out in 2004, 2009 and 2011 as per GEC-97 norms. The salient features of the methodology are given below.

Ground water resources are estimated assessment unit wise. The assessment unit is watershed in the states occupied predominantly with hard rocks. This is because the ground water balance equations recommended in GEC-1997 can be better applied in the assessment units with hydrologic/ hydrogeological boundaries. However, in the states covered predominantly with alluvium and/ or soft rocks, administrative blocks are chosen as assessment unit since in alluvial areas, it is difficult to identify watershed considering the possibility of trans-boundary aquifer system. Within the assessment areas, the hilly areas (slope greater than 20%) are to be excluded as these are not likely to contribute to ground water recharge. The assessment units are to be divided into command and non-command areas for the purpose of computation of ground water resources. The ground water resources in the poor quality (saline) areas are to be computed separately (Ministry of Water Resources, 1997).

The ground water recharge is estimated season-wise both for monsoon season and non-monsoon season separately. The following recharge and discharge components are assessed in the resource assessment - recharge from rainfall, recharge from canal, return flow from irrigation, recharge from tanks & ponds and recharge from water conservations structures and discharge through ground water draft.

2.1 Assessment of Ground Water Draft

Ground water draft is estimated seasonally. The most commonly used method for computation of irrigation draft is – number of abstraction structures multiplied by the unit seasonal draft. Alternative methods like area irrigated by ground water and the associated crop water requirements are also recommended for assessment of ground water draft for irrigation. Ground water draft for Domestic & Industrial needs is computed using unit draft method and based on consumptive use pattern of the population.

2.2 Assessment of Ground Water Recharge from Other sources

Ground water recharge due to return flow from irrigation, seepage from canals, recharge from tanks and ponds and recharge from water conservation structures are to be estimated separately for both monsoon and non-monsoon seasons based on the recommended norms as given in **Table 2.1**.

Table 2.1 Recommended norms for the Assessment of Recharges from Other Sources

Parameters	**Sources of Recharge**	**Range of Parameters**
Canal seepage factor	Unlined canals	15 to 30 ham/day/million sq.m. of wetted area
	Lined canals & canals in hard rock terrain	20% of above value suggested for unlined canals
Return flow factor	Surface water Irrigation	0.10 – 0.50
	Ground water Irrigation	0.05 – 0.45
Seepage from tanks and ponds	1.4 mm/day over the average water spread area	
Water conservation structures	50% of the Gross Storage. Out of this, 50% is during monsoon season and the remaining 50% during non-monsoon season	

(Source: Ministry of Water Resources, 1997)

2.3 Assessment of Ground Water Recharge from Rainfall

Ground water recharge from rainfall is estimated for monsoon and non-monsoon seasons separately. Rainfall recharge during monsoon season is estimated using two methods – Water level fluctuation Method and Rainfall Infiltration Factor Method.

2.3.1 Water level Fluctuation (WLF) Method

Under this method the change in storage will be computed by multiplying water level fluctuation between pre and post monsoon seasons with the area of assessment and specific yield.

Change in Storage = $\Delta S = h * Sy * A$ …….(i)

Where,

h = rise in water level due to monsoon (fluctuation between pre-monsoon and post-monsoon water level)

A = area for computation of recharge, Sy = specific yield.

The Specific yield of a soil or rock is the ratio of the volume of water that, after saturation, can be drained by gravity to its own volume (Todd & Mays, 2005). The Specific yield data were either arrived through field studies, including long-duration pumping tests and dry season groundwater balance (in hard-rock areas) or adopted from the norms recommended by GEC-1997, which were derived from the various water-balance studies carried out by CGWB, SGWDs and academic/research institutions. The range of specific yield considered for different formations are given in the **Table 2.2**.

Table 2.2 Specific Yields for Different Formations

Formation		Range of Specific Yield
Unconsolidated formations	Alluvium	0.04 to 0.22
Semi-consolidated formations	Sedimentary rocks	0.01 to 0.15
Consolidated formations	Crystalline and other hard rocks	0.002 to 0.04

The change in storage calculated from the above relation is the resultant of the recharge from rainfall and other sources during the monsoon period and the gross ground water draft during monsoon season. In order to segregate the rainfall recharge during monsoon season, the following equation is used –

$$Rrf = h \times Sy \times A + DG - Rc - Rsw - Rt - Rgw - Rwc \quad \text{………(ii)}$$

Where,

DG = Gross ground water draft for all uses during monsoon season

Rc = recharge due to seepage from canals during monsoon season

Rsw = recharge from surface water irrigation during monsoon season

Rt = recharge from tanks and ponds during monsoon season

Rgw = recharge from ground water irrigation during monsoon season

Rwc = recharge from water conservation structures during monsoon season

The rainfall recharge thus calculated is normalized for the normal monsoon season rainfall.

2.3.2 Rainfall Infiltration Factor (RIF) Method

The other method for assessment of rainfall recharge is using Rainfall infiltration factor. The recharge from rainfall is to be estimated as given below

$$R_{rf} = f * A * \text{normal monsoon rainfall} \quad \text{………..(iii)}$$

Where;

f = rainfall infiltration factor

A = area

The same Rainfall Infiltration Factor should be used for computation of recharge due to rainfall during monsoon and non-monsoon seasons.

The norms adopted for computation of recharge from rainfall is given in **Table 2.3**.

Table 2.3 Rainfall Infiltration Factor for different formations

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

(Source: Ministry of Water Resources, 1997)

The rainfall recharge computed by WLF method is to be compared with recharge computed by RIF method. In case the difference between the two sets of data are more than 20%, then rationalized RIF figure is to be considered, otherwise monsoon recharge using WLF method is to be considered. Whenever the percent difference is less than - 20%, 80 % of the recharge computed by RIF method is to be used and wherever, the percent difference is more than + 20 %, 120 % of recharge computed by RIF method is to be taken.

2.4 Ground Water Recharge during Monsoon Season

The total recharge in monsoon season is the sum of the normalized rainfall recharge and the recharge from other sources as expressed in the following equation –

R(normal) = Rrf (normal)+ Rc + Rsw + Rt + Rgw + Rwc ……….(iv)

Where,

R (normal) = Total recharge during monsoon season

Rrf (normal) = Rainfall recharge during monsoon season for normal monsoon season rainfall

2.5 Ground Water Recharge during Non-Monsoon Season

Similar expression as given in equation (iv) above is used for recharge during non-monsoon season wherein all the recharge components including rainfall recharge and recharge from other sources during non-monsoon season are computed. Only difference is that rainfall recharge during non-monsoon is computed using RIF method only. If the rainfall during non-monsoon period is less than 10% of the annual rainfall, the recharge due to rainfall is taken as zero. The total recharge during non monsoon is the sum of recharge from rainfall and recharge from other sources.

2.6 Annual Replenishable Ground Water Resources

The Annual Replenishable Ground Water Resources of the area is the sum of recharge during monsoon and non monsoon seasons. An allowance is kept for natural discharge during non monsoon season by deducting 5% of Annual Replenishable Ground Water Resource, wherever WLF method is employed to compute rainfall recharge during monsoon season and 10% if RIF method is used.

2.7 Net Annual Ground Water Availability

The Net annual ground water availability is the available resource after deducting the natural discharges from the Annual Replenishable Ground Water Resource and is expressed as:-

Net Annual Ground Water Availability =Annual Replenishable Ground Water Resource – Natural Discharge during non monsoon season …………… (v)

2.8 Future Utilization of Ground Water Resources

The projected demand for domestic and industrial water supply is kept based on projected population for the year 2025 and present dependency on ground water. The ground water available for future irrigation is obtained by deducting the sum of projected demand for Domestic and Industrial use and existing gross irrigation draft from the Net Annual Ground Water Availability. In order to rationalize the projected demand of ground water resources in over-exploited areas, following procedure is adopted:

- Case I, when GWav ≥ Dgi+ Alld
  In such cases projected demand for future domestic and industrial uses = Alld
- Case II, when GWav < Dgi+ Alld
  In such cases, projected demand for future domestic and industrial uses = (GWav – Dgi) or Dgd, whichever is more.

Where,

GWav = Net Annual Ground Water Availability

Dgi = Existing Ground Water draft for Irrigation

Dgd = Existing Ground Water draft for Domestic use

Dg = Existing Ground water draft for all uses

Alld = Computed value of allocation for domestic use

(Based on projected population, fractional load on ground water and per capita requirement)

2.9 Stage of Ground Water Development

The stage of Ground water Development is to be computed as given below,

$$Stage\ Of\ Development = \frac{Existing\ Gross\ Draft\ For\ All\ Uses}{Net\ Annual\ Groundwater\ Availability} \times 100 \ldots\ldots\ldots\ldots\ldots (vi)$$

2.10 Categorization of Assessment Units

The assessment units are to be categorized for ground water development based on two criteria – a) stage of ground water development, and b) long-term trend of pre and post monsoon water levels. The long term ground water level trend is to be computed generally for a period of 10 years. The significant rate of water level decline has been taken between 10 and 20 cm per year depending upon the local hydrogeological conditions. There are four categories, namely – 'Safe', 'Semi-critical', 'Critical' and 'Over-exploited' areas. The criteria for categorization are given in **Table 2.4.**

Table 2.4 Criteria for Categorization of Assessment Units

Stage of Ground Water Development	**Significant Long Term Water level Decline trend**		**Category**
	Pre-Monsoon	**Post-Monsoon**	
<=90%	No	No	Safe
>70% and <=100%	No	Yes	Semi-Critical
>70% and <=100%	Yes	No	Semi-Critical
>90% and <=100%	Yes	Yes	Critical
>100%	No	Yes	Over-Exploited
>100%	Yes	No	Over-Exploited
>100%	Yes	Yes	Over-Exploited

Apart from the four categories mentioned above, blocks where the entire assessment area is having poor quality ground water are demarcated as 'Saline'.

A sample calculation of one assessment unit to illustrate the methodology for assessment of replenishable ground water resources is given in **Appendix G.**

The State Governments broadly followed the methodology outlined above while carrying out the computation of ground water resources. However, at some places, the detailed steps, norms and criteria for categorization have been modified by the States to match the prevailing ground water conditions in the field.

3

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. India receives about 120 cm of rain in a year. Most of the rainfall (about 75%) occurs during a short span of four months (June to September) that define the monsoon period leaving the remaining eight months relatively dry. Similarly, the meteorological Subdivisions like Coastal Karnataka, Konkan and Goa, North east India receive more than 250 cm of rainfall annually whereas West Rajasthan gets only about 30cm (IMD).

3.1 Rainfall Pattern

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). For the purpose of compiling the rainfall data and drawing the inferences, India is divided into 36 meteorological homogeneous regions.

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. In 2012, the annual rainfall over the country as a whole was slightly below normal (89 % of its Long Period Average (LPA) value) (IMD). Season wise rainfall distribution over the country as a whole is listed below:

Winter (January to February): 96% of LPA
Pre-monsoon (March to May): 69% of LPA
Monsoon (June to September): 93% of LPA
Post-monsoon (Oct to Dec): 79% of LPA

Sub-division wise annual rainfall statistics for the year 2012 with respect to normal rainfall (1951- 2000) is given in **Table 3.1**.

3.1.1 Annual Rainfall (2012):

Rainfall activity over the country as a whole was slightly below normal (89 % of LPA) during the year. Out of 36 meteorological subdivisions, 1 (Andaman & Nicobar Islands) received excess rainfall, 22 received normal rainfall and remaining 13 subdivisions received deficient rainfall. At the end of year, of the four homogeneous regions, central India received 93 % of its normal rainfall, Northwest and East & Northeast India each received 86% of its respective normal rainfall, while the homogeneous region of south peninsular India received only 90% of its normal rainfall.

Table 3.1. Subdivision wise Annual Rainfall statistics for the year 2012 with respect to Normal (1951-2000) in mm

Sl. No	Subdivision	Actual (2012)	Annual	% Dep
1	Andaman & Nicobar islands	3515.9	2926.3	20
2	Arunachal Pradesh	2760.9	2933.7	-6
3	Assam & Meghalaya	2321.3	2624.9	-12
4	Naga Mani Mizo & Tripura	1669.2	2278	-27
5	Sub-Him W Bengal & Sikkim	2630.2	2708.9	-3
6	Gangetic W Bengal	1258.3	1527.2	-18
7	Orissa	1430.2	1460.5	-2
8	Jharkhand	1102	1296.3	-15
9	Bihar	924.2	1205.6	-23
10	East Uttar Pradesh	853.6	1018.6	-16
11	West Uttar Pradesh	582.8	886.2	-34
12	Uttarakhand	1309.7	1580.9	-17
13	Har Delhi Chandigarh	313.6	562.8	-44
14	Punjab	338.9	635.9	-47
15	Himachal Pradesh	1035.1	1373.9	-25
16	Jammu & Kashmir	1116.5	1205.3	-7
17	West Rajasthan	318.3	299.2	6
18	East Rajasthan	695.8	671.3	4
19	West Madhya Pradesh	1012.3	956.3	6
20	East Madhya Pradesh	1097	1169.4	-6
21	Gujarat Region	652	943.4	-31
22	Saurashtra& Kutch	315.2	507	-38
23	Konkan & Goa	2993.9	3100.2	-3
24	Madhya Maharashtra	664.2	876.8	-24
25	Marathwada	538.4	821.6	-34
26	Vidarbha	1090.3	1084.5	1
27	Chhattisgarh	1366.8	1290.7	6
28	Coastal Andhra Pradesh	1183.4	1024.2	16
29	Telangana	972.8	942.6	3
30	Rayalseema	665.3	706.1	-6
31	Tamil Nadu	709.6	914.4	-22
32	Coastal Karnataka	3395	3526.3	-4
33	North Int. Karnataka	529.4	740.3	-28
34	South Int. Karnataka	832.1	1019.2	-18
35	Kerala	2187.5	2928.3	-25
36	Lakshadweep	1433.2	1600	-10

3.1.2 Winter Season (2012):

Rainfall activity over the country as a whole was normal during the season. However, it was above normal during January (141 % of LPA) and was below normal during February (58 % of LPA). Meteorological subdivisions of eastern/northeastern and extreme northern region of the country received excess/normal rainfall while, rest of the country received deficient/scanty/no rainfall. Out of 36 meteorological subdivisions, 8 received excess rainfall, 2 received normal rainfall, 12 received deficient rainfall and 11 received scanty rainfall. 3 subdivisions did not receive any rain.

3.1.3 Pre-monsoon Season (2012):

During the season, rainfall activity over the country as a whole was below normal. Except for few subdivisions of South peninsula, Rajasthan state and Arunachal Pradesh, entire country received deficient/scanty rainfall. Out of 36 meteorological subdivisions, 1 (Andaman & Nicobar Islands) received excess rainfall, 5 received normal rainfall, 20 received deficient rainfall and 10 received scanty rainfall.

Spatial distribution of sub division wise annual and seasonal rainfall with respect to normal rainfall is shown in **Fig. 3.1**.

3.1.4 Monsoon Season (2012):

The 2012 southwest monsoon season rainfall over the country as a whole was near normal. However, there was a marked spatial and temporal variability as the central and eastern/northeastern parts of the country received normal rainfall while parts of south peninsula, western and some northern parts of the country received deficient rainfall. Rainfall deficiency over some meteorological subdivisions viz. West Uttar Pradesh, Haryana, Chandigarh & Delhi, Punjab, Gujarat Region, Saurashtra & Kutch, Madhya Maharashtra, Marathwada, North Interior Karnataka and Nagaland, Manipur, Mizoram & Tripura exceeded 25 %. During the season, out of 36 meteorological subdivisions, 1 subdivision (Andaman & Nicobar Islands) received excess rainfall, 22 received normal rainfall and remaining 13 subdivisions received deficient rainfall. For the country as a whole, seasonal rainfall at the end of southwest monsoon season was 93% of its LPA value. The LPA value of southwest monsoon rainfall calculated with the data of the period 1951-2000, is 89 cm. Over the four homogeneous regions, rainfall was 92% of its LPA over Northwest India, 96% of its LPA over Central India, 90% of its LPA over south Peninsula and 91% of its LPA over East & Northeast India.

Daily area weighted rainfall (mm) over the country as a whole during the monsoon season 2012 (1 Jun. to 30 Sep.) and its long term normal are shown in **Fig 3.2**. For the country as a whole, rainfall averaged was generally below normal on most of the days during the first two months of the season and above or near normal on most of the days during the next two months. During June, daily rainfall was even less than half of its normal value on many occasions, during July also it was below normal at a stretch from 1-5 and 17-24 July and again during last week of September it was below normal. However, on some occasions during September it was nearly twice its normal value.

3.1.4 Post-monsoon Season (2012):

During the season, rainfall activity over the country as a whole was generally subdued. Many subdivisions of the country received deficient/scanty rainfall. However, some subdivisions of the peninsula and eastern region received normal to excess rainfall. Rainfall activity over the core region of south peninsula (northeast monsoon region, comprising of 5 subdivisions viz. Coastal Andhra Pradesh, Rayalaseema, Tamil Nadu & Pondicherry, South Interior Karnataka and Kerala) during the season as a whole was near normal (93% of LPA). Out of the above five subdivisions, Coastal Andhra Pradesh received excess rainfall, Rayalaseema and Tamil Nadu & Puducherry received normal rainfall, while South Interior Karnataka and Kerala received deficient rainfall. Out of 36 meteorological subdivisions, 2 subdivisions (Coastal Andhra Pradesh and Telangana) received excess rainfall, 13 received normal rainfall, 9 received deficient rainfall and 12 received scanty rainfall.

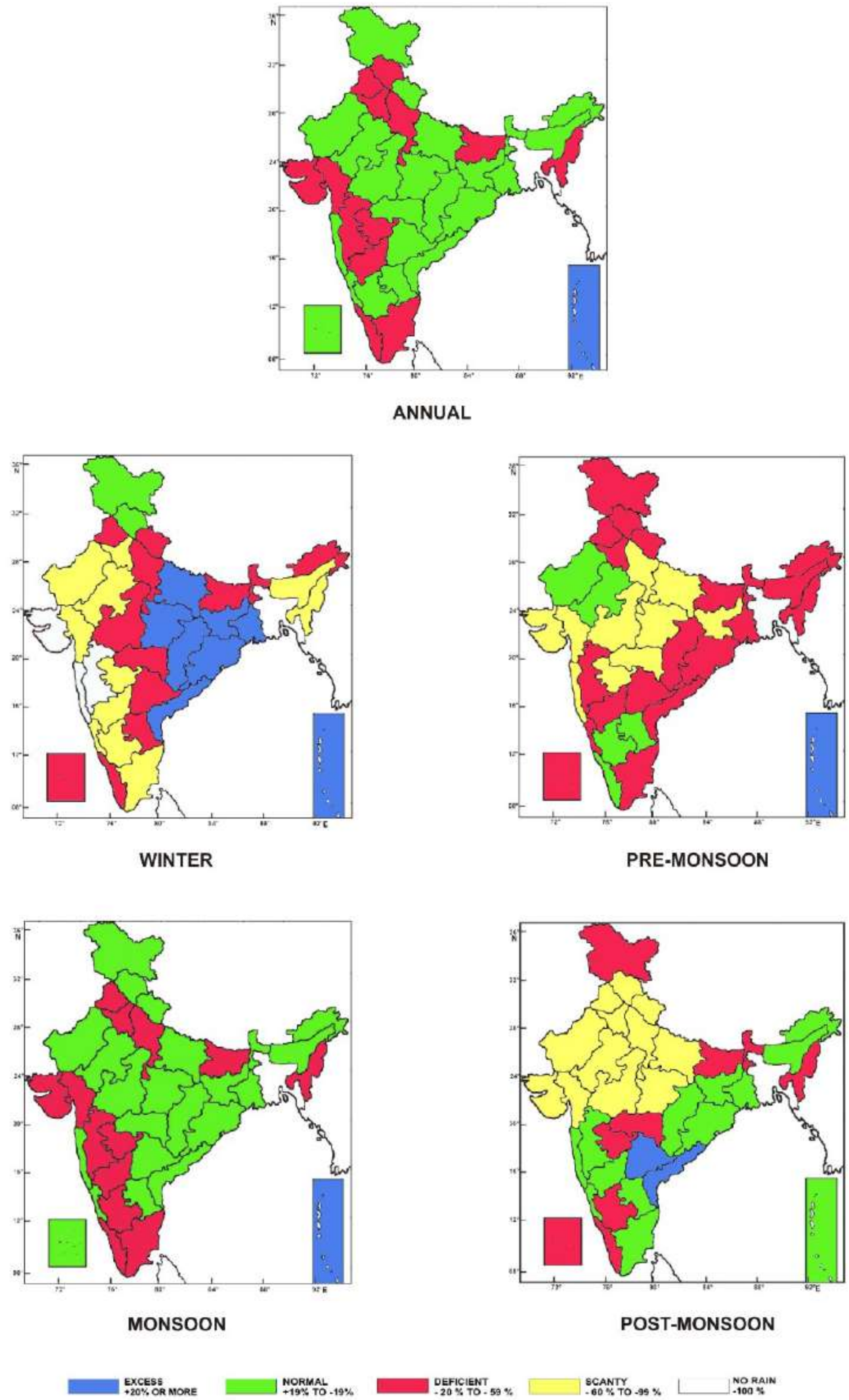


Fig 3.1. Subdivision wise annual and seasonal rainfall in 2012 percentage departures

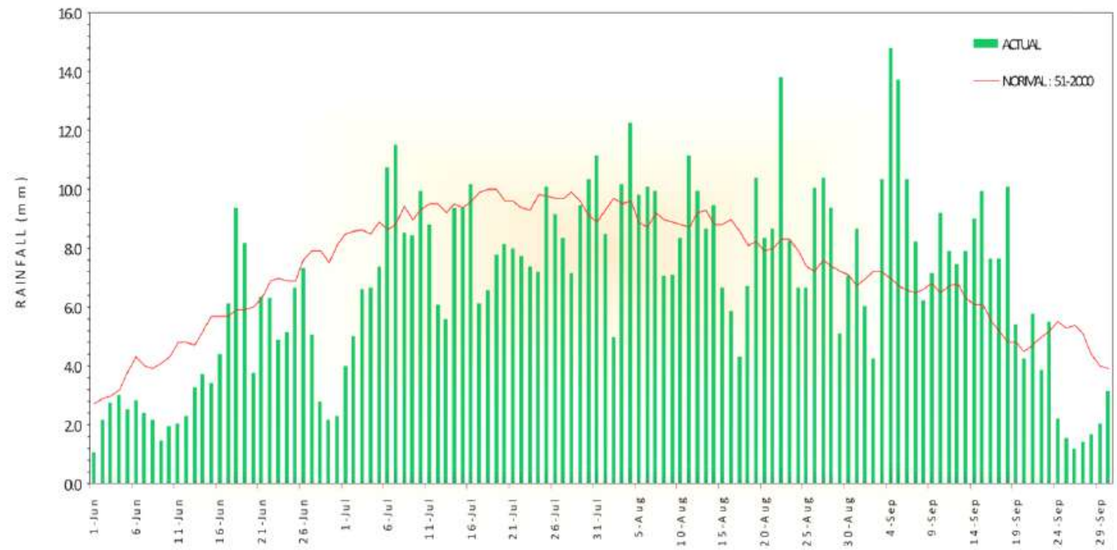


Fig 3.2. Daily Area Weighted Rainfall (mm) over the country as a whole (Vertical Bars) and its Long term (1951-2000) average (continuous line) for the period 1st June-30th September, 2012

3.2 Year wise Monsoon Rainfall Distribution (2011-2013)

Perusal of Monsoon rainfall maps of 2011, 2012 and 2013 **(Fig. 3.3)** indicates that in 2011 the rainfall has been normal. The West & East Rajasthan, West MP, Saurashtra, Kutch, Diu, Konkan, Goa and coastal Karnataka received excessive rainfall whereas Arunachal Pradesh, Assam and NMMT received deficient rainfall. Remaining part of country received normal rainfall. However, in 2012, 13 subdivisions mostly from western and South Western part of the country received deficient rainfall. This includes Saurashtra & Kutch, Gujarat Region, DNH & Daman, Marathwada, Madhya Maharashtra, NI Karnataka, SI Karnataka, Tamil Nadu & Puducherry and Kerala. In the north, Deficient monsoon rainfall has been reported from Punjab, Chandigarh, Delhi and West U.P. Bihar and NMMT also received deficient rainfall during 2012.

In 2013, 14 subdivisions received excess rainfall, this includes Jammu & Kashmir, West Rajasthan, East Rajasthan, Saurashtra& Kutch and Diu, Gujarat Region DNH and Daman, West M.P., East M.P Vidarbha, Telangana, Madhya Maharashtra, Konkan& Goa, SI Karnataka, Kerala and Andaman & Nicobar. Six subdivisions including Chandigarh, Bihar, Jharkhand, Arunachal Pradesh, Assam & Meghalaya and NMMT Received deficient rainfall. Rest of the 16 subdivisions received normal rainfall.

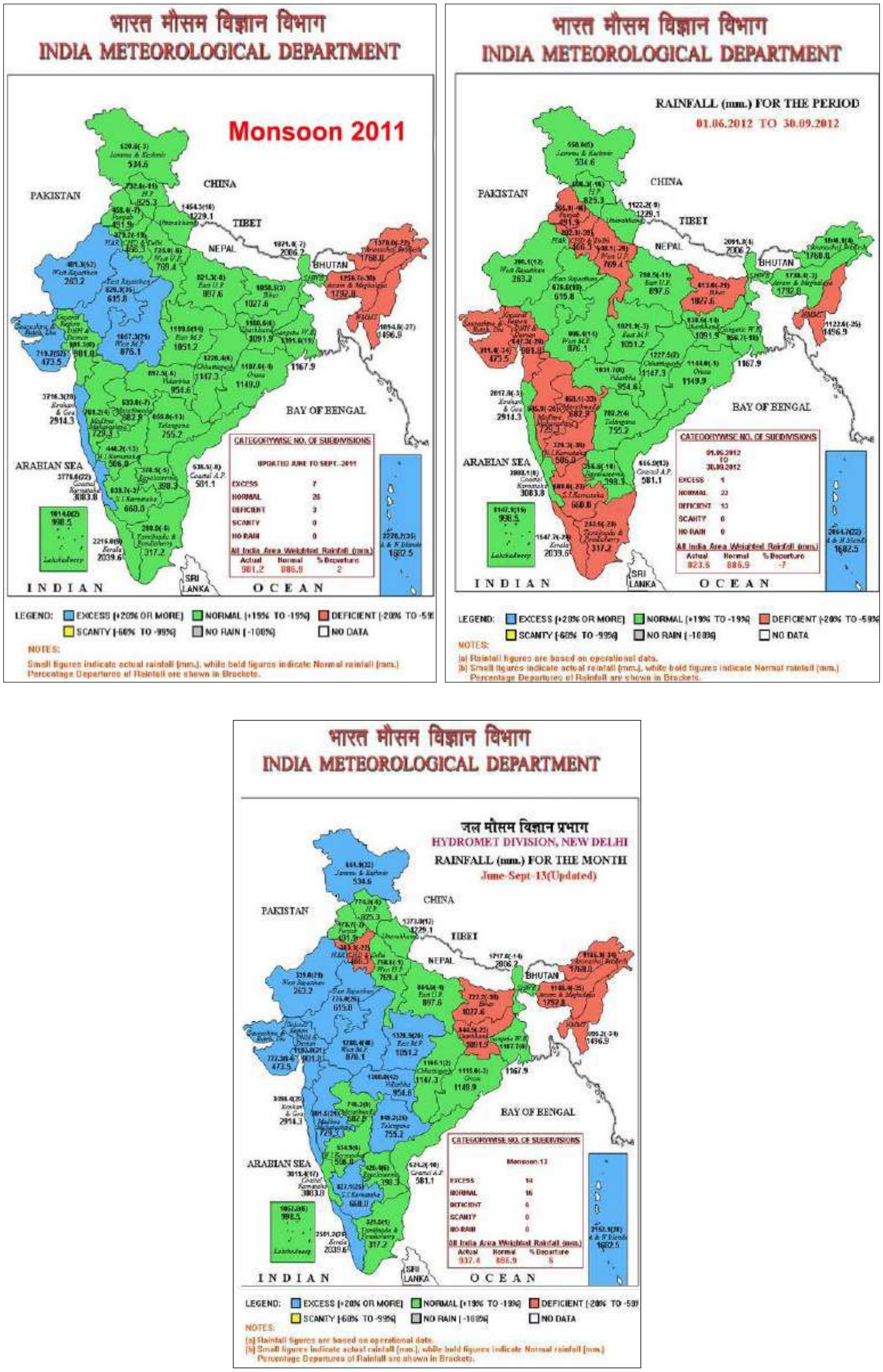


Fig. 3.3 Monsoon Rainfall Maps of India from 2011 to 2013

Normal Annual rainfall (1951 to 2000) for each Meteorological Sub Division is shown in **Fig. 3.4** The map of normal annual rainfall, shows that the highest rainfall of more than 300 cm is received in a narrow strip along West Coast in the Konkan region and coastal Karnataka. The major part of country including Northern, Central and Eastern India receives rainfall between 100 and 200 cm. Western part of Rajasthan receives the lowest rainfall in the country of about 25 cm in an year.

Fig 3.4. Normal Annual rainfall (1951 to 2000) for each Meteorological Sub Division

4

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 central part of the country 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 forms 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 rocks comprising Recent Alluvium, Older Alluvium, Aeolian Alluvium (Silt/ Sand) and Coastal Alluvium of Bay of Bengal are by and large important unconsolidated formations comprising 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, which is nearly unexplored. 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 Sandstone, 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 Limestone aquifers

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.

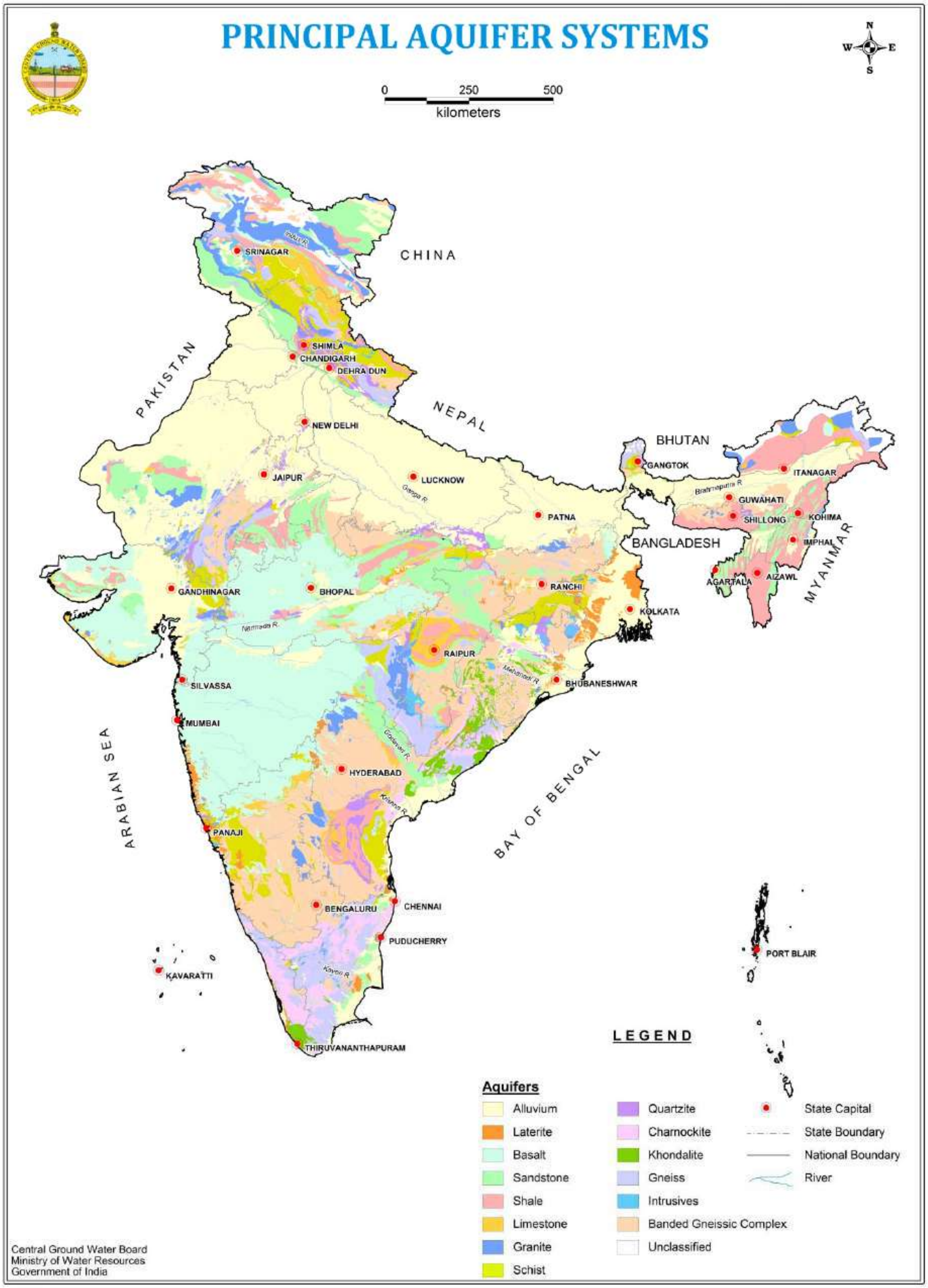


Fig 4.1 Principal Aquifer Systems of India

5

GROUND WATER 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 observation wells spread 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 of recharge and discharge parameters with reference to geology, climate, physiography, land use pattern and hydrologic characteristics. Natural conditions affecting the regime include climatic parameters like rainfall, evapotranspiration etc., whereas 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 (2012)

Depth to water level map of India for the pre-monsoon 2012 **(Fig 5.1)** indicates that shallow water levels, in the range of 2-5 m below ground level (bgl), are mostly reported from parts of sub-himalayan area (north of river Ganges), major part of Brahmaputra valley and parts of eastern coast (Odisha, Andhra Pradesh and Tamil Nadu states). Isolated pockets of shallow water level of less than 2 m bgl have been observed in western Maharashtra, coastal area of Odisha and Andhra Pradesh state. In major parts of north-western states, depth to water level generally ranges from 10-20 m bgl. In the western parts of the country, deeper water level is recorded in the depth range of 20-40 m bgl. In North Gujarat, parts of Haryana and western Rajasthan water level more than 40 m bgl have been recorded. In the western coast part of the country, water level is generally less than 10 m. In eastern states, water level in general ranges from 2-10 m bgl. North-South central part of West Bengal state recorded water level in the range of 10-20 m bgl. In north central India water level generally varies between 10-20 m bgl, except in isolated pockets where water level less than 10 m bgl has been observed. The peninsular part of country generally recorded a water level in the range 5-10 m bgl and 10-20 m bgl depth range.

The post monsoon (November-2012) depth to water level map **(Fig 5.2)** indicates that in Sub-Himalayan area, north of river Ganges, eastern coast of Odisha, Andhra Pradesh, Kerala, Gujarat, Maharashtra, Chhattisgarh, Madhya Pradesh, Bihar, Jharkhand, entire northeast and Coastal Tamil Nadu states, the depth to water level generally varies from 2-5 m bgl. Shallow water level less than 2 m bgl have been observed in west Maharashtra, Assam, North Bihar, Odisha and coastal area of Andhra Pradesh and Tamil Nadu states. In major parts of north-western states, depth to water level generally ranges from 10-20 m bgl. In the western parts of the country, deeper water level has been recorded in the depth range of 20-40 m bgl and more than 40 m bgl. In North Gujarat, part of Haryana and western Rajasthan, water level more than 40 m bgl has been recorded. In the west coast water level is generally less than 5 m and in western parts of Maharashtra State, isolated pockets of water level less than 2 mbgl has also been observed. In the east coast i.e. coastal Andhra Pradesh, shallow water level of less than 2 m have been recorded. In eastern states, water level in general ranges from 2-5 m bgl. However, south-eastern part of West Bengal has water level in the range of 10-20 m bgl and 5-10 m bgl. In southern India, water level generally varies between 5-10 m bgl, except in isolated pockets where water level more than 10 m bgl has also been observed.

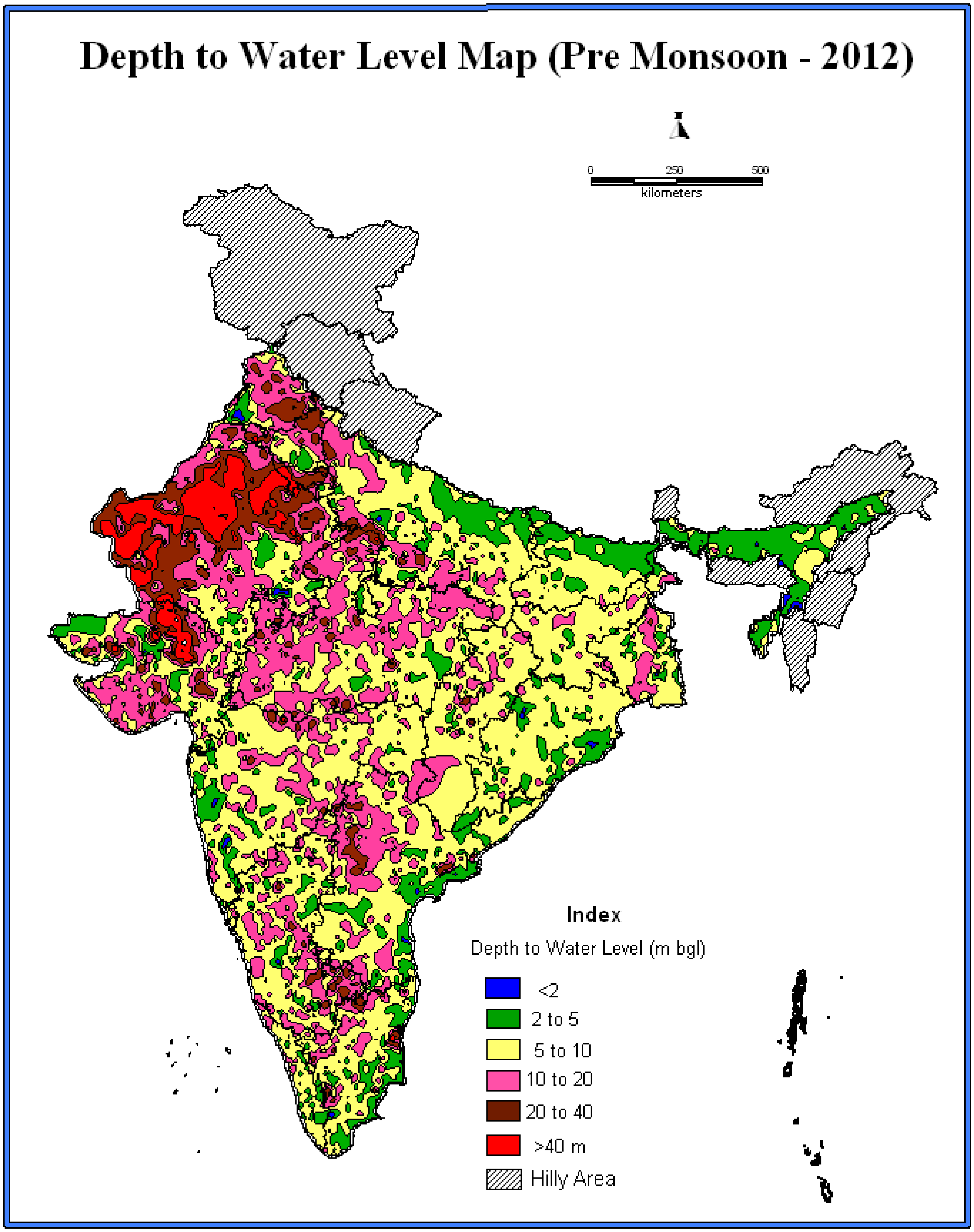


Fig. 5.1 Pre-monsoon Depth to water level Map, 2012

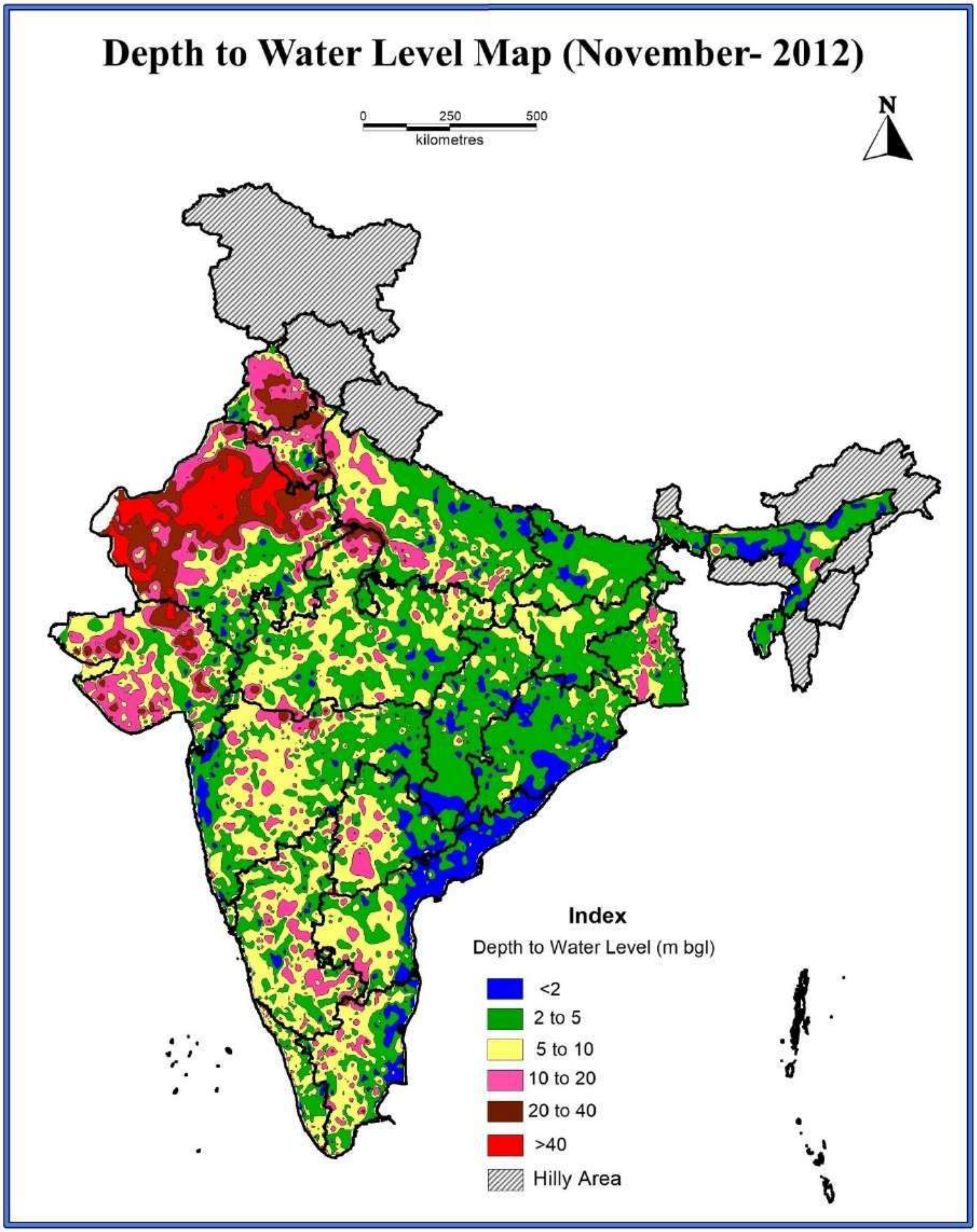


Fig. 5.2 Post-monsoon Depth to water level Map, 2012

6

GROUND WATER RESOURCES OF INDIA

Dynamic ground water resources (as on 31st March 2013) 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 Replenishable Ground Water Resources, since it gets replenished/recharged every year. Methodology adopted for the assessments has been outlined in Chapter 2 of this report. This section provides a summary of the ground water resources of the country.

6.1 Dynamic Fresh Ground Water Resources

Annual Replenishable Ground Water Resource for the entire country has been assessed as 447 billion cubic meter (bcm). Keeping 36 bcm for natural discharge, the Net Annual Ground Water Availability for the entire country is 411 bcm.

Major source of ground water recharge is the monsoon rainfall. About 58% of the annual replenishable resource i.e. 260 bcm is contributed by recharge from monsoon rainfall (Fig.6.1). The overall contribution of rainfall (both monsoon & non monsoon) to country's Annual Replenishable Ground water Resources 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 Replenishable Ground Water Resource from rainfall during monsoon season is more than 70% in the states of Arunachal Pradesh, Chhattisgarh, Himachal Pradesh, Jharkhand, Kerala, Madhya Pradesh, Meghalaya, Rajasthan, Andaman & Nicobar, Chandigarh, Dadra & Nagar Haveli and Daman & Diu. In the states of Jammu & Kashmir, Punjab, Tamil Nadu and Puducherry the contribution in annual ground water resources from other sources during monsoon season is more than 30% (Fig 6.2).

State-wise Ground Water Resources of India (as on 31st March 2013) are given in **Annexure I** and the district-wise figures are given in **Annexure II**. The over-all scenario of ground water resource availability and utilization 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. For comparison of ground water resource of different assessment units the volumetric estimates of annual replenishable ground water resources have been converted to depth units (m) by dividing the annual replenishable resources by the area of the respective assessment units. Spatial variation in annual replenishable ground water resources (m) is shown in **Fig 6.3.** Replenishable Groundwater resource 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 Replenishable Ground Water Resource in these regions varies from 0.25 to more than 0.5 m. The coastal alluvial belt particularly Eastern Coast also has relatively high replenishable ground water resources, in the range 0.25 to more than 0.5 m. In western India, particularly Rajasthan and parts of northern Gujarat which have arid climate, the annual replenishable ground water resources are scanty, mostly up to 0.025 m. Similarly, in major parts of the southern peninsula covered with hard rock terrains, annual replenishable ground water recharge is mostly limited to 0.10 m. 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.The overall estimate of annual replenishable ground water resources of the entire country shows an increase of 14 bcm in the present estimate as compared to the previous assessment i.e. 2011. The Annual Ground water draft for irrigation, domestic and Industrial uses has also increased by 8 bcm. The main reasons for these variations can be attributed to changes in rainfall pattern, changing ground water regime and refinement in database.

6.2 Ground Water Utilization

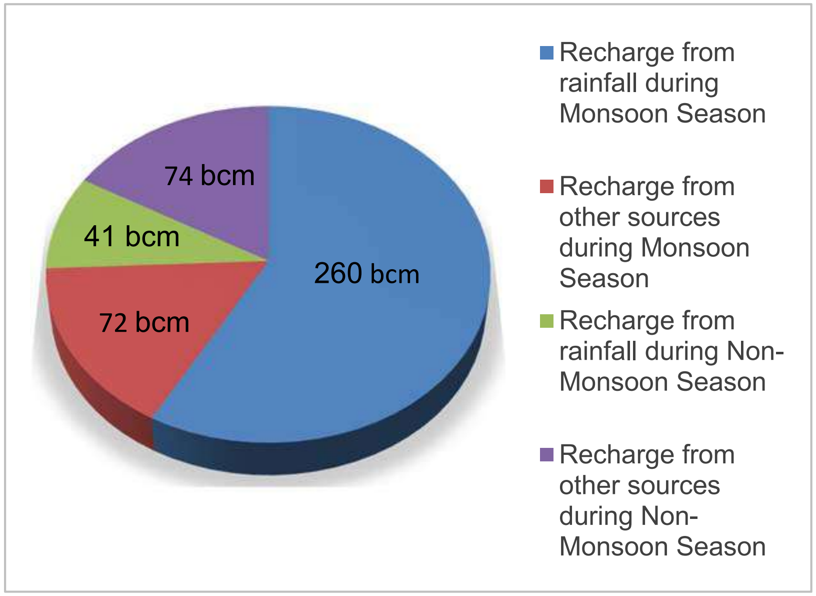
The assessment of ground water draft has been carried out considering the Minor Irrigation Census data and sample surveys carried out by the State Ground Water Departments. The Annual Ground Water Draft of the entire country for the reference year 2013 has been estimated as 253 bcm. Agriculture sector remained the predominant consumer of ground water resources. About 90% of total annual ground water draft i.e. 228 bcm is for irrigation use. Only 25 bcm is for Domestic & Industrial use which is about 10% of the total draft. In the states of Arunachal Pradesh, Delhi, Goa, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala and, Manipur, Mizoram, Nagaland and Tripura and Union Territories of Andaman & Nicobar Island, Dadra & Nagar Haveli, and Daman & Diu, the ground water draft for domestic & industrial purposes is more than 20% **(Fig 6.4).**

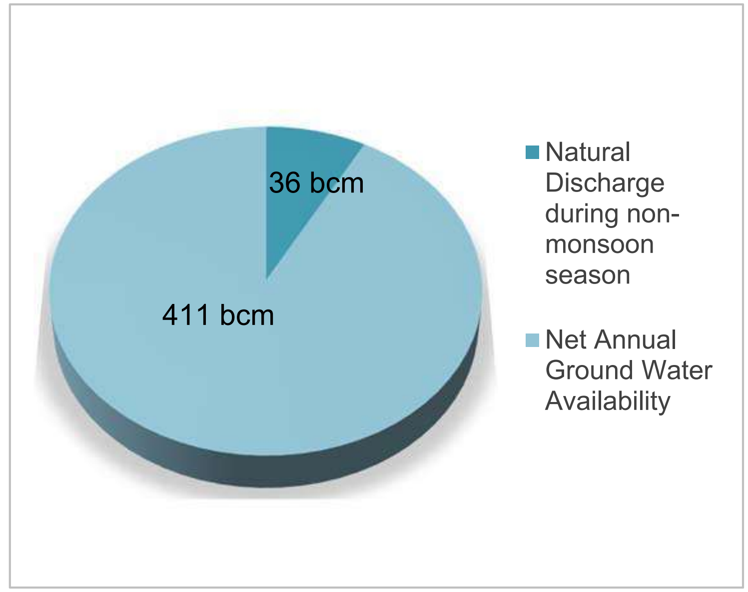
6.3 Stage of Ground Water Development

The overall stage of ground water development in the country is 62%. The stage of ground water development 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 ground water recharge. In the states of Tamil Nadu, Uttar Pradesh and UTs of Daman & Diu and Puducherry, the stage of ground water development is 70% and above. In rest of the states / UTs the stage of ground water development is below 70%.

6.4 Categorization of Assessment Units

Out of 6584 numbers of assessment units (Blocks/ Taluks/ Mandals/ Districts/Firkas/Valleys), 1034 has been categorized as Over-exploited, 253 as Critical, 681 as Semi-critical, and 4520 units as Safe. There are 96 assessment units which are completely saline **(Annexure III).** Number of Over-exploited and Critical administrative units is significantly higher in Delhi, Haryana, Himachal Pradesh, Karnataka, Punjab, Rajasthan and Tamil Nadu, Uttar Pradesh. (**Fig. 6.5**).





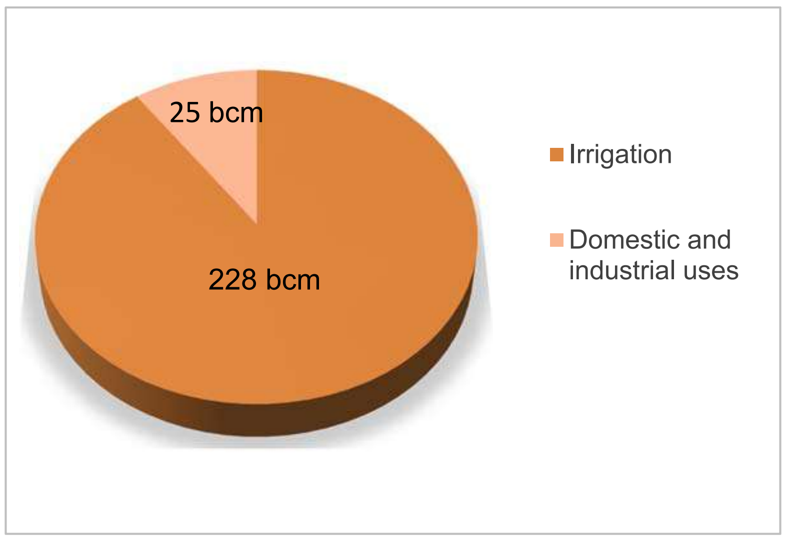


Fig 6.1 Ground Water Resources Availability and Utilization in India

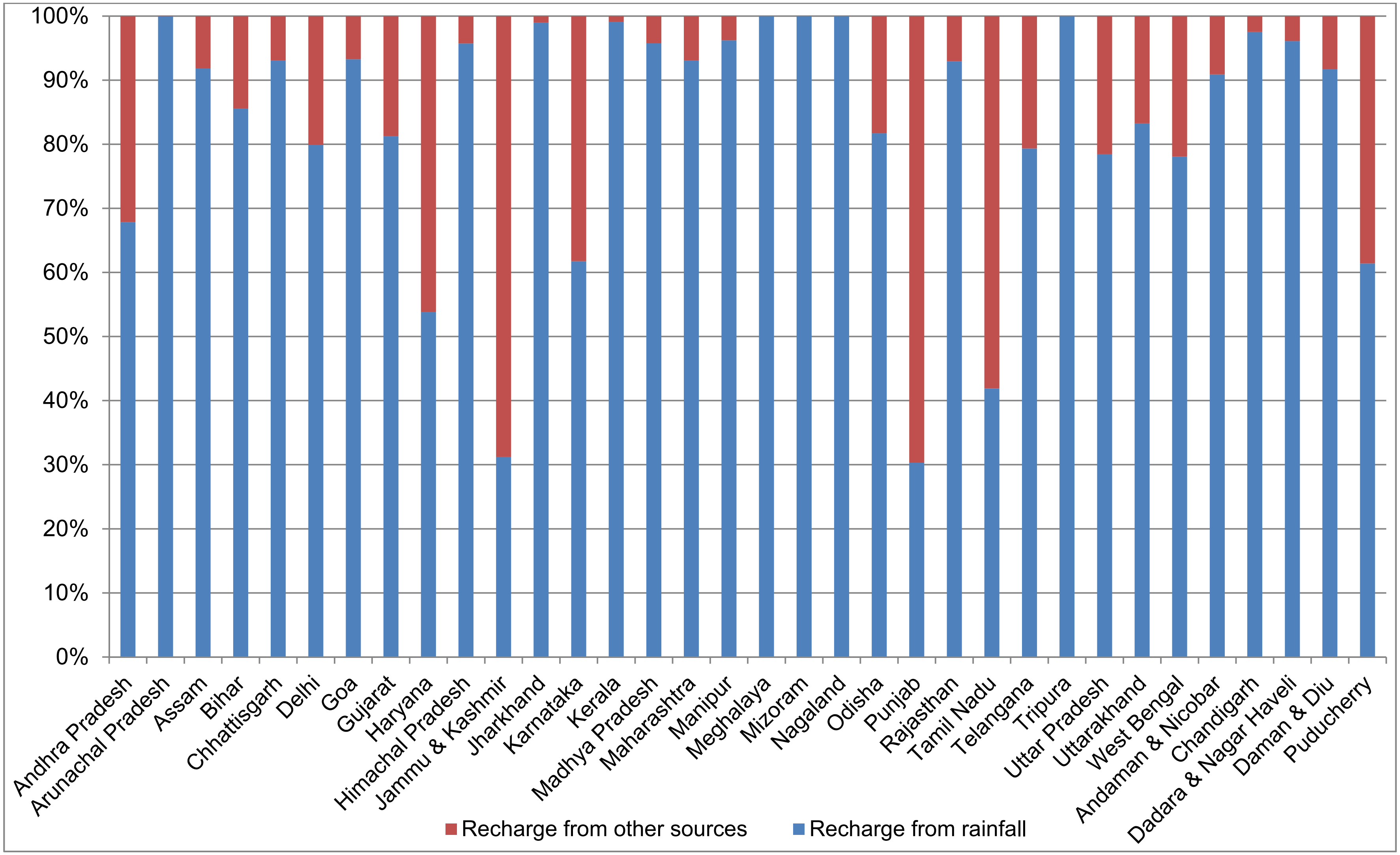
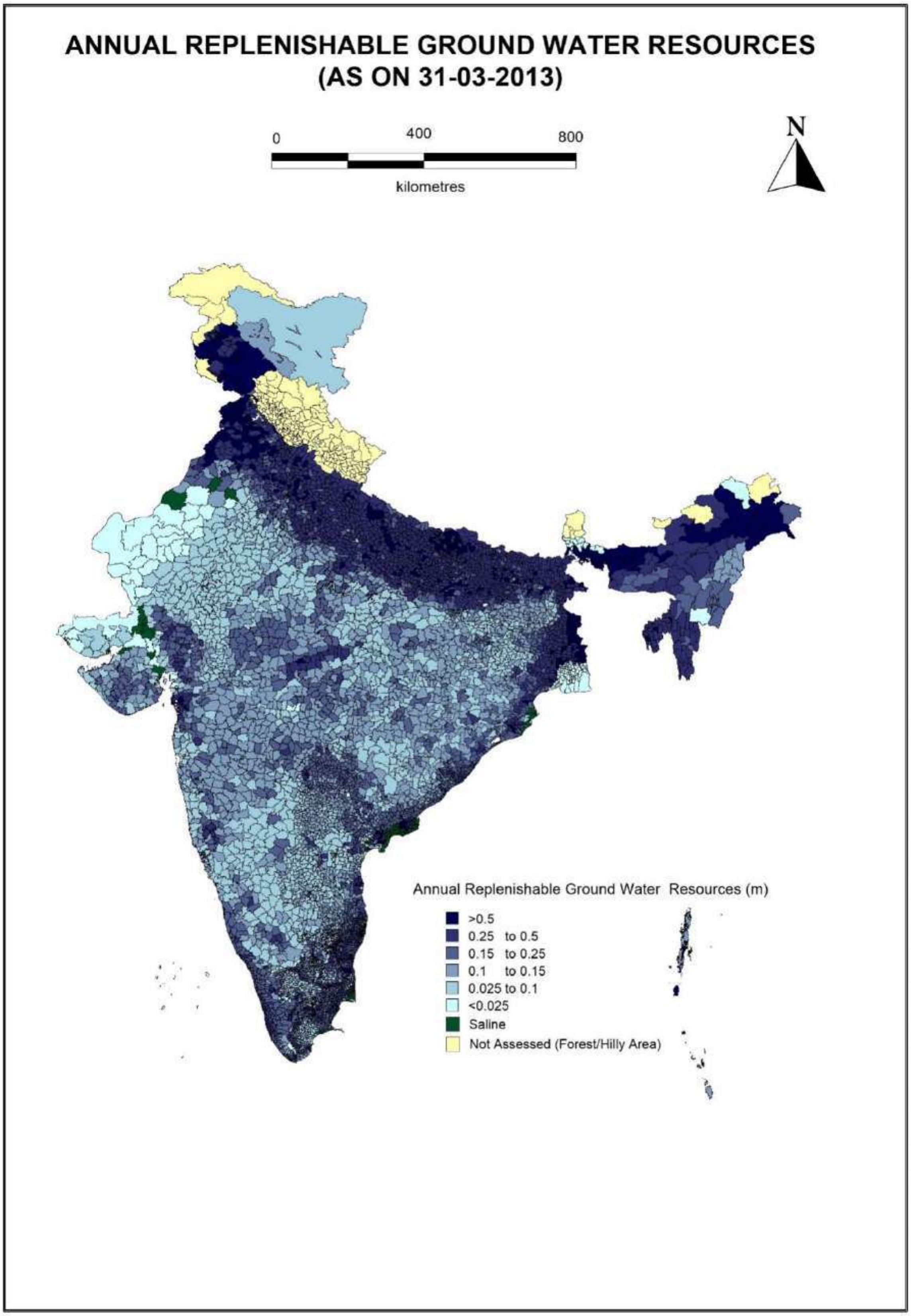


Fig.6.2 Recharge from Rainfall during monsoon *vis*-à-*vis* Recharge from Other sources during Monsoon

Fig 6.3


ANNUAL REPLENISHABLE GROUND WATER RESOURCES
(AS ON 31-03-2013)
0
400
800
kilometres
N
Annual Replenishable Ground Water Resources (m)
>0.5
0.25 to 0.5
0.15 to 0.25
0.1 to 0.15
0.025 to 0.1
<0.025
Saline
Not Assessed (Forest/Hilly Area)

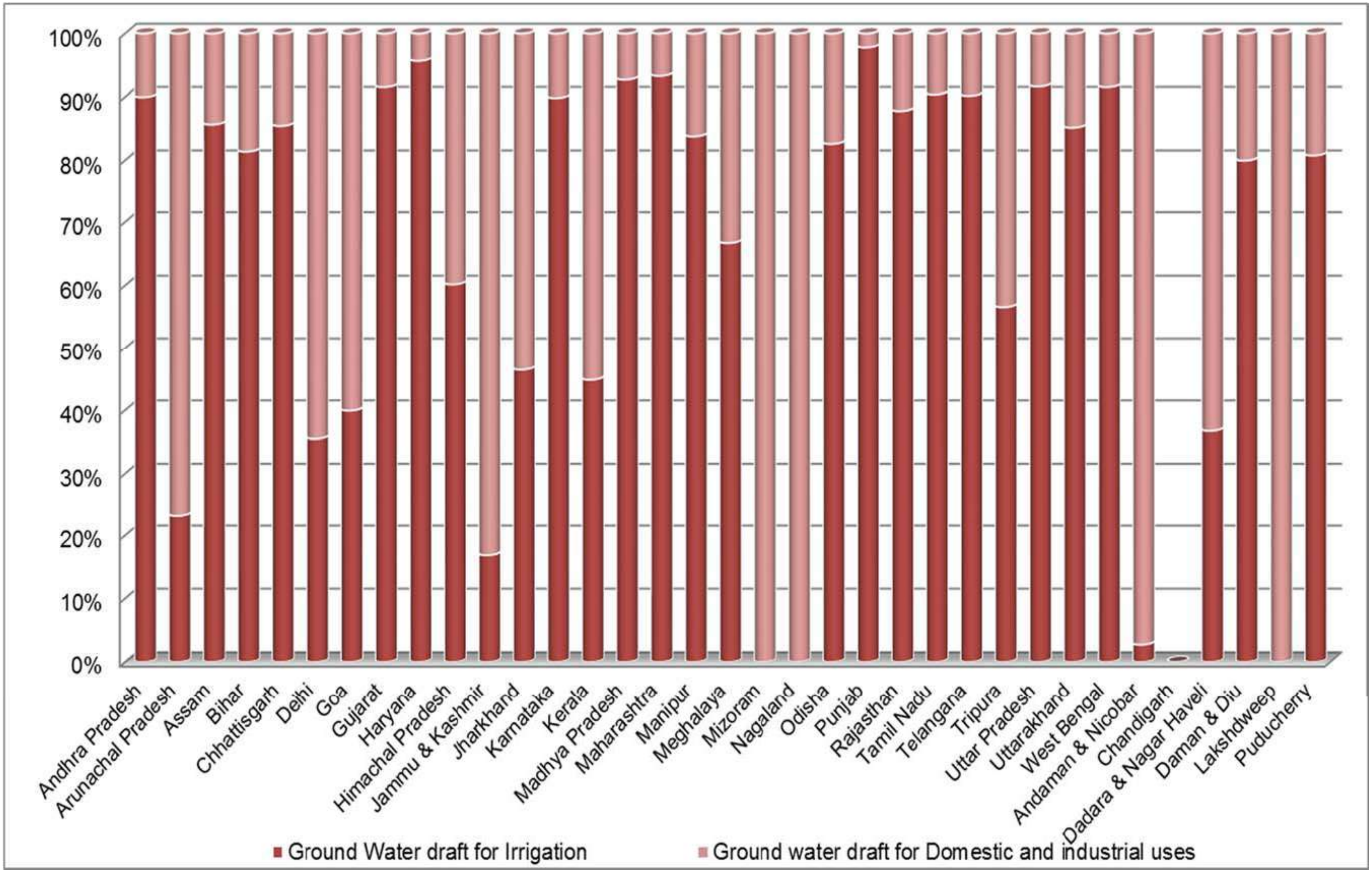
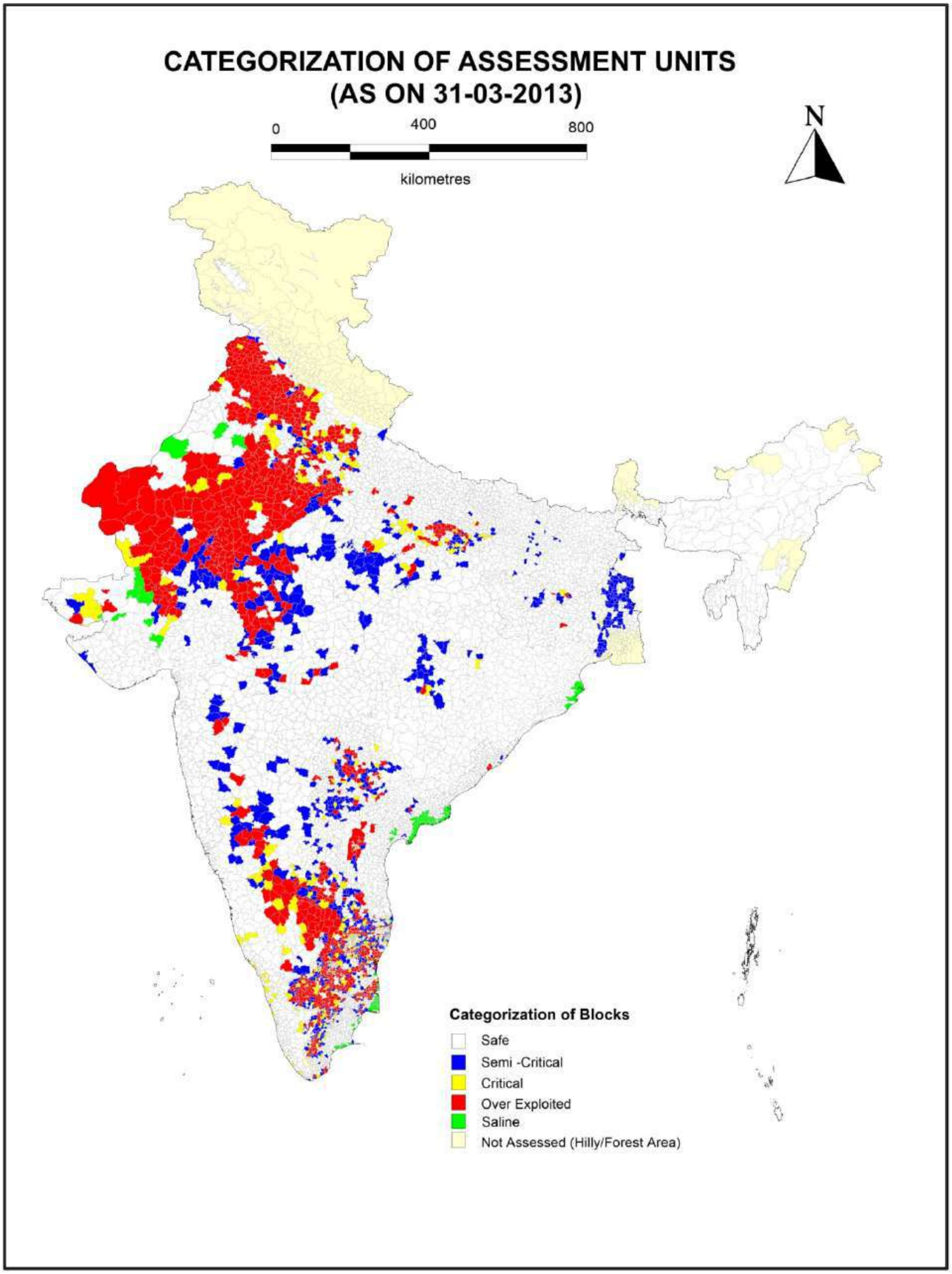


Fig. 6.4 Irrigation Draft vis-*à*-vis domestic & Industrial Draft

Fig 6.5


CATEGORIZATION OF ASSESSMENT UNITS
(AS ON 31-03-2013)
0
400
800
kilometres
N
Categorization of Blocks
Safe
Semi -Critical
Critical
Over Exploited
Saline
Not Assessed (Hilly/Forest Area)

7

STATE-WISE GROUND WATER RESOURCES SCENARIO

The ground water conditions, its availability and utilization scenario and categorization of assessment units in different states aregiven in Annexure I, II, III & IV. State wise summaries are given below.

7.1 Andhra Pradesh

Andhra Pradesh shares its boundaries with Odisha, Tamil Nadu, Chhattisgarh, Karnataka and Telangana and on the eastern side it is bounded by the Bay of Bengal. The State is divided into 748 watersheds and 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 2013. 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 annual replenishable ground water resource of the state has been estimated as 20.39 bcm and net annual ground water availability is 18.48 bcm. The annual ground water draft for all uses is 8.10 bcm and stage of ground water development is 44%. Out of 670 mandals, 61 have been categorized as ‘Over-exploited’, 17 as ‘Critical’, 54 as ‘Semi-Critical’, 497 as ‘Safe’ and 41 are ‘Saline”.As compared to 2011 assessment, the annual replenishable ground water resource for the state has decreased from 20.79 bcm to 20.39 bcm, which may be attributed to decrease in rainfall. The annual ground water draft has increased from 7.01 bcm in 2011 to 8.10 bcm in 2013. This increase in the annual ground water draft is attributed to increase in ground water irrigation from 15.61 lakh ha (37% of the total irrigated area) to 16.31 lakh ha (44% of the total irrigated area).

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, infiltration as also discharge zones. 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 is manifested as springs. Springs in all geological formations are 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 1.14 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, Kurung Kumey and Tawang could not be estimated due to paucity of data. The annual replenishable ground water resource of the State has been estimated as 4.43 bcm and net annual ground water availability is 3.99 bcm. The annual ground water draft is 0.01 bcm and stage of ground water development is 0.23%. All the districts have been categorized as 'Safe' and there is no saline area in the state. As compared to 2011 estimate, the annual replenishable ground water resource has decreased from 4.51 bcm to 4.43 bcm which is attributed to relatively less rainfall in the state.

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, Nagaon.

Ground water resources have been assessed district-wise due to paucity of block wise data. The annual replenishable ground water resource of the state has been estimated as 32.11 bcm and net annual ground water availability is 28.90 bcm. The annual ground water draft is 4.74 bcm and stage of ground water development is 16%. All the 27 districts have been categorized as 'Safe' and there is no saline area in the state. As compared to 2011 assessment, the annual replenishable ground water resource for the state has increased from 28.52 bcm to 32.11 bcm in 2013 due to increase in recharge from both surface and ground water irrigation components. The annual ground water draft has increased from 3.49 bcm to 4.74 bcm due to refinement in the database.

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 ground water abstraction structures. The estimation of dynamic ground water resources has been carried out in 534 blocks of the state. The annual replenishable resource has been worked out as 31.31 bcm with the net ground water availability as 28.49 bcm. The annual ground water draft for all uses has been estimated as 12.73 bcm and the stage of ground water development of the state is 45%. As compared to 2011 assessment, the annual replenishable ground water resource and net ground water availability for the state have increased from 29.34 bcm to 31.31 bcm and 26.86 bcm to 28.49 bcm respectively. The annual ground water draft has increased from 11.95 bcm to 12.73 bcm.Out of the total 534 assessed blocks, 14 have been categorized as ‘Semi-Critical’ and 520 as ‘Safe’. There is no Critical, Over-exploited or Saline block in the state.

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 2 lps and the yield of the bore wells ranges from < 1 to 5 lps. About 13% area of the State is occupied by Semi-consolidated sedimentary rocks where Dug wells & tube wells have yield range of 1 to 10 lps.

The estimation of ground water resources has been carried out block-wise. The annual replenishable ground water resource of the state has been estimated as 12.80 bcm and net annual ground water availability is 11.90 bcm. The annual ground water draft is 4.40 bcm and stage of ground water development is 37%. Out of 146 blocks, 18 have been categorized as ‘Semi-critical’, 2 as ‘Critical’, 1 as ‘Over-exploited’ and remaining 125 as ‘Safe’. 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 2011 estimate, there are no significant changes in the annual replenishable ground water resources and ground water draft in 2013.

7.6 Delhi

The state is covered by diverse rock types of different geological ages from Pre-Cambrian to Recent. Around 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 10 lps in older alluvial deposits and from 25 to 55 lps in newer alluvium. About 11% of the State is occupied by quartzitic hard rock where bore wells have yield of 0.6 to 5 lps.

The ground water resources assessment has been carried out tehsil-wise. The annual replenishable ground water resource of the state has been estimated as 0.34 bcm and net annual ground water availability is 0.31 bcm. The annual ground water draft is 0.39 bcm and stage of ground water development is 127%. Out of 27 tehsils, 15 have been categorized as ‘Over-exploited’, 7 as ‘Semi-Critical’, and 5 as ‘Safe’. As compared to 2011 assessment, the annual replenishable ground water resource and net ground water availability have increased from 0.31 bcm to 0.34 bcm and 0.29 bcm to 0.31 bcm respectively. There is a slight decrease in the annual ground water draft for the state from 0.392 to 0.388 bcm and the stage of ground water development has decreased from 137% to 127%.The increase in the total annual replenishable ground water resources is attributed to refinement in the data pertaining to canals/drains. The decrease in the draft from 2011 to 2013 assessment is due to improvement in surface water supply by the DJB which has led to the less dependency on ground water after commissioning of Sonia Vihar treatment plant in 2007. 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 have been assessed taluk-wise. The annual replenishable ground water resource has been estimated as 0.24 bcm and net annual ground water availability is 0.15 bcm. The annual ground water draft is 0.05 bcm and stage of ground water development is 37%. All 12 taluks in the state have been categorized as 'Safe'. As compared to 2011 assessment there is no significant change in the annual replenishable ground water resources and net annual ground water availability. However, the annual ground water draft has increased from 0.04 to 0.05 bcm and the stage of ground water development has increased from 28% to 37%.This change is due to refinement in the number of abstraction structures and increase in withdrawal.

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 100 m^3/day. The estimation of ground water resources has been carried out taluk-wise.

The annual replenishable ground water resource of the state has been estimated as 20.85 bcm and net annual ground water availability is 19.79 bcm. The annual ground water draft is 13.44 bcm and stage of ground water development is 68%. Out of 223 assessment units, 23 taluks have been categorized as 'Over-exploited', 6 as 'Critical', 9 as 'Semi-Critical', 175 as 'Safe' and there are 10 saline taluks in the state.As compared to 2011 estimate, the annual replenishable ground water resource and the net ground water availability has increased from 18.57 bcm to 20.85 bcm and 17.59 bcm to 19.79 bcm respectively. This could be attributed to increase in rainfall and surface water irrigation. The annual ground water draft has increased from11.86 bcm to 13.44 bcm due to increase in number of ground water extraction structures.

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.

The annual replenishable ground water resource of the state has been estimated as 11.36 bcm and net annual ground water availability is 10.30 bcm. The annual ground water draft is 13.92 bcm and stage of ground water development is 135%. Out of total 119 assessed blocks taken for study, 64 have been categorized as 'Over-exploited', 14 as'Critical', 11 as 'Semi Critical' and 30 as 'Safe'.As compared to 2011 assessment, recharge from other sources has increased from 6.12 bcm in 2011 to 6.70 bcm during 2013. This is mainly due to the contribution from return flow component by surface and ground water irrigation. In 2011, only three values were taken for return flow factor based on water level, <10 m, 10-25 m & more than 25 m. However, in 2013, a linear factor was applied, instead of three ranges, which has resulted in increase of ground water recharge. The annual ground water draft has also increased from 13.05 to 13.92 bcm due to increase in total number of tube wells from 741062 during 2011 to 785894 in 2013.

7.10 Himachal Pradesh

The diverse physiographic, climatic, topographic and geologic conditions have given rise to diversified groundwater 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 groundwater 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. Ground water 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. The annual replenishable ground water resource of the state has been estimated as 0.56 bcm and net annual ground water availability is 0.53 bcm. The annual ground water draft is 0.27 bcm and stage of ground water development is 51%. Out of the 8 assessment units, 1 has been categorized as 'Over-exploited', 1 as 'Critical', 6 as 'Safe' and there is no saline assessment unit in the state. As compared to 2011 estimates, there are no significant changes in the annual replenishable ground water resource and net ground water availability. However, the annual ground water draft for irrigation during 2013 assessment has decreased from 0.25 bcm to 0.16 bcm. This is due to refinement in the number of abstraction structures and draft parameters.

7.11 Jammu & Kashmir

The ground water resources of the state of Jammu & Kashmir have been estimated 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 groundwater irrigation. The annual replenishable ground water resource of the state has been estimated as 5.25 bcm and net annual ground water availability is 4.82 bcm. The annual ground water draft is 1.18 bcm and the stage of ground water development is 24%. All the assessment units have been categorized as 'Safe' .As compared to the 2011 estimates, the annual replenishable ground water resource and net ground water availability have increased from 4.25 bcm to 5.25 bcm and 3.83 bcm to 4.82 bcm respectively. This is due to increased rainfall and recharge from other sources. The annual ground water draft has increased from 0.81 bcm to 1.18 bcm. This is attributed to increase in ground water structures for domestic and industrial purposes.

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 0.75 m^3/hr. The dug wells in volcanic rocks 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 7-10 m^3/hr and in Tertiary formations, yield ranges from 18 to 78 m^3/hr. The Younger Alluvium deposits are confined in patches. The depth of dug wells in general ranges between 10-15 m bgl and that of shallow tube wells varies between 20-40 m bgl.

The ground water resources have been assessed block-wise. The annual replenishable ground water resource of the State has been estimated as 6.56 bcm and net annual ground water availability is 5.99 bcm. The annual ground water draft is 1.35 bcm and stage of ground water development is 23%. Out of 260 blocks, 4 blocks has been categorized as 'Over-exploited', 2 as 'Critical', 10 as 'Semi-Critical', and 244 as 'Safe' and there are no saline block in the state. As compared to 2011 assessment, the annual replenishable ground water resource and net ground water availability have increased from 6.31 bcm to 6.56 bcm and 5.76 bcm to 5.99 bcm respectively. The annual ground water draft for the state has decreased from 1.86 bcm to 1.35 bcm and the stage of ground water development has decreased from 32% to 23%.The change in ground water draft is mainly due to refinement of number of abstraction structures.

7.13 Karnataka

Karnataka State is underlain by rock types ranging in age fromArchaean 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 distribution namely Banded Gneissic Complex (BGC), Basalt, Schists, Granites, Charnockites, Limestones, Laterites, Sandstones and alluvium.

The ground water resources assessment has been carried out watershed wise and the resources so assessed are apportioned taluk-wise. The annual replenishable ground water resources have been assessed as 17 bcm and the net annual ground water availability is 14.83 bcm. The annual ground water draft is 9.76 bcm and the stage of ground water development is 66%.Out of the 176 taluks, 98 have been categorized as 'Safe', 21 as 'Semi critical', 14 as 'Critical' and 43 as'Over exploited'.As compared to 2011 assessment, there is a marginal change in annual replenishable ground water resources, net annual ground water availability and the annual ground water draft in 2013. In 2011, 'Command' and 'Non-Command' areas in a taluk were taken as separate assessment units, whereas in 2013, 'taluk' has been considered as one assessment unit.This has resulted in the decreased number of assessment units from 270 to 176.

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 10 m^3/day, whereas that of bore wells ranges from less than 1 to 35 lps. 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 35 m^3/day, whereas deep tube wells have yields in the range of 1 to 57 lps. 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 6 m^3/day.

The ground water resources for the state have been assessed block-wise. The annual replenishable ground water resource has been estimated as 6.27 bcm and net annual ground water availability is 5.66 bcm. The annual ground water draft is 2.63 bcm and stage of ground water development is 47%. Out of 152 blocks, 1 has been categorized as 'Over-exploited', 2 as 'Critical', 18 as 'Semi-Critical' and 131 as 'Safe'.There are no saline blocks in the state. As compared to 2011 assessment, the annual replenishable ground water resource of the state has decreased from 6.69 bcm to 6.27 bcm due to variation in rainfall.The unit draft for ground water abstraction structures were calculated area-wise during 2013 assessment instead of the whole state. This has resulted in the decrease in the annual ground water draft from 2.84 bcm to 2.63 bcm.

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 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.

The annual replenishable ground water resource of the state has been estimated as 35.98 bcm and net annual ground water availability is 34.16 bcm. The annual ground water draft is 19.36 bcm and stage of ground water development is 57%. Out of 313 blocks, 25 blocks has been categorized as ‘Over-exploited’, 2 as ‘Critical’, 58 as ‘Semi-Critical’ and 228 blocks as ‘Safe’. As compared to 2011 assessment, there is a marginal increase in the annual replenishable ground water resources, which could be attributed to increase in recharge from rainfall and other sources. The increase in annual ground water draft in the 2013 is due to increased population.

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 Sindhu durg and Ratnagiri districts. Large part of the State is underlain by Basaltic hard rocks where dug wells are predominant. 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 yield of 5 to 45 lps. The central part of Maharashtra which is a drought prone area, receives very less rainfall i.e. from 400 to 700 mm, but the geology is favorable for the ground water recharge. Hence, in this area the dependency on ground water 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. The annual replenishable ground water resource of the state has been estimated as 33.19 bcm and net annual ground water availability is 31.48 bcm. The annual ground water draft is 17.07 bcm and stage of ground water development is 54%. Out of 353 blocks, 9 have been categorized as ‘Over-exploited’, 1 as ‘Critical’, 19 as ‘Semi-critical' and remaining 324 as 'Safe'. As compared to 2011 estimates, the annual replenishable ground water resources in 2013 has decreased from 33.95 bcm to 33.19 bcm which is mainly attributed to lesser rainfall in the Marathwada region during the assessment period. The annual ground water draft has also decreased from 17.18 bcm to 17.07 bcm. As a result of less or non-availability of groundwater during summer season, the irrigation draft during the assessment period also decreased which is reflected in the decreased annual ground water draft for the state.

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 20 m 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 block-wise. The annual replenishable ground water resource of the state has been estimated as 0.474 bcm and net annual ground water availability is 0.426 bcm. The annual ground water draft is 0.004 bcm and stage of ground water development is 1%. All the districts have been categorized as 'Safe' and there is no saline area in the state. As compared to 2011 estimate, there is negligible change in annual ground water recharge and net ground water availability and annual ground water draft.

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. Ground water 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 are 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 data. The annual replenishable ground water resource of the state has been estimated as 3.31 bcm and net annual ground water availability is 2.98 bcm. The annual ground water draft is 0.012 bcm and stage of ground water development is 0.4%. All the 11 districts have been categorized as ‘Safe’. As compared to 2011 estimates, the annual replenishable ground water resources and net ground water availability have increased from 1.78 bcm to 3.31 bcm and 1.60 bcm to 2.98 bcm respectively. This increase is due to re-calculation of ground water recharge worthy area using digitized slope maps for 2013 assessment. Moreover, recharge from water spread area of various reservoirs has been taken into consideration for 2013 estimation, which was not taken earlier. The annual ground water draft has also increased from 0.0017 bcm to 0.0120 bcm due to refinement in data.

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 Barails 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 200 m tapping Tertiary sandstone ranges from 120 to 330 liters 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. The annual replenishable ground water resource has been estimated as 0.039 bcm and net annual ground water availability is 0.035 bcm. The annual ground water draft is 0.001 bcm and stage of ground water development is 2.9%. All the 22 assessed blocks have been categorized as ‘Safe’. There are no saline areas in the state. As compared to 2011 estimate, there is no significant change in annual ground water recharge and ground water draft.

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 arrenacious. 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 20m and deep tube well down to 100 m depth which yield 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 20 m^3/hr. The valleys underlain by Tipam sandstones form good aquifers with yield prospects varying from 30 to 80 m^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. The annual replenishable ground water resource of the state has been estimated as 1.94 bcm and net annual ground water availability is 1.75 bcm. The annual ground water draft is 0.03 bcm and stage of ground water development is 2%. All the 11 districts have been categorized as 'Safe'. There are no saline areas in the state. As compared to 2011 estimates, the annual replenishable ground water resource of the state has increased from 0.62 bcm to 1.94 bcm and similarly, the net annual ground water availability has increased by 0.55 bcm to 1.75 bcm in the 2013.This variation is due to re-calculation of recharge worthy areas for the state.

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. Ground water 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 5 lps. 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 10 lps in general depending on the aquifer disposition.

The ground water resources in the state have been assessed block-wise. The annual replenishable ground water resource of the state has been estimated as 17.78 bcm and net annual ground water availability is 16.69 bcm. The annual ground water draft is 5.02 bcm and stage of ground water development is 30%. Out of the total of 314 blocks in the state, 308 have been categorized as ‘Safe’ and the remaining 6 blocks are ‘Saline’. As compared to 2011 estimates, there is no significant change in annual replenishable ground water resource and net ground water availability. However, annual ground water draft has increased from 4.73 bcm to 5.02 bcm due to increase in irrigation and domestic consumption.

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 groundwater resources and 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 15 km wide followed by Sirowal which imperceptibly merges with the alluvial plain. Kandi deposit explored up to 450 m 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. The annual replenishable ground water resource of the state has been estimated as 25.91 bcm and net annual ground water availability is 23.39 bcm. The annual ground water draft is 34.81 bcm and stage of ground water development is 149%. Out of the 138 assessed blocks, 105 blocks has been categorized as ‘Over-exploited’, 4 as ‘Critical’, 3 as ‘Semi-Critical’, and 26 as ‘Safe’ and there is no saline area in the state. As compared to 2011 estimates, the annual replenishable ground water resources has increased from 22.53 bcm to 25.91 bcm and similarly, net ground water availability increased from 20.32 bcm to 23.39 bcm. This is due to change in recharge factors of return flow as per linear graph having an interval of 1 m instead of various ranges. This is also reflected in the reduction of stage of ground water development from 172% to 149%.

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 and 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 0.75 m^3/day. The yield of the wells drilled in Vindhayan formation has been observed to be 15m^3/day, tapping fractures between 50-75 mbgl. In consolidated formation (Fissured) the thickness of the weathered zone varies from 5 to 50 m. 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 40m and yield varies from 3 to15 m^3/day, whereas transmissivity varies from 3 to 30 m^2/day.

The ground water resources for the state have been assessed block-wise. The annual replenishable ground water resource of the state has been estimated as 12.51 bcm and net ground water availability is 11.26 bcm. The annual ground water draft is 15.71 bcm and the stage of ground water development in the state is 140%. Out of the 248 assessed blocks, 164 blocks has been categorized as 'Over-exploited', 9 as 'Critical', 28 as 'Semi-critical', 44 blocks as 'Safe' and 3 as 'Saline'. As compared to 2011 estimate, the annual replenishable ground water resource, net annual ground water availability has increased from 11.94 bcm to 12.51 bcm and 10.83 0 to 11.26 bcm respectively. Thisis attributed to relatively good rainfall in the state during the assessment period.

7.24 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, ground water is mainly developed through dug wells and dugcum bore wells tapping the weathered zone.The yield of open wells varies from 1 to 3 lps, whereas in dugwells tapping soft rocks including sedimentary formations, the yield is upto 10 lps.

The ground water resources for the state have been assessed firka-wise. The annual replenishable ground water resource has been estimated as 20.65 bcm and net annual ground water availability is 18.59 bcm. The annual ground water draft is 14.36 bcm and stage of ground water development is 77%. Out of 1139 firkas, 358 has been categorized as 'Over exploited', 105 as 'Critical', 212 as 'Semi-critical',429 as 'Safe' and 35 firkas has been categorized as 'Saline'. As compared to 2011 estimate, the annual replenishable ground water resource has decreased from 21.53 bcm to 20.65 bcm. This is attributed to decrease in rainfall recharge due to marginally less rainfall and urbanization.

7.25 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 ranges from 75 to 200 lpm; however, present day mean well yields are around 50 to 125 lpm. The rest of the state is underlain by semi consolidated sedimentary formations encompassing Gondwanas, Tertiary group of formations and Sub-Recent to Recent unconsolidated sediments. In Kamthi sandstones, the tube-wells constructed down to 250 mbgl and yield varies from 13 to 162m^3/hour. Within the 200 m depth range yield varies from 1.5 to 16.6 lps for draw-down of 9 to 30 m. Transmissivity of these aquifers varies between 28 and 950 m^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 1500 lpm.

The ground water resources for the state have been assessed mandal-wise. The annual replenishable ground water resource of the state has been estimated as 14.74 bcm and net annual ground water availability is 13.39 bcm. The annual ground water draft is 7.77 bcm and stage of ground water development is 58 %. Out of 443 mandals, 46 mandals has been categorized as 'Over-exploited', 12 as 'Critical', 74 as 'Semi-critical' and 311 as 'Safe'. There are no saline Mandals in the state. As compared to 2011 estimates, the annual replenishable ground water resource of the state has decreased from 15.10 bcm to 14.74 bcm. This is attributed to relatively less rainfall during the assessment year. Moreover, about 3486 sq.km, area of the state has been included in Andhra Pradesh state due to bi-furcation.The annual ground water draft has increased from 7.50 bcm to 7.77 bcm due to increase in number of irrigation wells and domestic and industrial consumption.

7.26 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 formation, Recent formation and in Tipam formation. Besides it also occur 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. The annual replenishable ground water resource of the state has been estimated as 2.47 bcm and net annual ground water availability is 2.269 bcm. The annual ground water draft is 0.165 bcm and stage of ground water development is 7.3%. All the 39 blocks assessed have been categorized as ‘Safe’. As compared to 2011 estimate, there is no significant change in the annual replenishable ground water resources and annual ground water draft.

7.27 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 60 lps. 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 60 lps at 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 10 lps. The tube wells in the phreatic aquifer yield between 20 and 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 40 lps 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 8 lps.

The ground water resources have been assessed block-wise. The annual replenishable ground water resource of the state has been estimated as 76.34 bcm and net ground water availability is 71.58 bcm. The annual ground water draft is 52.76 bcm and stage of ground water development is 74%. Out of the 820 assessment units, 113 have been categorized as ‘Over-exploited’, 59 as ‘Critical’, 45 as ‘Semi-critical’ and 603 as ‘Safe’. There is no saline block in the State.As compared to 2011 estimate, there is no significant change in the annual replenishable ground water resources and annual ground water draft.

7.28 Uttarakhand

Uttarakhand State has a distinct geological attribute with wide variety of rock units ranging in age from Archaean to Quaternary. About 85% of the geographical area of the state is mountainous and underlain by hard rocks. Groundwater is the hard rock area is developed 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 600 lpm. 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. The annual replenishable ground water resource of the state has been estimated as 2 bcm and net ground water availability is 1.97 bcm. The annual ground water draft is 0.99 bcm and stage of ground water development is 50%. Out of the18 blocks assessment units, 1 has been categorized as ‘Critical’, 1 as ‘Semi-Critical’ and 16 as ‘Safe’. As compared to 2011 estimate, there is a marginal decrease in the annual replenishable ground water resource of the state. The ground water draft for irrigation has decreased from 1.10 bcm to 0.84 bcm due to reduction in number of ground water abstraction structures. However, the ground water draft for industrial and domestic water supply has increased from 0.03 bcm to 0.15 bcm. This is attributed to establishment of new industries in the state.

7.29 West Bengal

Nearly two third area of the state is occupied by unconsolidated sediments; the western part of the state is partly occupied by the hard rocks. The phreatic aquifer is generally developed through dug well, dug cum bore well and shallow tubewell. The yield of these wells varies from 1-5 lps. The ground water resources have been assessed block-wise. The annual replenishable ground water resource of the state has been estimated as 29.33 bcm and net ground water availability is 26.56 bcm. The annual ground water draft is 11.84 bcm and stage of ground water development is 45%. Out of 268 assessment units, 76 have been categorized as ‘Semi-critical’ and 1 as ‘Critical’ and remaining 191 as ‘Safe’. As compared to 2011 estimate, the annual ground water draft has increased from 10.69 bcm to 11.84 bcm in 2013 assessment. This is attributed to increase in number of abstraction structures and population.

7.30 Andaman & Nicobar Islands

The A&N 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. Geologically, 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 15% goes to the coralline and limestone formations.All these rock formations have been subjected tochain of tectonically active zone, evident from the occurrence of shallow and deep focus earthquakes in the islands. Because of tectonic activity, the igneous and sedimentary groups 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 meager yield of 0.1 to 0.5 lps. The igneous Ophiolite suite of rocks in the areaalthough restricted in occurrence, are observed to yield moderate to high both in shallow and deeper locales and they are developed by dugwells and bore wells with yield ranging from 1 to 10 lps. The island area which is covered by Coralline Limestones contains appreciable quantity of ground water with yield ranging from 5 to 25 lps. The ground water resources have been assessed island-wise. The annual replenishable ground water resources of the A&N Islands have been estimated as 0.420 bcm and net annual ground water availability is 0.378 bcm. The annual ground water draft is 0.0037bcm and stage of ground water development is 1%. All of the 34 assessment units have been categorized as “Safe”.

7.31 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 180 mbgl 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 80 m. In other areas, the semi-confined conditions prevail up to 20-30 m below land surface. The depth of the shallow aquifer system is less than 30 mbgl, whereas the depth of the deeper aquifer system ranges from 40 to 450 mbgl of explored depth. The transmissivity values for the deeper aquifer system ranges between 74 m^2/day to 590 m^2/day. The transmissivity values of shallow aquifers up to 100 m depth ranges from 70 and 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. The annual replenishable ground water resource has been estimated as 0.022 bcm and net annual ground water availability is 0.0194 bcm. The UT of Chandigarh has been categorized as 'Safe'. As compared to 2011 estimate, there is no change in annual replenishable ground water resources and annual ground water draft.

7.32 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 transmissivity of shallow aquifer ranges from 5.5 to 305 m^2/day. During 2010, the pre-monsoon depth to water levels in these wells ranged from 2.90 to10.45 mbgl, while the post-monsoon depth to water levels varied from 1.90 to 8.35 mbgl. The depth to water levels during pre-monsoon interval during May 2011 varied from 2.35 to 12.70 mbgl. The entire D&NH has been considered as a single assessment unit. The annual replenishable ground water resource of the UT of D&NH has been estimated as 0.070 bcm and net annual ground water availability is 0.063 bcm. The annual ground water draft is 0.020 bcm and stage of ground water development is 32%. The entire UT of D&NH has been categorized as 'Safe'. As compared to 2011 estimate, the annual ground water draft has increased from 0.013 bcm to 0.020 bcm due to increase in domestic draft.

7.33 Daman & Diu

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

The ground water resources have been assessed district-wise. The annual replenishable ground water resource of the UT of Daman & Diu has been estimated as 0.015 bcm and net ground water availability is 0.014 bcm. The annual ground water draft is 0.010 bcm and stage of ground water development is 70%. Out of 2 assessment units, Diu has been categorized as 'Critical' and Daman as 'Safe. As compared to 2011 estimate, the annual replenishable ground water resource has decreased from 0.018 bcm to 0.015 bcm. This is attributed to lesser recharge from rainfall due to urbanization.Theannual ground water draft and the stage of ground water development has decreased from 0.016 bcm to 0.010 bcm and 97% to 70% respectively. This variation is attributed to reduction in irrigated area due to urbanization and adoption of micro irrigation schemes such as drip and sprinkler irrigation.

7.34 Lakshdweep Islands

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 the domestic consumption. Irrigation draft is negligible in the islands as almost all the crops are rainfed.

Dynamic ground water resources have been assessed for individual islands. The annual replenishable ground water resource in the islands has been estimated as 0.01055 bcm, the annual ground water draft for all the islands grouped together, is 0.00237 bcm. The stage of ground water development for is 68%. Out of the 9 islands, 3 have been categorized as 'Semi-Critical' and 6 as 'Safe'. As compared to 2011 estimate, there is no significant change in annual replenishable ground water resource and the annual ground water draft.

7.35 Puducherry

The UT of Puducherry is underlain by the semi-consolidated and unconsolidated sedimentary formations which mainly sustains dug wells and shallow and deep tube wells. The yield of the wells generally varies between 3 to 15 lps. High yielding wells in the range of 10 to 40 lps exists in the Tertiary sandstones. The dynamic ground water resources for UT of Puducherry have been assessed Region wise. The annual replenishable ground water resource has been estimated as 0.193 bcm, net annual ground water availability is 0.174 bcm and the annual ground water draft is 0.153 bcm. The overall stage of ground water development of UT of Puducherry is 88 %. Out of 4 regions, 1 has been categorized as 'Over-exploited', 2 as 'Safe' and 1 as 'Saline'. As compared to 2011 estimate, there is no significant change in annual replenishable ground water resource and annual ground water draft.

8

CONCLUSION AND RECOMMENDATION

The annual replenishable ground water resources of the country (2013) have been assessed as 447 bcm. The ground water resources get 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 replenishable ground water resource is recharge through rainfall which contributes to nearly 67% of the total annual replenishable resources. The net annual ground water availability of the country has been assessed as 411 bcm after keeping a provision for natural discharge. The annual ground water draft is 253 bcm, the largest user being irrigation sector. The stage of ground water development for the entire country, which is the percentage of ground water draft with respect to net annual ground water availability, has been computed as 62%. The utilization pattern of ground water is uneven across the country resulting in ground water stressed conditions in some parts of the country while in other areas, ground water utilization has been sub-optimal. Out of 6584 numbers of assessment units (blocks/taluks/mandals/districts/firkas/valleys), 1034 has been categorized as 'Over-exploited', 253 as 'Critical', 681 as 'Semi-critical', and 4520 units as Safe'. There are 96 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, Delhi and Uttar Pradesh have plenty of replenishable ground water resources but because of the over extraction beyond the ground water recharge limits, 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 prevalent aquifer properties of the hard rock terrains which is leading to lesser availability of the resource.

As compared to 2011 assessment, in the annual replenishable ground water resources of the country has increased by 3%. And the recharge from other sources (during Monsoon and Non-Monsoon season) has also increased by 5%. This may be attributed to relatively more rainfall over the country and ground water management interventions coupled with improved database resulting in refinements in assessments. The overall estimate of annual replenishable ground water resources of the entire country shows an increase of 14 bcm in the present estimate as compared to the previous assessment i.e. 2011. The annual ground water draft for irrigation, domestic and Industrial uses has also increased by 8 bcm. The main reasons for these variations can be attributed to changes in rainfall pattern, changing ground water regime and refinement in database.

Ground water resource estimation methodology, 1997 is based on water balance theory. Various input and output components of ground water balance are computed to estimate the ground water recharge. The methodology is robust and is reflective of field conditions. However, the ground water scenario of the country has changed significantly with time. The extraction of ground water resources has increased manifold. As a consequence, many areas of the country have become over exploited. National Water Policy, 2012 suggests that assessment of ground water resource should take into consideration the base flow as well as other elements of water cycle. Assessment of the ground water resources should also include information on quality of ground water along with its quantity which should be based on the knowledge of aquifer disposition and characteristics in different hydrogeological settings of the country.

In view of this, the existing methodology requires a relook on the concepts and details of the methodology applied as well as evaluation and incorporation of the findings of the case studies of ground water assessment carried out in recent years in different parts of the country. Following are the observations/recommendations for estimation of ground water resources:

1. Unit for Ground Water Resource Assessment

Even though an administrative unit is convenient for assessing the resources for development, GEC 1997 recommends watershed as an assessment unit in hard rock areas. In contrast to hard rock areas where surface and subsurface water divides generally coincide, in alluvial areas, there may be ground water flow across watershed boundaries also. Hence, it is recommended to continue with the administrative unit (Block/ Taluk/ Mandal) as an assessment unit in alluvial areas. However, wherever Aquifer Geometry has been established, it is recommended to carry out estimation of aquifer-wise exploitable ground water resources.

2. Scale of assessment

States like Andhra Pradesh, Telangana and Tamil Nadu have adopted smaller administrative units viz. Mandal (Andhra Pradesh/Telangana) and Firka (Tamil Nadu) as ground water assessment units. The reason for assessment at a finer scale by these States is mainly to introduce more pragmatic ground water management interventions. It is recommended that other states should also gradually attempt micro-level assessment.

3. Quality Based Assessment

GEC 1997 methodology recommends resource assessment for poor ground water quality sub units separately. Though, it doesn't provide any clarity as to what is meant by poor ground water quality. Presently, quality based assessment is carried out only for areas having saline aquifers. However, the poor ground water quality area can also include the area where Fluoride and Arsenic are beyond the permissible limits. A quality tag i.e. Arsenic, Fluoride, salinity affected area can also be added in the categorization of assessment units.

4. 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.

5. 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 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 specific yield.

6. Spring Discharges

GEC 1997 Methodology recommends excluding hilly areas (having slope more than 20%) from the assessment areas. However, in most of the hilly areas there occur isolated aquifers which occasionally manifest in the form of springs. These springs in general can sustain the water needs of the inhabitants. A provision should be made for assessing such spring resources.

7. Case studies linking assessment with management

It is recommended that few case studies in various assessment units may be undertaken, wherein quantitative evaluation of the ground water management interventions and consequent changes in the assessment results would be analysed. Such studies would help in bringing out the efficacy of various management programmes.

8. Temporal Availability of Ground Water Resources

Even though the GEC 1997 methodology advocates season wise resource estimation, the estimation of recharge during monsoon and non-monsoon season may not be sufficient. The present practice is to estimate annual groundwater availability and the categorization is done based on annual groundwater availability. Temporal variation in groundwater availability particularly in hard rock terrain is not reflected in GEC 1997 methodology. There are instances, when a unit has been categorized as safe, yet the area have acute shortage of groundwater during the summer. Hence, estimation of temporal availability of ground water resources may be carried out wherever more frequent water level data is available. Attempts may be made to acquire more frequent water level data with installation of AWLR/DWLR.

9. No Direct Reflection of Ground Water Mining

The ground water resources of the country have been assessed 4 times using GEC-97 methodology during the years 2004, 2009, 2011 and 2013. The ground water resources of the country have always been estimated around 430 bcm. The reason being the use of normalised rainfall data for resource estimation which does not change annually. The normal rainfall data gets affected in a span of 20-30 years, even though the annual rainfall figures are different. The effect of annual rainfall is not reflected in resources computed on normalised rainfall data. The water levels are declining day by day in over exploited areas and it is difficult to explain the effects of ground water mining in these areas because of the lacuna in this methodology. Therefore, it is important to estimate the availability of total ground water resources i.e. dynamic and in-storage/ static resources of confined and unconfined aquifers in an area.

ANNEXURE-I

STATE - WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF GROUND WATER DEVELOPMENT (AS ON 31ST MARCH 2013)

STATE-WISE GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
INDIA (As on 31st March 2013)														
														(in bcm)
Sl. No.	States / Union Territories	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation use	Stage of Ground Water Development (%)
		Monsoon Season		Non-monsoon Season		Total			Irrigation	Domestic and industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	States													
1	**Andhra Pradesh**	8.97	4.25	3.21	3.97	20.39	1.91	18.48	7.29	0.81	8.10	1.64	10.21	44
2	**Arunachal Pradesh**	3.340	0.0003	1.092	0.001	4.433	0.443	3.990	0.002	0.007	0.01	0.020	3.967	0.23
3	**Assam**	20.56	1.82	9.22	0.49	32.11	3.21	28.90	4.06	0.68	4.74	0.84	24.00	16
4	**Bihar**	20.66	3.48	3.36	3.81	31.31	2.82	28.49	10.36	2.37	12.73	0.60	17.52	45
5	**Chhattisgarh**	10.11	0.76	0.87	1.06	12.80	0.90	11.90	3.76	0.64	4.40	0.76	7.38	37
6	**Delhi**	0.09	0.02	0.014	0.22	0.34	0.03	0.31	0.14	0.25	0.39	0.25	0.02	127
7	**Goa**	0.15	0.011	0.01	0.08	0.24	0.10	0.15	0.02	0.03	0.05	0.04	0.09	37
8	**Gujarat**	13.93	3.22	0.00	3.71	20.85	1.07	19.79	12.30	1.14	13.44	1.46	6.77	68
9	**Haryana**	3.62	3.10	1.03	3.60	11.36	1.06	10.30	13.32	0.60	13.92	0.56	-3.58	135
10	**Himachal Pradesh**	0.40	0.02	0.11	0.03	0.56	0.03	0.53	0.16	0.11	0.27	0.07	0.30	51
11	**Jammu & Kashmir**	1.22	2.69	0.79	0.55	5.25	0.43	4.82	0.20	0.98	1.18	1.07	3.55	24
12	**Jharkhand**	5.61	0.06	0.73	0.16	6.56	0.57	5.99	0.63	0.72	1.35	0.17	5.19	23
13	**Karnataka**	6.74	4.18	2.67	3.40	17.00	2.16	14.83	8.76	0.99	9.76	1.49	5.55	66
14	**Kerala**	4.51	0.04	0.59	1.13	6.27	0.60	5.66	1.18	1.45	2.63	1.55	2.93	47
15	**Madhya Pradesh**	28.59	1.27	0.82	5.30	35.98	1.82	34.16	17.95	1.41	19.36	2.35	13.86	57
16	**Maharashtra**	21.96	1.64	1.83	7.76	33.19	1.71	31.48	15.93	1.14	17.07	2.21	13.72	54
17	**Manipur**	0.244	0.010	0.201	0.019	0.474	0.047	0.426	0.004	0.001	0.004	0.049	0.374	1.01
18	**Meghalaya**	3.05	0.00	0.15	0.107	3.31	0.33	2.98	0.0080	0.0040	0.0120	0.207	2.76	0.4
19	**Mizoram**	0.02899	Negligible	0.01042	Negligible	0.03942	0.00394	0.03548	0	0.00104	0.00104	0.00238	0.0331	2.9
20	**Nagaland**	1.30	0	0.64	0	1.94	0.194	1.75	0.00	0.03	0.03	0.01	1.74	2.0
21	**Odisha**	11.29	2.53	1.33	2.63	17.78	1.09	16.69	4.14	0.87	5.02	1.35	11.20	30
22	**Punjab**	5.75	13.21	1.32	5.64	25.91	2.52	23.39	34.05	0.77	34.81	0.97	-11.63	149
23	**Rajasthan**	9.06	0.69	0.27	2.49	12.51	1.26	11.26	13.79	1.92	15.71	2.32	0.90	140
24	**Sikkim**	-	-	-	-	-	-	-	-	-	-	-	-	-
25	**Tamil Nadu**	7.12	9.87	1.52	2.15	20.65	2.07	18.59	12.98	1.38	14.36	1.53	4.08	77
26	**Telangana**	8.13	2.12	1.65	2.84	14.74	1.35	13.39	7.00	0.76	7.77	1.55	4.83	58
27	**Tripura**	1.141	0.000	0.738	0.593	2.471	0.202	2.269	0.093	0.072	0.165	0.200	1.976	7.3
28	**Uttar Pradesh**	41.97	11.52	4.60	18.25	76.34	4.75	71.58	48.35	4.41	52.76	6.44	19.01	74
29	**Uttarakhand**	1.10	0.22	0.24	0.43	2.00	0.03	1.97	0.84	0.15	0.99	0.30	0.82	50
30	**West Bengal**	18.71	5.26	1.51	3.85	29.33	2.77	26.56	10.84	1.00	11.84	1.53	14.19	45
	Total States	**259.33**	**72.00**	**40.53**	**74.28**	**446.14**	**35.49**	**410.65**	**228.16**	**24.71**	**252.87**	**31.54**	**161.76**	**62**
	Union Territories													
1	**Andaman & Nicobar**	0.38	0.04	0.0002	0.00005	0.420	0.0420	0.378	0.0001	0.0035	0.0037	0.016	0.361	1
2	**Chandigarh**	0.015	0.0004	0.005	0.001	0.022	0.0022	0.0194	0	0	0	0	0	0
3	**Dadara & Nagar Haveli**	0.054	0.002	0.010	0.004	0.070	0.007	0.063	0.008	0.013	0.020	0.014	0.042	32
4	**Daman & Diu**	0.012	0.001	0.000	0.001	0.015	0.001	0.014	0.008	0.002	0.010	0.003	0.003	70
5	**Lakshdweep**	0	0	0	0	0.01055	0.00704	0.00350	0.00000	0.00237	0.00237	0	0	68
6	**Puducherry**	0.095	0.060	0.009	0.028	0.193	0.019	0.174	0.124	0.029	0.153	0.047	0.053	88
	Total UTs	**0.56**	**0.10**	**0.024**	**0.035**	**0.73**	**0.08**	**0.65**	**0.139**	**0.050**	**0.189**	**0.08**	**0.46**	**29**
	Grand Total	**259.89**	**72.10**	**40.55**	**74.32**	**446.87**	**35.56**	**411.30**	**228.30**	**24.76**	**253.06**	**31.62**	**162.22**	**62**

ANNEXURE-II

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

(AS ON 31ST MARCH 2013)

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

Andhra Pradesh

Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge During Non-Monsoon Period	Net Ground Water Availability	Annual Ground Water Draft			Projected demand for Domestic and Industrial uses upto 2025	Ground Water Availability for Future Irrigation use	Stage of Ground Water Develop ment (%)
		Monsoon Season		Non-Monsoon Season		Total			Irrigation	Domestic & Industrial Water Supply	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	**Srikakulam**	40417	38297	24646	19754	123115	11733	111382	38291	4504	42795	17584	62902	38
2	**Vizianagaram**	42539	22254	28250	7492	100534	8936	91598	16894	918	17812	6116	68723	19
3	**Visakhapatnam**	73586	5905	13328	5271	98090	8636	89454	13442	4485	17927	12541	63470	20
4	**East Godavari**	69958	37094	38290	24618	169960	16007	153953	33967	9075	43042	14482	106654	28
5	**West Godavari**	58870	42876	23364	45290	170399	16033	154366	59783	967	60750	10080	85823	39
6	**Krishna**	47059	63644	22479	17616	150798	14502	136296	45270	9539	54809	9539	82026	40
7	**Guntur**	37569	83241	24505	18180	163499	15955	147544.1843	40902	6545	47447	14685	100727	32
8	**Prakasam**	57624	20460	25579	68527	172190	16194	155996.3639	50627	2120	52747	9677	100062	34
9	**Nellore**	160189	36313	772	85132	282406	25677	256729	74470	5804	80274	9535	172725	31
10	**Chittoor**	134147	15718	9185	23505	182555	17673	164882	100549	17147	117696	18817	47341	71
11	**Kadapa**	47303	9645	38097	14720	109765	10507	99258	63987	5780	69767	9456	27016	70
12	**Anantapur**	70802	19520	43047	31393	164762	15225	149537	129642	10730	140372	18684	34765	94
13	**Kurnool**	56720	30261	29164	35273	151418	14353	137065	61274	3688	64962	13214	68736	47
	Total (Ham)	**896782.7269**	**425227.8604**	**320706.755**	**396771.2992**	**2039491.56**	**191431.0113**	**1848060.548**	**729098.2057**	**81302.3591**	**810400.5648**	**164410.0553**	**1020970**	**44**
	Total (bcm)	**8.97**	**4.25**	**3.21**	**3.97**	**20.39**	**1.91**	**18.48**	**7.29**	**0.81**	**8.10**	**1.64**	**10.21**	**44**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Arunachal Pradesh														
Sl.No	District	Annual Replenishable Ground Water Resource					NaturalDischarge During Non-Monsoon Period	Net Ground Water Availability	Annual Ground Water Draft			Projected demand for Domestic and Industrial uses upto 2025	Ground Water Availability for Future Irrigation use	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total			Irrigation	Domestic & Industrial Water Supply	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	Tirap	7208	0.07	2044	0.1	9252.17	925	8327.17	2.8	17.8	20.6	57	8267.37	0.247383
2	Changlang	20761	17.83	6907	26.74	27712.57	2771	24941.57	25.5	98.7	124.2	204	24712.07	0.4979638
3	Lohit	142890	0	52307	0	195197	19520	175677	5.3	252.8	258.1	1081	174590.7	0.1469174
4	Anjaw	0	0	0	0	0	0	0	0	0	0	0	0	0
5	Dibang valley	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Lower Dibang Valley	70406	0	24947	0	95353	9535	85818	33.5	48	81.5	161	85623.5	0.0949684
7	East Siang	60304	8.07	14949	12.1	75273.17	7527	67746.17	70.6	179	249.6	366	67309.57	0.3684341
8	West Siang	4936	0.53	1286	0.53	6223.06	622	5601.06	0	25	25	10	5591.06	0.4463441
9	Upper Siang		0	0	0	0		0	0	0	0	0	0	0
10	East Kameng	13364	0	3030	0	16394	1639	14755	15	2.5	17.5	14	14726	0.1186039
11	West Kameng	1406	0.21	344	0.31	1750.52	175	1575.52	0	0	0	7	1568.52	0
12	Lower Subansiri	1761	0.05	803	0.05	2564.1	256	2308.1	5	0	5	12	2291.1	0.2166284
13	Upper Subansiri	228	0	105	0.1	333.1	33	300.1	0	0	0	0	300.1	0
14	Papum Pare	10727	0	2504	26.74	13257.74	1325.7	11932.04	57.5	83.9	141.4	110	11764.54	1.1850446
15	Tawang	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Kurung Kumey	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total (Ham)	**333991**	**26.76**	**109226**	**66.67**	**443310.43**	**44328.7**	**398981.73**	**215.2**	**707.7**	**922.9**	**2022**	**396744.53**	**0.23**
	Total (bcm)	**3.340**	**0.0003**	**1.092**	**0.001**	**4.433**	**0.443**	**3.990**	**0.002**	**0.007**	**0.01**	**0.020**	**3.967**	**0.23**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Assam														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge During Non-Monsoon Period	Net Ground Water Availability	Annual Ground Water Draft			Projected demand for Domestic and Industrial uses upto 2025	Ground Water Availability for Future Irrigation use	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total			Irrigation	Domestic & Industrial Water Supply	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	**Baksa**	98006	5714	33485	2217	139422	13942	125480	9297	2012	11309	2352	113831	9
2	**Barpeta**	119188	14659	44658	4134	182639	18264	164375	33392	3641	37033	4807	126176	23
3	**Bongaigaon**	63920	13985	31849	2294	112048	11205	100843	35131	1597	36728	2029	63683	36
4	**Cachar**	56753	101	33589	22	90465	9046	81419	242	3837	4079	4847	76329	5
5	**Chirang**	90683	2703	36455	888	130729	13073	117656	5582	1032	6614	1189	110885	6
6	**Darrang**	55917	9533	25871	1573	92894	9289	83605	23925	1951	25876	2512	57168	31
7	**Dhemaji**	157318	3337	53993	724	215372	21537	193835	7920	1472	9392	1924	183991	5
8	**Dhubri**	66278	15915	26160	3453	111806	11181	100625	37768	4204	41972	5764	57093	42
9	**Dibrugarh**	110898	3365	61196	794	176253	17625	158628	7732	2987	10719	3313	147583	7
10	**Dima Hasao**	1755	0	1756	1	3512	351	3161	0	482	482	544	2618	15
11	**Goalpara**	66604	19717	31555	3237	121113	12111	109002	10460	2323	12783	2637	110400	12
12	**Golaghat**	88166	4169	44195	689	137219	13722	123497	49525	2219	51744	2918	56558	42
13	**Hailakandi**	13767	2	10871	3	24643	2464	22179	0	1417	1417	1873	20306	6
14	**Jorhat**	88883	1780	44704	303	135670	13567	122103	4443	2456	6899	2620	115039	6
15	**Kamrup**	76973	14050	37245	2312	130580	13058	117522	35277	3350	38627	3982	78263	33
16	**Kamrup Metro**	15162	0	7336	0	22498	2250	20248	0	3225	3225	3461	16787	16
17	**Karbi Anglong**	29714	4064	13537	3408	50723	5072	45651	3461	2093	5554	2640	39550	12
18	**Karimganj**	24857	16	21751	18	46642	4664	41978	0	2620	2620	3425	38553	6
19	**Kokrajhar**	178911	6142	59890	2735	247678	24768	222910	10964	1896	12860	2013	209934	6
20	**Lakhimpur**	73775	5975	37980	987	118717	11872	106845	14992	2242	17234	2783	89070	16
21	**Morigaon**	45227	6413	16379	1054	69073	6907	62166	16107	2080	18187	2794	43265	29
22	**Nagaon**	96925	23949	38445	9845	169164	16916	152248	42572	6177	48749	8100	101576	32
23	**Nalbari**	25263	7491	15992	1234	49980	4998	44982	18803	1665	20468	1914	24265	46
24	**Sibsagar**	74853	1206	34257	208	110524	11052	99472	3003	2510	5513	2767	93702	6
25	**Sonitpur**	155887	7721	70126	2398	236132	23613	212519	16219	4169	20388	5053	191248	10
26	**Tinsukia**	147082	5668	65794	942	219486	21949	197537	14209	2977	17186	3400	179929	9
27	**Udalguri**	33720	4739	23368	3818	65645	6565	59080	4698	1784	6482	2014	52369	11
	Total (Ham)	**2056485**	**182414**	**922437**	**49291**	**3210627**	**321061**	**2889566**	**405722**	**68418**	**474140**	**83675**	**2400171**	**16**
	Total (bcm)	**20.56**	**1.82**	**9.22**	**0.49**	**32.11**	**3.21**	**28.90**	**4.06**	**0.68**	**4.74**	**0.84**	**24.00**	**16**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

Bihar

Sl.No	District	Annual Replenishable Ground Water Resource: Monsoon Season: Recharge from Rainfall	Annual Replenishable Ground Water Resource: Monsoon Season: Recharge From Other Sources	Annual Replenishable Ground Water Resource: Non-Monsoon Season: Recharge from Rainfall	Annual Replenishable Ground Water Resource: Non-Monsoon Season: Recharge From Other Sources	Annual Replenishable Ground Water Resource: Total	Natural Discharge During Non-Monsoon Period	Net Ground Water Availability	Annual Ground Water Draft: Irrigation	Annual Ground Water Draft: Domestic & Industrial Water Supply	Annual Ground Water Draft: Total	Projected demand for Domestic and Industrial uses upto 2025	Ground Water Availability for Future Irrigation use	Stage of Ground Water Development (%)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Araria**	64316.63	5629.64	16077.93	2391.98	88416.18	8841.62	79574.56	16526.40	6061.67	22588.07	1646	61402.16	28.39
2	**Arwal**	14215.29	5040.38	1978.24	3679.36	24913.27	2222.55	22690.72	8814.90	1884.15	10699.05	448	13427.82	47.15
3	**Aurangabad**	78885.74	10979.18	9314.89	10562.01	109741.82	9608.16	100133.66	16966.70	5291.20	22257.90	1488	81678.96	22.23
4	**Banka**	40422.71	7066.94	7804.28	2402.29	57696.22	5613.03	52083.19	11728.80	4154.66	15883.46	1199	39155.39	30.50
5	**Begusarai**	43472.21	6197.45	7198.32	15089.12	71957.10	6884.62	65072.48	27950.20	7541.29	35491.49	1743	35379.28	54.54
6	**Bhabhua**	59631.43	8466.01	5720.35	8232.37	82050.16	7398.21	74651.95	21989.40	3958.42	25947.82	956	51706.55	34.76
7	**Bhagalpur**	65091.97	1673.93	11794.75	1887.61	80448.26	8044.83	72403.43	17207.70	5560.82	22768.52	1426	53769.73	31.45
8	**Bhojpur**	54639.03	15586.74	7308.26	15729.68	93263.71	8858.27	84405.44	35173.60	6718.59	41892.19	1602	47629.84	49.63
9	**Buxar**	36657.96	19465.93	4869.18	19851.89	80844.96	7813.73	73031.23	29281.80	4218.05	33499.85	1001	42748.43	45.87
10	**Darbhanga**	48113.40	5124.21	7547.95	6015.35	66800.91	4611.29	62189.62	22714.60	9096.32	31810.92	2308	37167.02	51.15
11	**East Champaran**	93746.32	22911.98	14625.88	13012.89	144297.07	12686.17	131610.91	47621.40	11521.23	59142.63	2991	80998.51	44.94
12	**Gaya**	90922.45	7515.78	12424.20	10344.00	121206.43	9850.31	111356.12	55302.80	11184.66	66487.46	2519	53534.32	59.71
13	**Gopalganj**	46651.86	12411.12	6908.13	12546.40	78517.51	6634.38	71883.13	38738.10	6451.68	45189.78	1503	31642.03	62.87
14	**Jamui**	36024.20	2638.67	6941.70	3226.24	48830.81	4883.08	43947.73	7011.60	3443.38	10454.98	1034	35902.13	23.79
15	**Jehanabad**	22421.30	4299.91	2896.93	9514.16	39132.30	3913.23	35219.07	21214.20	3016.99	24231.19	661	13343.87	68.80
16	**Katihar**	77743.57	7287.98	15801.51	8218.34	109051.40	9221.53	99829.87	52245.30	7677.93	59923.23	1800	45784.57	60.03
17	**Khagaria**	37566.72	2422.30	6138.40	13726.31	59853.73	5061.05	54792.68	15945.80	3631.02	19576.82	975	37871.88	35.73
18	**Kishanganj**	59622.24	1328.56	14675.96	2957.10	78583.86	7858.39	70725.47	16162.50	3777.63	19940.13	991	53571.97	28.19
19	**Lakhisarai**	22615.60	3483.93	3181.59	1573.93	30855.05	3085.51	27769.55	9278.80	2244.33	11523.13	535	17955.75	41.50
20	**Madhepura**	42913.78	6762.93	8510.28	9407.42	67594.41	5342.27	62252.14	28678.00	5019.26	33697.26	1177	32397.14	54.13
21	**Madhubani**	95287.05	8154.76	15263.68	6035.00	124740.49	11792.93	112947.56	37070.90	9385.29	46456.19	2631	73245.66	41.13
22	**Munger**	26929.75	5774.56	4179.30	4452.61	41336.22	3969.16	37367.06	9136.60	2968.72	12105.32	808	27422.46	32.40
23	**Muzaffarpur**	62878.57	18510.69	11172.44	22542.29	115103.99	10114.27	104989.72	51420.00	11176.06	62596.06	2811	50758.72	59.62
24	**Nalanda**	49047.47	6310.64	6964.07	11013.30	73335.48	6087.44	67248.04	39395.70	7334.16	46729.86	1691	26161.34	69.49
25	**Nawada**	38503.00	6579.16	6895.37	9868.76	61846.29	4976.22	56870.07	22871.55	4330.02	27201.57	1066	32932.52	47.83
26	**Patna**	71244.76	13927.82	10351.51	20319.74	115843.83	11584.38	104259.45	36622.10	13051.46	49673.56	3419	64218.35	47.64
27	**Purnia**	96651.06	5294.43	18884.75	5860.96	126691.20	11490.86	115200.34	48955.91	7982.71	56938.62	1914	64330.43	49.43
28	**Rohtas**	92009.77	13448.21	10670.68	7380.68	123509.34	11858.02	111651.32	19959.30	6399.64	26358.94	1741	89951.02	23.61
29	**Saharsa**	45844.41	5444.89	8139.27	4642.47	64071.04	5013.60	59057.44	13182.40	3721.49	16903.89	1115	44760.04	28.62
30	**Samastipur**	66497.87	22107.39	10749.35	29305.17	128659.78	12865.98	115793.80	52610.10	9743.80	62353.90	2499	60684.70	53.85
31	**Saran**	61458.09	11476.26	8104.88	14115.53	95154.76	8616.60	86538.16	47711.10	9332.85	57043.95	2316	36511.06	65.92
32	**Sheihkpura**	15196.72	1640.50	2135.83	1904.51	20877.56	2087.76	18789.80	6360.00	1548.90	7908.90	375	12054.80	42.09
33	**Sheohar**	13315.40	1757.58	1891.65	1193.42	18158.05	1698.85	16459.20	6299.40	1485.63	7785.03	385	9774.80	47.30
34	**Sitamarhi**	53660.09	5115.55	9711.04	3617.05	72103.73	5759.72	66344.01	20496.00	6858.90	27354.90	2008	43840.01	41.23
35	**Siwan**	43367.75	22611.72	7262.79	18459.19	91701.45	6859.77	84841.68	39373.40	7516.98	46890.38	1954	43514.28	55.27
36	**Supaul**	61106.69	10798.75	11808.84	8418.32	92132.60	6527.96	85604.64	22048.20	4848.78	26896.98	1306	62250.44	31.42
37	**Vaishali**	47807.88	11646.67	7336.96	10086.99	76878.50	7406.81	69471.70	32320.59	7952.67	40273.26	2049	35102.11	57.97
38	**West Champaran**	89283.97	21277.99	12402.18	31745.08	154709.22	15094.34	139614.88	29810.80	8916.64	38727.44	2306	107498.08	27.74
	Total (Ham)	**2065764.71**	**348171.14**	**335643.32**	**381329.52**	**3130908.69**	**282236.87**	**2848671.82**	**1036196.65**	**237007.99**	**1273204.64**	**60397.00**	**1752078.17**	**44.69**
	Total (bcm)	**20.66**	**3.48**	**3.36**	**3.81**	**31.31**	**2.82**	**28.49**	**10.36**	**2.37**	**12.73**	**0.60**	**17.52**	**44.69**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Chhattisgarh														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge During Non-Monsoon Period	Net Ground Water Availability	Annual Ground Water Draft			Projected demand for Domestic and Industrial uses upto 2025	Ground Water Availability for Future Irrigation use	Stage of Ground Water Develop ment (%)
		Monsoon Season		Non-Monsoon Season		Total			Irrigation	Domestic & Industrial Water Supply	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	Balod	18793.87	4196.82	2570.07	5818.56	31379.32	2522.02	28857.30	15244.56	2125.87	17370.43	2445.88	11462.82	60
2	Baloda Bazar	37079.03	6814.14	4099.72	4389.11	52382.00	4096.41	48285.59	16208.17	2401.07	18609.24	2996.85	29080.57	39
3	Balrampur	56280.91	673.96	4219.38	2293.84	63468.09	4625.18	58842.91	10210.87	1680.01	11890.88	2190.22	46441.82	20
4	Bastar	41478.34	604.17	5571.10	1306.30	48959.91	3911.80	45048.11	3875.09	2083.22	5958.31	2541.77	38631.25	13
5	Bemetara	21616.51	3558.47	2948.83	10148.28	38272.09	3022.97	35249.12	23627.04	1631.58	25258.62	1696.86	9925.22	72
6	Bijapur	74599.28	92.51	10258.92	184.58	85135.29	8513.53	76621.76	808.93	579.74	1388.67	688.18	75124.65	2
7	Bilaspur	36923.93	3620.45	0.00	3142.06	43686.44	2584.00	41102.44	15522.66	3215.18	18737.84	4681.47	20898.31	46
8	Dantewara	19630.75	103.90	0.00	580.63	20315.28	1259.64	19055.64	1259.75	640.68	1900.43	765.93	17029.96	10
9	Dhamtari	32969.93	7146.50	0.00	9909.05	50025.48	3963.91	46061.57	33385.08	2791.71	36176.79	3130.64	9545.85	79
10	Durg	16858.12	4081.23	2090.00	5216.73	28246.08	1881.95	26364.13	17234.14	4190.77	21424.91	4825.31	4304.68	81
11	Gariaband	25108.19	3718.98	0.00	3407.29	32234.46	2797.81	29436.65	12709.50	1684.83	14394.33	1876.91	14850.24	49
12	Janjgir-Champa	25033.80	6778.18	3155.97	5512.10	40480.05	3120.71	37359.34	12001.10	3470.03	15471.13	4218.96	21139.28	41
13	Jashpur	41275.88	598.02	4966.28	3534.75	50374.93	3155.76	47219.17	14829.85	1954.44	16784.29	2258.36	30130.96	36
14	Kanker	77929.28	1102.98	8447.93	3125.12	90605.31	5047.28	85558.03	20702.54	1766.65	22469.19	2165.72	62689.77	26
15	Kawardha	35202.43	2234.96	3942.45	7831.82	49211.66	4118.93	45092.73	22869.89	1885.73	24755.62	2161.27	20061.57	55
16	Kondagaon	45186.57	261.17	5641.14	1202.33	52291.21	2614.57	49676.64	5751.59	1470.87	7222.46	1814.55	42110.50	15
17	Korba	41178.34	885.17	4089.97	2962.13	49115.61	2464.44	46651.17	10499.28	3923.61	14422.89	4676.56	31475.33	31
18	Koriya	46655.01	1445.81	3397.30	2401.02	53899.14	3307.82	50591.32	9872.87	1669.71	11542.58	2913.54	37804.91	23
19	Mahasamund	54007.26	3699.24	1096.20	6662.39	65465.09	3722.04	61743.05	29530.10	4241.31	33771.41	4716.97	27495.98	55
20	Mungeli	17975.07	1957.80	0.00	2044.66	21977.53	1098.88	20878.65	10190.40	1552.05	11742.45	1646.13	9042.12	56
21	Narayanpur	22960.73	218.84	4254.64	375.96	27810.17	1851.88	25958.29	383.20	506.43	889.63	620.94	24954.15	3
22	Raigarh	32330.10	2233.08	3501.24	4993.84	43058.26	2962.61	40095.65	17787.91	3820.36	21608.27	4548.32	17799.26	54
23	Raipur	23706.25	10854.80	876.71	5064.06	40501.82	3256.21	37245.61	14901.51	6067.53	20969.04	6950.76	15393.34	56
24	Rajnandgaon	37890.69	6561.12	4897.76	7185.51	56535.08	4386.18	52148.90	27677.98	3889.94	31567.92	3976.66	20494.26	61
25	Sukma	33001.60	103.20	0.00	420.50	33525.30	2660.39	30864.91	857.86	564.99	1422.85	622.77	29384.28	5
26	Surajpur	53933.61	983.07	3737.63	3861.94	62516.25	3164.45	59351.80	17940.49	1856.28	19796.77	2399.84	39011.47	33
27	Surguja	41173.81	1150.60	3157.98	2582.20	48064.59	3520.90	44543.69	9916.70	2370.84	12287.54	2757.41	31869.58	28
	Total (Ham)	**1010779.29**	**75679.17**	**86921.22**	**106156.76**	**1279536.44**	**89632.27**	**1189904.17**	**375799.06**	**64035.43**	**439834.49**	**76288.78**	**738152.13**	**37**
	Total (bcm)	**10.11**	**0.76**	**0.87**	**1.06**	**12.80**	**0.90**	**11.90**	**3.76**	**0.64**	**4.40**	**0.76**	**7.38**	**37**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Delhi														
Sl.No	Tehsil	Annual Replenishable Ground Water Resource					Natural Discharge During Non-Monsoon Period	Net Ground Water Availability	Annual Ground Water Draft			Projected demand for Domestic and Industrial uses upto 2025	Ground Water Availability for Future Irrigation use	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total			Irrigation	Domestic & Industrial Water Supply	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	Darya Ganj	196.25	8.75	26.48	99.82	331.3	33.13	298.17	40.7	217.18	257.88	217.18	40.29	86
2	Karol Bagh	29.34	1.12	3.46	8.56	42.48	4.25	38.23	10.42	49.8	60.22	49.79	0	158
3	Pahar Ganj	63.43	2.79	8.01	18.36	92.59	9.26	83.33	0	74.02	74.02	74.01	9.32	89
4	Gandhi Nagar	90.34	10.03	15.88	266.41	382.66	38.27	344.39	96.04	150.72	246.76	150.72	97.63	72
5	Preet Vihar	119.9	74.86	21.07	879.93	1095.76	109.58	986.18	690.7	813.43	1504.13	813.43	0	153
6	Vivek Vihar	98.32	12.86	17.28	119.79	248.25	24.83	223.42	57.36	403.68	461.04	403.68	0	206
7	Chanakay Puri	88.35	35.34	19.53	266.16	409.38	40.94	368.44	250.41	153.39	403.8	153.39	0	110
8	Connaught Place	92.48	10.59	13.62	83.31	200	20	180	20.83	198.78	219.61	198.78	0	122
9	Parliament Street	61.66	7.78	13.63	57.51	140.58	14.06	126.52	21.36	88.47	109.83	88.47	16.69	87
10	Civil Lines	541.02	49.05	83.19	433.15	1106.41	55.32	1051.09	85.55	784.37	869.92	784.37	181.17	83
11	Kotwali	32.42	1.18	5.73	75.89	115.22	11.52	103.7	52.84	45.49	98.33	45.48	5.38	95
12	Sadar Bazar	30.1	3.27	5.56	24.99	63.92	3.2	60.72	0	46.09	46.09	46.09	14.63	76
13	Seelam Pur	210.21	24.26	36.94	694.85	966.26	96.63	869.63	328.91	587.81	916.72	587.81	0	105
14	Seema Puri	110.1	0.79	12.9	3.15	126.94	12.69	114.25	0	195.31	195.31	195.31	0	171
15	Shahdra	30.46	4.06	5.35	32.12	71.99	7.2	64.79	0	115.44	115.44	115.44	0	178
16	Model Town	436.63	54.71	45.43	458.03	994.8	99.48	895.32	70.45	868.72	939.17	868.72	0	105
17	Narela	1438.93	363.36	261.69	4180.18	6244.16	624.42	5619.74	1972.67	2951.01	4923.68	2951	696.06	88
18	Saraswati Vihar	231.62	198.26	40.27	2351.56	2821.71	282.17	2539.54	1238.76	1173.65	2412.41	1173.65	127.13	95
19	Defence Colony	280.48	84.52	61.98	385.82	812.8	81.28	731.52	299.42	422.99	722.41	422.99	9.11	99
20	Hauz Khas	1082.98	225.82	122.41	543.43	1974.64	197.46	1777.18	466.71	4152.01	4618.72	4152.01	0	260
21	Kalkaji	676.18	78.63	74.1	462.57	1291.48	129.15	1162.33	1127.22	2092.74	3219.96	2092.74	0	277
22	Delhi Cantonment	522.19	82.13	84.54	471.98	1160.84	58.04	1102.8	369.03	945.21	1314.24	945.21	0	119
23	Najafgarh	1116.79	425.04	214.37	6407.43	8163.63	816.36	7347.27	5787.04	1203.56	6990.6	1203.57	356.66	95
24	Vasant Vihar	784.75	77.86	133.13	234.67	1230.41	123.04	1107.37	303.91	2668.11	2972.02	2668.11	0	268
25	Patel Nagar	219.73	177	28.4	1422.71	1847.84	184.78	1663.06	73.81	2959.72	3033.53	2959.71	0	182
26	Panjabi Bagh	78.64	163.89	0	1389.79	1632.32	163.23	1469.09	380.97	929.16	1310.13	929.17	158.95	89
27	Rajouri Garden	97.25	25.99	11.39	201.79	336.42	16.82	319.6	18.45	722.37	740.82	722.37	0	232
	Total (Ham)	**8760.55**	**2203.94**	**1366.34**	**21573.96**	**33904.79**	**3390.48**	**30647.68**	**13763.56**	**25013.23**	**38776.79**	**25013.21**	**1713.02**	**127**
	Total (bcm)	**0.09**	**0.02**	**0.014**	**0.22**	**0.34**	**0.03**	**0.31**	**0.14**	**0.25**	**0.39**	**0.25**	**0.02**	**127**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Goa														
Sl.No	**District**	**Annual Replenishable Ground Water Resource**					**Natural Discharge During Non-Monsoon Period**	**Net Ground Water Availability**	**Annual Ground Water Draft**			**Projected demand for Domestic and Industrial uses upto 2025**	**Ground Water Availability for Future Irrigation use**	**Stage of Ground Water Development (%)**
		Monsoon Season		**Non-Monsoon Season**		**Total**			**Irrigation**	**Domestic & Industrial Water Supply**	**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**	9395	51	0	5251	14697	5879	8818	1594	1818	3411	2197	5028	39
2	**South Goa**	5451	1010	644	2574	9678	3871	5807	554	1412	1966	1706	3547	34
Total (Ham)		**14846**	**1061**	**644**	**7824**	**24375**	**9750**	**14625**	**2148**	**3229**	**5377**	**3902**	**8575**	**37**
Total (bcm)		**0.15**	**0.011**	**0.01**	**0.08**	**0.24**	**0.10**	**0.15**	**0.02**	**0.03**	**0.05**	**0.04**	**0.09**	**37**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Gujarat														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Ahmedabad**	39327.77	8993.34	0.00	10008.78	58329.89	3071.48	55258.40	35069.40	7420.00	42489.40	9597.00	10592.00	77
2	**Amreli**	76488.80	10666.14	0.00	12631.17	99786.11	4989.31	94796.80	59553.35	2637.00	62190.35	3532.00	31711.45	66
3	**Anand**	31958.88	23846.82	0.00	26681.84	82487.54	4779.06	77708.48	37191.20	5652.00	42843.20	6875.00	33642.28	55
4	**Banaskantha**	88500.43	13922.63	0.00	18015.04	120438.10	6164.97	114273.13	133217.08	5870.00	139087.08	7638.00	6622.84	122
5	**Bharuch**	34201.93	2602.20	0.00	9872.66	46676.78	2333.84	44342.94	18361.70	2292.00	20653.70	2978.00	23003.24	47
6	**Bhavnagar**	81802.34	17528.86	0.00	14091.79	113423.00	5671.15	107751.85	64735.30	6233.50	70968.80	7561.00	35455.55	66
7	**Dang**	4624.21	2048.67	0.00	34.38	6707.26	335.36	6371.89	1441.50	582.00	2023.50	758.00	4172.39	32
8	**Dohad**	22451.18	6805.08	0.00	9545.94	38802.20	1940.11	36862.09	13340.60	4571.00	17911.60	5547.00	17974.49	49
9	**Gandhinagar**	35503.58	5245.20	0.00	2845.75	43594.52	2179.73	41414.79	57054.00	3112.00	60166.00	3753.00	0.00	145
10	**Jamnagar**	80505.45	11681.29	0.00	7646.04	99832.78	4991.64	94841.14	57756.50	4500.00	62256.50	6033.00	31051.64	66
11	**Junagadh**	115401.36	13671.87	0.00	16840.77	145914.00	7295.70	138618.30	84908.60	6869.00	91777.60	9203.00	44506.70	66
12	**Kachchh**	59875.02	13036.63	0.00	13821.69	86733.34	4336.67	82396.68	63559.80	4529.00	68088.80	5694.00	14989.28	83
13	**Kheda**	44245.20	15699.83	0.00	17741.37	77686.40	4021.93	73664.47	37168.10	6482.40	43650.50	7862.00	28634.37	59
14	**Mahesana**	76463.40	10621.22	0.00	12992.13	100076.75	5003.84	95072.91	110581.00	4976.00	115557.00	6476.00	196.02	122
15	**Narmada**	18167.03	1666.88	0.00	4453.99	24287.90	1214.39	23073.50	4412.60	1601.00	6013.60	2085.00	16575.90	26
16	**Navsari**	19739.97	7852.87	0.00	13215.06	40807.90	2040.40	38767.51	14753.60	2344.00	17097.60	3117.00	20896.91	44
17	**Panchmahals**	34908.10	18313.86	0.00	33012.76	86234.72	4311.74	81922.98	24649.00	5775.00	30424.00	7007.00	50266.98	37
18	**Patan**	13641.37	7474.20	0.00	7257.54	28373.11	1418.66	26954.46	26758.50	1915.00	28673.50	2495.00	0.00	106
19	**Porbandar**	17295.56	2149.96	0.00	1409.84	20855.36	1042.77	19812.59	13710.30	835.00	14545.30	1618.00	4484.29	73
20	**Rajkot**	116081.86	20348.85	0.00	25253.85	161684.56	8084.23	153600.33	95511.10	8046.00	103557.10	10416.00	47673.23	67
21	**Sabarkantha**	103933.01	17012.48	0.00	18065.89	139011.38	6950.57	132060.82	88314.20	5798.00	94112.20	7738.00	36008.62	71
22	**Surat**	63262.07	56216.37	0.00	46869.42	166347.86	8317.39	158030.47	45722.50	6317.00	52039.50	8286.00	104021.97	33
23	**Surendranagar**	68273.94	4254.01	0.00	6880.46	79408.41	3970.42	75437.99	42188.00	3055.00	45243.00	3936.00	29313.99	60
24	**Tapi**	24597.97	10620.05	0.00	13133.73	48351.74	3708.30	44643.44	19396.50	1330.00	20726.50	1793.00	18750.53	46
25	**Vadodara**	93739.69	11875.61	0.00	22433.01	128048.31	6402.42	121645.89	64595.60	8372.40	72968.00	10566.00	46484.29	60
26	**Valsad**	27838.00	7553.00	0.00	6108.00	41498.00	2075.00	39423.00	16341.00	2608.00	18949.00	3165.00	19917.00	48
	Total (ham)	**1392828.10**	**321707.92**	**0.00**	**370862.91**	**2085397.93**	**106651.05**	**1978746.87**	**1230291.03**	**113722.30**	**1344013.33**	**145729.00**	**676945.98**	**68**
	Total (bcm)	**13.93**	**3.22**	**0.00**	**3.71**	**20.85**	**1.07**	**19.79**	**12.30**	**1.14**	**13.44**	**1.46**	**6.77**	**68**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Haryana														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Developme nt (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Ambala	30434	13023	9196	8762	61415	5109	56306	49756	7710	57466	4875	1675	102
2	Panchkula	8342	2516	2569	2141	15568	1015	14553	8862	2790	11652	377	5314	80
3	Fatehabad	14233	27295	3127	25599	70254	7025	63229	115758	365	116123	414	-52943	184
4	Bhiwani	26116	17183	4643	20881	68823	6702	62121	103397	1742	105139	2413.7	-43690	169
5	Hissar	23133	19722	4834	29151	76840	6662	70178	77990	310	78300	610	-8422	112
6	Gurgaon	12579	2785	4495	6616	26475	2648	23827	28062	3688	31750	2100	-6335	133
7	Mewat	11921	3964	4704	3405	23994	2180	21814	15016	1180	16196	2092	4705	74
8	Faridabad	6928	3650	3273	4737	18588	1447	17141	14777	2232	17009	1228	1136	99
9	Palwal	11890	16270	2533	20556	51248	5124	46124	46095	999	47094	1494	-1465	102
10	Jhajjar	14177	13651	3188	16163	47180	4717	42462	35002	295	35297	221	7239	83
11	Jind	18309	37489	9856	46874	112528	10350	102178	111148	3989	115137	3123	-12093	113
12	Kaithal	16114	22791	5204	15342	59450	5943	53507	114114	6573	120687	8238	-68845	226
13	Karnal	24827	18567	5315	29360	78069	6123	71946	85311	1853	87164	1755	-15120	121
14	Kurukshetra	21794	19239	4945	11468	57445	5746	51699	135122	9993	145115	11093	-94516	281
15	Mahendragarh	16907	1931	4444	4823	28105	2475	25630	21607	551	22158	2596	1427	86
16	Panipat	13748	8979	2597	11655	36979	3698	33281	53347	894	54241	794	-20860	163
17	Rewari	14503	4129	3513	12250	34395	3433	30962	27175	1164	28339	2068	1719	92
18	Rohtak	13014	16830	4636	18625	53105	5310	47795	33285	99	33384	1283	13227	70
19	Sirsa	13557	20891	5148	31156	70752	7074	63678	110751	849	111600	849	-47922	175
20	Sonepat	22527	28180	6067	31746	88519	8324	80195	86500	2361	88861	2169	-8474	111
21	Yamunanagar	26469	11273	9165	9081	55988	4948	51040	58647	10215	68862	6554	-14161	135
	Total (ham)	**361522.44**	**310358.29**	**103451.99**	**360391.12**	**1135719.84**	**106053.42**	**1029666.42**	**1331722**	**59852**	**1391574**	**56347**	**-358403**	**135**
	Total (bcm)	**3.62**	**3.10**	**1.03**	**3.60**	**11.36**	**1.06**	**10.30**	**13.32**	**0.60**	**13.92**	**0.56**	**-3.58**	**135**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Himachal Pradesh														
Sl.No	Valleys	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Developme nt (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Indaura	7584.35	441.93	2556.12	883.85	11466.25	573.31	10892.94	5303.12	2220.2	7523.32	647.17	4942.65	69
2	Nurpur	9929.58	123.06	2289.39	246.13	12588.16	629.41	11958.75	1476.75	2061.17	3537.92	976.44	9505.56	30
3	Balh	1849.5	9.49	864.22	18.98	2742.19	137.11	2605.08	113.89	784.98	898.87	933.85	1557.34	35
4	Paonta	5464.68	24.07	1009.72	48.13	6546.6	327.33	6219.27	288.79	598.35	887.14	1239.38	4691.1	14
5	Kala Amb	58.28	3.97	16.15	7.93	86.33	4.32	82.01	47.58	289.37	336.95	42.48	-8.05	411
6	Nalagarh	6296.76	134.39	1920.85	268.78	8620.78	431.04	8189.74	1612.64	2286.4	3899.04	1916.03	4661.07	48
7	Una	8107.62	999.29	2689.81	1723.71	13520.43	676.02	12844.41	7050.11	2509.55	9559.66	1290.67	4503.63	74
8	Hum	417.55	41.77	120.03	49.54	628.89	31.44	597.45	466.14	73.32	539.46	164.32	-33.01	90
Total (ham)		39708.32	1777.97	11466.29	3247.05	56199.63	2809.98	53389.65	16359.02	10823.34	27182.36	7210.34	29820.29	51
Total (bcm)		0.40	0.02	0.11	0.03	0.56	0.03	0.53	0.16	0.11	0.27	0.07	0.30	51

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Jammu & Kashmir														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Jammu	28532.97	38738.05	12475.16	19457.2	99203.38	9814.14	89389.24	12093	10847.6	22940.6	9398.36	67897.88	26
2	Samba	7746.98	6724.3	3453.45	6136.45	24061.18	3196.07	20865.11	900	5115	6015	2175.6	17789.51	29
3	Kathua	15978.08	17400.4	5968.7694	10288.45	49635.7	3943.93	45691.77	5469	3830.2	9299.2	4597.19	35625.58	20
4	Srinagar	2150.11	9199.2	1852.58	31.17	13233.06	880.43	12352.63	264	7920	8184	9761.26	2327.37	66
5	Ganderbal	1899.28	9407.2	5324.4	122.85	16753.73	780.77	15972.96	235.5	4260.8	4496.3	3505.69	12231.77	28
6	Anantnag	5642.06	31695.4	4955.92	779.7	43073.09	2550.471	40522.62	34.5	6239.6	6274.1	13460.778	27027.34	15
7	Kulgam	2063.79	15533.4	1812.81	1524.9	20934.9	2550.471	18384.43	34.5	5525.1	5559.6	2192.536	16157.4	30
8	Baramulla	21573.57	23093	10837.28	943.05	56446.91	4688.49	51758.42	364.5	4924.4	5288.9	7996.1	43397.82	10
9	Bandipora	2049.31	8124	1029.45	1003.8	12206.56	465.925	11740.64	36	5150.9	5186.9	2581.2	9123.44	44
10	Badgam	5640.595	21463.6	5494.4	2846.4	35444.995	2963.173	32481.82	61.5	8651.5	8713	6302.07	26118.25	27
11	Pulwama	5118.32	22665.6	5602.13	1093.8	34479.85	2378.736	32101.114	30	7902.9	7932.9	5390.95	26680.16	25
12	Shopian	1470.46	17090.2	1609.45	119.22	20289.33	710.53	19578.8	21	4800.3	4821.3	2299	17258.8	25
13	Kupwara	7730.4	15819.8	4898.4	64.65	28513.25	2105.5	26407.75	24	4857.6	4881.6	9562.16	16821.59	18
14	Udhampur	3775.78	1918.2	2267.12	3178	11139.1	452.31	10686.79	7.5	2956.8	2964.3	4199.4	6479.89	28
15	Reasi	1211.862	1560	734.95	2266.35	5773.16	195.97	5577.19	7.5	2442.5	2450	2810.76	2758.93	44
16	Ramban	216.72	4851.8	655.11	510	6233.63	567	5666.63	0	2772	2772	2873.86	2792.77	49
17	Rajouri	4549.29	3314.2	2565.42	750.75	11179.66	1179.95	9999.71	235.5	3388.5	3624	5694.216	4069.99	34
18	Kishtwar	443.83	4656.6	1224.52	911.55	7236.5	710.32	6526.18	0	382.8	382.8	1756.21	4769.97	6
19	Poonch	2994.72	5393.4	3291.74	522.3	12202.16	1043.4	11158.77	4.5	3748.8	3753.3	4364.34	6789.92	34
20	Doda	162.73	6895	492.21	1767	9316.94	848.06	8468.88	6	1813.4	1819.4	3672.09	4790.79	21
21	Kargil	227.09	1480.05	1452.15	240.6	3399.89	158.337	3241.55	0	138	138	1064.99	2176.56	4
22	Leh*	723.8	1498.35	1239.59	398.25	3859.99	410.442	3449.55	6	124.6	130.6	1258.97	2184.59	4
	Total (ham)	**121901.75**	**268521.75**	**79237.01**	**54956.44**	**524616.97**	**42594.43**	**482022.55**	**19834.50**	**97793.30**	**117627.80**	**106917.73**	**355270.32**	**24**
	Total (bcm)	**1.22**	**2.69**	**0.79**	**0.55**	**5.25**	**0.43**	**4.82**	**0.20**	**0.98**	**1.18**	**1.07**	**3.55**	**24**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Jharkhand														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Bokaro	23033.61	475.88	2325.32	898.61	26733.42	2014.94	24718.48	2380.50	9080.91	11461.41	1155.00	21182.98	46
2	Chatra	28610.09	496.15	2540.35	1640.19	33286.78	2902.66	30384.12	7463.50	2205.34	9668.84	620.00	22300.62	32
3	Deoghar	19926.15	158.65	2346.91	531.17	22962.88	2296.29	20666.59	2426.63	2001.22	4427.84	767.00	17472.97	21
4	Dhanbad	16128.37	1739.40	1761.93	2301.36	21931.06	1960.68	19970.38	1765.50	13544.34	15309.84	926.00	17278.88	77
5	Dumka	27924.48	391.56	3058.53	1550.19	32924.76	2770.44	30154.32	7693.75	1944.69	9638.44	781.00	21679.57	32
6	East Singhbhum	28503.59	87.93	3934.60	343.99	32870.11	3287.01	29583.10	1692.75	4126.01	5818.76	864.00	27026.35	20
7	Garhwa	30034.94	92.52	1427.38	346.81	31901.65	2963.32	28938.33	1651.38	1859.83	3511.20	786.00	26500.95	12
8	Giridih	41502.81	174.01	4190.74	587.42	46454.98	4123.13	42331.85	2689.88	4302.72	6992.59	1447.00	38194.98	17
9	Godda	21479.69	128.34	3431.87	360.92	25400.82	2427.08	22973.74	1471.25	2215.91	3687.16	785.00	20717.49	16
10	Gumla	42355.94	237.70	8263.99	933.27	51790.90	4423.19	47367.71	4603.50	1480.94	6084.44	608.00	42156.21	13
11	Hazaribagh	31664.94	153.60	4894.67	310.15	37023.36	2798.58	34224.78	885.38	3495.21	4380.59	994.00	32345.41	13
12	Jamtara	10023.11	108.20	921.02	426.85	11479.18	751.44	10727.74	2112.75	1078.30	3191.05	449.00	8165.99	30
13	Khunti	13954.06	145.10	2400.76	568.50	17068.42	1206.48	15861.94	2799.75	761.41	3561.16	309.00	12753.19	22
14	Koderma	8563.23	74.21	785.75	295.46	9718.65	782.69	8935.96	1472.63	1004.94	2477.56	376.00	7087.34	28
15	Latehar	19745.68	147.21	3496.32	516.69	23905.90	1577.79	22328.11	2396.50	1229.67	3626.17	438.00	19493.61	16
16	Lohardaga	17069.50	65.69	2740.37	253.80	20129.36	1852.27	18277.09	1237.00	590.39	1827.39	254.00	16786.09	10
17	Pakur	11393.35	69.17	2730.41	268.01	14460.94	1355.97	13104.97	1309.50	1346.71	2656.21	531.00	11264.47	20
18	Palamau	32472.24	259.01	2526.07	972.70	36230.02	3095.94	33134.08	4708.50	3033.59	7742.09	1116.00	27309.58	23
19	Ramgarh	9342.66	529.18	1135.12	783.81	11790.77	1128.96	10661.81	1126.75	5634.02	6760.77	543.00	8992.06	63
20	Ranchi	36157.48	395.36	6041.71	1321.18	43915.73	3601.51	40314.22	6027.38	4709.36	10736.73	1135.00	33151.84	27
21	Sahebganj	22760.58	81.30	2846.52	312.93	26001.33	2408.84	23592.49	1521.00	1733.21	3254.21	647.00	21424.49	14
22	Saraikela - Kharsawan	12405.86	41.86	1118.43	157.64	13723.79	1372.38	12351.41	753.00	1735.57	2488.57	547.00	11051.41	20
23	Simdega	27209.61	109.12	4375.94	422.64	32117.31	2793.29	29324.02	2064.50	812.69	2877.19	347.00	26912.52	10
24	West Singhbhum	28338.38	35.64	3774.44	123.53	32271.99	3047.25	29224.74	550.50	2412.40	2962.90	860.00	27814.24	10
	Total (ham)	560600	6196.79	73069.15	16228	656094	56942	599152	62804	72339	135143	17285	519063	23
	Total (bcm)	5.61	0.06	0.73	0.16	6.56	0.57	5.99	0.63	0.72	1.35	0.17	5.19	23

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Karnataka														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1	**Bagalkote**	13180	15127	5950	9993	44250	3636	40614	33563	3397	36959	4966	7175	91
2	**Bangalore Rural**	8080	3447	4999	3524	20050	1126	18924	22824	2228	25051	2250	0	132
3	**Bangalore Urban**	6838	1218	3624	1583	13262	695	12568	12473	6381	18854	6381	0	150
4	**Belgaum**	31660	47403	10926	23207	113196	10053	103143	75403	6875	82278	10549	21655	80
5	**Bellary**	21478	23266	13408	15125	73276	6970	66305	24851	3768	28619	6410	35378	43
6	**Bidar**	21027	2220	3874	3989	31110	1973	29137	16047	2039	18085	3021	10070	62
7	**Bijapur**	27339	7979	9209	7203	51730	3770	47960	31247	5356	36603	8336	8378	76
8	**Chamrajnagara**	15207	11108	6062	7603	39980	2812	37168	26694	2402	29096	2915	10857	78
9	**Chikballapur**	11478	8404	7901	4539	32322	2708	29614	41425	1404	42829	1501	250	145
10	**Chikmagalur**	35469	12546	12862	6528	67406	12104	55301	22455	2458	24913	3490	29501	45
11	**Chitradurga**	22359	8851	15463	8257	54930	4863	50067	48900	3915	52815	4628	2641	105
12	**Dakshin Kannada**	40482	1722	7174	3515	52893	19899	32995	19802	3274	23076	4215	8977	70
13	**Davangere**	22127	10614	13697	15111	61548	4832	56716	47750	3818	51568	5007	8553	91
14	**Dharwad**	17088	3826	6236	2584	29733	5901	23832	12087	2685	14772	4649	7096	62
15	**Gadag**	10616	5772	6012	4619	27018	2025	24994	21025	2095	23121	2741	3198	93
16	**Gulbarga**	29555	5208	9049	25938	69749	5853	63896	17033	3444	20476	7650	39213	32
17	**Hassan**	20686	28756	13069	18648	81159	8392	72768	38560	2826	41386	3915	30560	57
18	**Haveri**	16407	23541	9235	6758	55941	3869	52072	31838	3009	34847	4816	15435	67
19	**Kodagu**	18475	1577	9156	1236	30444	4821	25623	5560	1434	6994	1889	18174	27
20	**Kolar**	13326	6353	7515	7380	34574	1827	32746	58921	3438	62359	3438	0	190
21	**Koppal**	13636	19903	7018	19673	60230	5717	54513	22057	2518	24575	4131	28325	45
22	**Mandya**	12189	45549	7482	38921	104141	10136	94004	43281	2410	45691	4316	46407	49
23	**Mysore**	18777	19258	12551	12837	63422	5013	58410	23537	4044	27581	6250	28623	47
24	**Raichur**	19191	30077	9152	33339	91759	8732	83027	23696	2788	26484	5111	54220	32
25	**Ramanagara**	9392	4405	7004	4044	24846	1678	23168	19918	6294	26212	6377	464	113
26	**Shimoga**	39539	35873	11424	19968	106804	15901	90903	23797	2943	26740	5877	61230	29
27	**Tumkur**	28669	22448	20112	16010	87239	5633	81606	75323	4326	79649	6660	11414	98
28	**Udupi**	46777	973	5995	1770	55516	21755	33761	9839	2722	12561	3874	20048	37
29	**Uttar kannada**	70340	3664	5611	3356	82972	30456	52516	17207	3587	20794	10920	24389	40
30	**Yadgir**	13013	6646	5425	13201	38285	3336	34949	9232	1339	10571	2841	22876	30
	Total (ham)	**674402**	**417732**	**267196**	**340457**	**1699787**	**216487**	**1483300**	**876343**	**99215**	**975558**	**149124**	**555107**	**66**
	Total (bcm)	**6.74**	**4.18**	**2.67**	**3.40**	**17.00**	**2.16**	**14.83**	**8.76**	**0.99**	**9.76**	**1.49**	**5.55**	**66**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Kerala														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1		3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Alappuzha**	28700	67	7091	10869	46727	3566	43161	3893	9855	13748	9453	29815	32
2	**Ernakulam**	38788	304	7264	13502	59858	5986	53872	7700	12178	19878	13638	32533	37
3	**Idukki**	17048	189	3276	1757	22270	2227	20043	5516	4637	10153	4046	10481	51
4	**Kannur**	45281	0	0	6831	52112	5211	46901	8012	10567	18579	10999	27889	40
5	**Kasargod**	31746	770	0	4643	37158	3716	33442	16397	6561	22958	7180	9865	69
6	**Kollam**	27379	138	8949	3880	40346	3891	36455	4995	11282	16277	12893	18567	45
7	**Kottayam**	31597	105	6607	6994	45304	4530	40774	4850	8282	13132	9155	26769	32
8	**Kozhikode**	35393	148	0	1286	36827	3683	33144	4411	13429	17839	14590	14144	54
9	**Malappuram**	42101	330	6401	8552	57383	5696	51687	9560	20654	30214	23886	18241	58
10	**Palakkad**	33473	895	6068	30433	70870	7087	63783	21858	13426	35285	14112	27899	55
11	**Pathanamthitta**	20200	121	6344	3508	30174	2901	27273	3647	5645	9292	5433	18193	34
12	**Trivandrum**	22497	240	6603	3050	32389	2765	29624	5291	12563	17854	12888	11445	60
13	**Thrissur**	46381	875	0	17004	64261	6086	58175	20470	12337	32808	12938	24766	56
14	**Wayanad**	30553	30	0	634	31217	3122	28096	1576	3898	5474	3777	22743	19
	Total (ham)	**451137**	**4212**	**58603**	**112943**	**626896**	**60467**	**566430**	**118176**	**145314**	**263491**	**154988**	**293350**	**47**
	Total (bcm)	**4.51**	**0.04**	**0.59**	**1.13**	**6.27**	**0.60**	**5.66**	**1.18**	**1.45**	**2.63**	**1.55**	**2.93**	**47**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Madhya Pradesh														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Alirajpur**	19191.82	823.1	0	1448.74	21463.66	1073.18	20390.48	4750.28	2213.72	6964	5824	9816.2	34
2	**Agar**	36674.73	2061.45	0	8251.14	46987.32	2349.37	44637.95	37308.18	1272.29	38580.47	1790.1	5539.67	86
3	**Anupur**	33590.79	95.36	5577.68	233.85	39497.68	1974.89	37522.79	1122.34	1209.16	2331.5	2700.4	33700.05	6
4	**Ashoknagar**	36014.15	1787.64	0	6046.9	43848.69	2192.51	41656.18	19542.35	1602.5	21144.85	2584	19529.83	51
5	**Balaghat**	83218.32	3972.9	8090.86	2730.51	98012.59	4900.97	93111.62	10860.16	3178.92	14039.08	4145	78106.46	15
6	**Barwani**	36922.22	1608.16	0	5775.65	44306.03	2215.3	42090.73	31115.06	3242.63	34357.69	4714.6	6261.07	82
7	**Bhind**	52460.95	793.56	1546.75	11341.93	66143.19	3332.85	62810.34	23723.56	2860.69	26584.25	8094	30992.78	42
8	**Bhopal**	32025.09	1913.4	0	5630.96	39569.45	1978.47	37590.98	24889.03	2874.92	27763.95	3512.71	9189.24	74
9	**Betul**	94253.18	3660.07	11957.14	11055.68	120926.07	6000.13	114925.94	62997.1	3475.04	66472.14	4914	47014.84	58
10	**Burhanpur**	28866.6	913.96	0	4275.55	34056.11	1702.81	32353.3	24460.62	1212.39	25673.01	1562	6330.68	79
11	**Chhatarpur**	65915.85	3698.68	0	14049.49	83664.02	4156.91	79507.11	46826.13	3196.17	50022.3	4618.01	28062.97	63
12	**Chhindwara**	103113.36	4312.48	11904.87	14033.34	133364.05	6668.27	126695.78	66603.33	5474.03	72077.36	7279	52813.45	57
13	**Damoh**	30727.61	1579	0	8960.48	41267.09	2063.36	39203.73	22773.4	2301.39	25074.79	3254.51	13175.82	64
14	**Datia**	30023.02	766.82	0	7025.73	37815.57	1890.6	35924.97	15362.68	1274.69	16637.37	1954	18608.29	46
15	**Dewas**	71679.07	3016.28	2670.07	11404.21	88769.63	4438.45	84331.18	67877.65	4066.48	71944.13	4955.03	11498.5	85
16	**Dhar**	84510.70	4664.9	0	20377.75	109553.35	5481.52	104071.83	79322.11	5337.12	84659.23	10632.42	14117.3	81
17	**Dindori**	39718.11	119.17	4682.65	396.97	44916.9	2243.87	42673.03	1350.29	1397.26	2747.55	1715	39607.74	6
18	**Guna**	64983.8	3607.01	0	12073.02	80663.83	4045.51	76618.32	38692.19	2625.89	41318.08	3498.81	34427.32	54
19	**Gwalior**	38069.48	4664.33	562.86	15572.82	58869.49	3013.17	55856.32	19811.88	1484.87	21296.75	6090.31	29954.13	38
20	**Harda**	38346.24	2598.48	0	15558.05	56502.77	2815.83	53686.94	14155.84	1010.13	15165.97	1329	38202.1	28
21	**Hoshangabad**	148471.94	10274.43	0	60539.74	219286.11	10963.87	208322.24	39242.87	3067.7	42310.57	4349	164730.37	20
22	**Indore**	44562.76	4116.67	0	13134.42	61813.85	3090.77	58723.08	65164.51	3721.02	68885.53	4501.77	-10943.2	117
23	**Jabalpur**	53095.45	2668.53	980.43	6627.1	63371.51	3169.37	60202.14	25989.84	3500.83	29490.67	5198	29014.3	49
24	**Jhabua**	21844.53	787.69	0	2184.05	24816.27	1240.31	23575.96	9000.64	2542.3	11542.94	5689.44	8885.88	49
25	**Katni**	35274.65	1841.98	0	4802.18	41918.81	2095.59	39823.22	13609.97	2640.66	16250.63	4528	21685.25	41
26	**Khargone**	59372.35	3184.01	0	12771.42	75327.78	3713.65	71614.13	48826.49	3698.67	52525.16	5923.44	16864.2	73
27	**Khandwa**	70273.8	2012.27	0	10446.48	82732.55	4136.82	78595.73	48690.44	2934.56	51625	4976	24929.29	66
28	**Mandla**	49542.28	854.68	6601.47	3815.77	60814.2	2867.25	57946.95	6090.69	2405.35	8496.04	3359.61	48496.65	15
29	**Mandsaur**	46294.84	2459.51	0	11364.78	60119.13	3005.96	57113.17	54142.79	2979.39	57122.18	3352.55	-382.17	100
30	**Morena**	42924.13	868.68	694.25	20366.68	64853.74	3254.6	61599.14	19609.61	4487.31	24096.92	9549.51	32440.02	39
31	**Neemuch**	31855.76	3758.56	0	7610.23	43224.55	2161.23	41063.32	32576.45	1644.67	34221.12	1973	6513.87	83
32	**Narsinghpur**	110324.93	3673.57	0	17905.89	131904.39	6595.25	125309.14	81427.18	2222.12	83649.3	3066.08	40815.88	67
33	**Panna**	53572.84	732.98	0	3017.86	57323.68	2866.18	54457.5	13326.22	1915.83	15242.05	3536	37595.28	28
34	**Raisen**	82252.15	3143.19	0	8999.3	94394.64	4656.72	89737.92	37548.25	3310.34	40858.59	4412	47777.67	46
35	**Rajgarh**	83148.57	3719.62	0	11829.17	98697.36	4934.87	93762.49	71529.52	3165.76	74695.28	4811.23	17421.74	80
36	**Ratlam**	57659.69	4955.58	0.00	18595.70	81210.97	4060.54	77150.43	95656.9	2592.92	98249.82	3268.51	-21774.98	127
37	**Rewa**	50181.32	1272.86	3571.69	10017.67	65043.54	3184.23	61859.31	26197.55	5028.44	31225.99	6205	29456.76	50
38	**Satna**	47623.63	2879.56	3248.95	10951.52	64703.66	3322.85	61380.81	39664.57	4793.54	44458.11	6459.35	15256.89	72
39	**Sagar**	108423.48	3640.50	0.00	15607.78	127671.76	6383.60	121288.16	70597.54	3013.65	73611.19	8255	42435.62	61
40	**Sehore**	67863.68	3918.88	0	14792.49	86575.05	4328.75	82246.3	50999.57	2375.16	53374.73	5787	25459.73	65
41	**Seoni**	72003.21	1475.54	3608.77	4878.39	81965.91	4098.17	77867.74	20440.37	3210.04	23650.41	9115.39	48311.98	30
42	**Shahdol**	59265.54	236.48	7158.85	986.92	67647.79	3380.31	64267.48	2420.92	2107.21	4528.13	5283	56563.56	7
43	**Shajapur**	49259.82	2849.13	0.00	9820.81	61929.76	3096.49	58833.27	57711.43	2090.06	59801.49	2336.24	-1214.4	102

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Madhya Pradesh														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
44	Sheopur	31760.05	649.17	0	13781.95	46191.17	4127.55	42063.62	14015.12	1337	15352.12	1781	26267.5	37
45	Shivpuri	62231.56	3176.11	0	13329.33	78737	4450.25	74286.75	48341.24	3356.44	51697.68	4617.56	21327.95	70
46	Sidhi	27564.01	598.9	3514.15	2689.5	34366.56	1699.42	32667.14	7180.12	2640.52	9820.64	3576	21911.02	30
47	Singrauli	34125.66	728.73	0	2237.42	37091.81	1854.6	35237.21	8728.29	2488.1	11216.39	4170.79	22338.13	32
48	Tikamgarh	41738.47	2681.19	0	10498.45	54918.11	2745.9	52172.21	35228.51	2830.15	38058.66	6032.89	10910.81	73
49	Umaria	41465.73	366.13	5916.7	897.93	48646.49	2432.33	46214.16	3866.29	1377.94	5244.23	4024.6	38323.27	11
50	Ujjain	78204.33	4718.53	0	18410.43	101333.29	5066.66	96266.63	87195.07	3048.53	90243.6	3805.04	5266.52	94
51	Vidisha	76186.97	2296.53	0.00	10540.86	89024.36	4447.23	84577.13	46353.86	3406.81	49760.67	5648.52	32574.75	59
	Total (ham)	**2858673.22**	**127196.94**	**82288.14**	**529694.99**	**3597853.29**	**181969.29**	**3415884.00**	**1794917.00**	**141243.31**	**1936160.31**	**234758.42**	**1386208.58**	**57**
	Total (bcm)	**28.59**	**1.27**	**0.82**	**5.30**	**35.98**	**1.82**	**34.16**	**17.95**	**1.41**	**19.36**	**2.35**	**13.86**	**57**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Maharashtra														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Ahmednagar	95601.25	14619.56	25412.14	52791.67	188424.63	9930.86	178493.77	133519.33	4833.40	138352.73	8745.35	43606.01	78
2	Akola	32424.47	1285.53	1758.83	7380.70	42849.53	2421.55	40427.98	16146.90	1413.58	17560.48	2819.79	21461.30	43
3	Amravati	61476.81	4823.30	7386.52	27917.95	101604.57	5080.23	96524.34	67495.70	2870.52	70366.22	5121.00	30229.26	73
4	Aurangabad	70006.92	5609.39	2662.69	33564.15	111843.14	5623.39	106219.76	77357.33	3288.67	80645.99	6426.51	23275.18	76
5	Beed	84481.01	7452.96	15607.30	29540.57	137081.84	6854.09	130227.75	65453.94	4896.46	70350.41	9792.92	54980.88	54
6	Bhandara	32769.93	5723.24	3904.41	13439.19	55836.77	3038.50	52798.27	19559.67	3185.41	22745.07	6296.92	26941.69	43
7	Buldhana	68227.36	5193.70	5542.80	20455.31	99419.17	4970.96	94448.21	64278.73	3565.94	67844.68	6841.92	24555.48	72
8	Chandrapur	101730.03	4723.36	0.00	5966.47	112419.86	5620.99	106798.86	10401.36	8332.02	18733.38	16664.04	79733.46	18
9	Dhule	49496.49	5622.81	0.00	19488.35	74607.65	4119.12	70488.53	34967.48	1786.61	36754.09	3520.35	32000.70	52
10	Gadchiroli	83840.67	1919.75	0.00	7379.27	93139.70	4656.98	88482.71	20553.49	3133.85	23687.34	6261.48	61667.74	27
11	Gondia	39321.46	6110.74	3209.05	17087.69	65728.95	3713.48	62015.47	12301.26	5960.03	18261.29	11920.06	37794.15	29
12	Hingoli	49296.06	1530.87	7211.48	36626.92	94665.33	4795.61	89869.73	36251.18	2062.52	38313.70	4125.04	49493.51	43
13	Jalgaon	93409.56	4810.23	4650.97	44126.46	146997.22	7442.41	139554.81	102010.44	4881.90	106892.33	8671.06	32554.95	77
14	Jalna	60331.03	2750.85	692.73	25565.34	89339.95	4875.89	84464.07	43770.69	1360.75	45131.44	2721.50	37971.87	53
15	Kolhapur	59764.92	8867.20	3667.49	59567.60	131867.21	6971.12	124896.10	48658.89	1436.04	50094.93	2872.08	73365.13	40
16	Latur	50585.86	3961.41	0.00	17012.84	71560.11	3578.01	67982.10	51112.21	2249.36	53361.57	4085.70	14980.57	78
17	Nagpur	71693.57	4427.49	11334.08	28369.76	115824.90	5791.24	110033.65	55781.95	5929.04	61710.99	11699.78	42551.92	56
18	Nanded	105861.07	882.40	16607.75	17585.22	140936.45	7052.15	133884.30	34725.40	3309.99	38035.40	6618.94	92539.96	28
19	Nandurbar	42593.32	2235.11	0.00	8437.21	53265.64	2988.83	50276.81	22405.60	3085.97	25491.58	6171.95	21699.26	51
20	Nashik	147883.34	10527.60	285.40	43692.96	202389.29	10942.27	191447.02	106355.59	3518.53	109874.12	6525.52	82424.97	57
21	Osmanabad	65225.72	7164.26	8022.20	16654.48	97066.67	4853.33	92213.34	54752.49	2305.61	57058.11	4447.04	33226.98	62
22	Parbhani	57441.09	888.40	3870.48	24575.71	86775.68	4460.47	82315.21	35413.93	2015.09	37429.02	4009.90	42891.39	45
23	Pune	101905.14	12904.56	3568.40	65283.89	183662.00	9652.65	174009.35	120523.31	8015.80	128539.11	14444.40	44233.51	74
24	Raigad	36139.11	352.40	0.00	5443.73	41935.24	2133.30	39801.94	4195.14	2094.08	6289.23	4188.16	31418.63	16
25	Ratnagiri	46668.99	134.69	0.00	1843.88	48647.56	2436.04	46211.53	4194.18	1248.51	5442.69	2497.02	39520.33	12
26	Sangli	56693.61	10911.63	2462.01	30585.54	100652.79	5234.69	95418.10	71147.46	2835.92	73983.38	5105.76	20936.96	78
27	Satara	59260.16	8757.87	10544.24	26006.09	104568.35	5316.75	99251.60	71821.96	5072.92	76894.88	9820.46	17760.32	77
28	Sindhudurg	25173.86	142.92	208.73	1936.46	27461.97	1373.10	26088.87	6361.98	1963.31	8325.29	3926.61	15800.27	32
29	Solapur	99444.95	13137.57	13436.88	40846.07	166865.46	8500.34	158365.12	114689.73	4862.70	119552.43	9039.12	39516.89	75
30	Thane	36679.41	484.13	0.00	6126.36	43289.91	2191.04	41098.86	7471.10	1516.02	8987.12	3032.03	30595.72	22
31	Wardha	60983.82	505.64	9366.49	16401.19	87257.13	4432.40	82824.73	37306.69	3755.57	41062.27	7511.15	38006.89	50
32	Washim	44896.00	2826.45	1680.01	10655.09	60057.55	3004.09	57053.46	20173.57	1615.38	21788.95	3230.76	33649.13	38
33	Yeotmal	104323.96	2996.45	19473.47	14027.00	140820.88	7078.37	133742.51	21553.99	5752.54	27306.53	11505.07	100683.44	20
	Total (ham)	**2195630.95**	**164284.47**	**182566.57**	**776381.12**	**3318863.11**	**171134.25**	**3147728.86**	**1592712.68**	**114154.05**	**1706866.73**	**220659.38**	**1372068.46**	**54**
	Total (bcm)	**21.96**	**1.64**	**1.83**	**7.76**	**33.19**	**1.71**	**31.48**	**15.93**	**1.14**	**17.07**	**2.21**	**13.72**	**54**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Manipur														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1	**Imphal West-I Block**	2682.93	86.38	2201.92	172.85	5144.08	514.41	4629.67	93.31	25.95	119.26	404.33	4132.03	2.58
2	**Imphal West-II Block**	2272.38	111.74	1864.97	223.49	4472.58	447.26	4025.32	12.04	3.99	16.03	942.37	3070.91	0.40
3	**Imphal East-I Block**	2223.68	77.04	1825	154.09	4279.81	427.98	3851.83	6.02	2	8.02	902.84	2942.97	0.21
4	**Imphal East-II Block**	4545.71	87.65	3730.72	174.95	8539.03	853.9	7685.13	27.09	6.99	34.08	282.99	7375.05	0.44
5	**Thoubal Block**	3093.49	165.92	2538.86	331.87	6130.14	613.02	5517.12	33.11	5.99	39.1	745.34	4738.67	0.71
6	**Kakching Block**	1814.08	146	1488.84	292.04	3740.96	374.09	3366.87	57.19	4.99	62.18	352.23	2957.45	1.85
7	**Bishnupur Block**	2673.38	62.42	2194.08	124.88	5054.76	505.48	4549.28	33.11	5.99	39.1	480.09	4036.08	0.86
8	**Moirang Block**	2062.32	67.45	1692.58	134.92	3957.27	395.73	3561.54	24.08	3.99	28.07	293.1	3244.36	0.79
9	**Khuga catchment/ Khuga Valley** *	3064.84	158.82	2515.36	317.71	6056.73	605.67298	5451.06	75.25	9.98	85.23	452.73	4923.08	1.56
	Total (ham)	**24432.81**	**963.42**	**20052.33**	**1926.80**	**47375.36**	**4737.54**	**42637.82**	**361.20**	**69.87**	**431.07**	**4856.02**	**37420.60**	**1.01**
	Total (bcm)	**0.244**	**0.010**	**0.201**	**0.019**	**0.474**	**0.047**	**0.426**	**0.004**	**0.001**	**0.004**	**0.049**	**0.374**	**1.01**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Meghalaya														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1	**East Khasi Hills**	32240	0	1726	861	34826	3483	31343	0	200	200	6040	25303	0.64
2	**West Khasi Hills**	24637	0	1395	830	26863	2686	24177	0	14	14	1835	22342	0.06
3	**South West Khasi**	14785	0	838	302	15926	1593	14333	0	5	5	1835	12498	0.04
4	**East Jaintia Hills**	45056	0	2703	995	48754	4875	43879	0	33	33	742	43137	0.07
5	**West Jaintia Hills**	31668	0	1897	997	34561	3456	31105	5	34	39	1697	29403	0.12
6	**Ri-Bhoi**	10559	0	585	2263	13406	1340	12066	0	20	20	1912	10154	0.17
7	**East Garo Hills**	10136	0	475	942	11553	1156	10397	0	13	13	980	9417	0.13
8	**North Garo Hills**	17784	0	835	713	19331	1933	17398	150	10	160	929	16319	0.92
9	**West Garo Hills**	79681	0	3518	1580	84780	8478	76302	300	49	349	3053	72949	0.46
10	**South West Garo Hills**	22661	0	1001	490	24151	2415	21736	350	15	365	813	20573	1.68
11	**South Garo Hills**	15323	0	348	716	16387	1639	14748	0	2	2	897	13851	0.02
Total (ham)		**304529**	**0**	**15321**	**10688**	**330538**	**33054**	**297484**	**805**	**396**	**1201**	**20731**	**275946**	**0.4**
Total (bcm)		**3.05**	**0.00**	**0.15**	**0.107**	**3.31**	**0.33**	**2.98**	**0.0080**	**0.0040**	**0.0120**	**0.207**	**2.76**	**0.4**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Mizoram														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Aizawl	347.28	Negligible	154.13	Negligible	501.42	50.14	451.27	0	22.99	22.99	56.16	395.11	5.09
2	Champhai	624.55	Negligible	261.5	Negligible	886.05	88.6	797.44	0	17.49	17.49	32.92	764.52	2.19
3	Kolasib	391.15	Negligible	134.37	Negligible	525.53	52.55	472.98	0	8.69	8.69	22.1	450.88	1.84
4	Lawngtalai	538.24	Negligible	154.41	Negligible	692.65	69.27	623.39	0	9.41	9.41	31.61	591.76	1.51
5	Lunglei	256.85	Negligible	77.75	Negligible	334.6	33.46	301.14	0	25.74	25.74	40.24	260.9	8.55
6	Mamit	291.93	Negligible	116.41	Negligible	408.33	40.83	367.5	0	5.17	5.17	23.17	344.33	1.41
7	Saiha	250.39	Negligible	67.07	Negligible	317.45	31.75	285.71	0	3.41	3.41	14.87	270.84	1.19
8	Serchipp	199.35	Negligible	76.89	Negligible	276.24	27.62	248.62	0	11	11	17.1	231.52	4.42
	Total (ham)	**2899.75**	**Negligible**	**1042.53**	**Negligible**	**3942.28**	**394.23**	**3548.05**	**0**	**103.9**	**103.9**	**238.18**	**3309.86**	**2.9**
	Total (bcm)	**0.02899**	**Negligible**	**0.01042**	**Negligible**	**0.03942**	**0.00394**	**0.03548**	**0**	**0.00104**	**0.00104**	**0.00238**	**0.0331**	**2.9**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Nagaland														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Kohima	11240		5531		16770	1677	15093	0	489.53	489.53	134.59	14959.41	3.2
2	Dimapur	7812		3844		11655	1166	10490	0	1043.76	1043.76	723.06	9766.94	10.0
3	Phek	16693		8214		24907	2491	22416	0	264.05	264.05	61.14	22354.86	1.2
4	Mokokchung	12525		6163		18689	1869	16820	0	239.94	239.94	38.04	16780.96	1.4
5	Zunheboto	9402		4626		14028	1403	12625	0	188.14	188.14	33.4	12591.6	1.5
6	Wokha	12769		6283		19052	1905	17147	0	250.52	250.52	52.57	17094.43	1.5
7	Tuenchung	21035		10351		31386	3139	28247	0	304.15	304.15	66.27	28180.73	1.1
8	Mon	14187		6981		21168	2117	19051	0	351.62	351.62	66.95	18984.05	1.8
9	Peren	12945		6370		19316	1932	17384	0	133.79	133.79	25.47	17358.53	0.8
10	Kiphire	8261		4065		12326	1233	11093	0	103.98	103.98	19.8	11073.2	0.9
11	Longleng	3329		1638		4966	497	4470	0	70.93	70.93	13.51	4456.49	1.6
	Total (ham)	**130197**	**0**	**64066**	**0**	**194263**	**19426**	**174837**	**0**	**3440**	**3440**	**1235**	**173601**	**2.0**
	Total (bcm)	**1.30**	**0**	**0.64**	**0**	**1.94**	**0.194**	**1.75**	**0**	**0.03**	**0.03**	**0.01**	**1.74**	**2.0**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

Odisha

Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Angul**	37078	4312	1645	5795	48830	2753	46077	12934	3698	16632	4786	28357	36
2	**Balasore**	78853	13281	4808	19543	116485	6422	110063	52556	6095	58651	10072	47435	53
3	**Bargarh**	38893	4556	1127	4261	48837	2783	46054	9706	3180	12886	4097	32250	28
4	**Bhadrak**	26200	8525	1862	11629	48216	2807	45409	24521	2361	26882	3612	17276	59
5	**Bolangir**	45972	5958	3265	5599	60794	3138	57656	11283	2968	14250	3464	42909	25
6	**Boudh**	14105	7742	1930	6123	29900	2061	27839	5238	912	6150	1460	21141	22
7	**Cuttack**	38608	12326	2430	22353	75717	5001	70716	21925	6129	28054	8143	40648	40
8	**Deogarh**	13351	4256	0	4566	22173	1544	20629	3116	652	3768	1020	16493	18
9	**Dhenkanal**	36582	3574	2820	3896	46872	2608	44264	9897	2819	12716	3558	30809	29
10	**Gajapati**	10985	3549	5802	3673	24009	1339	22670	5769	1061	6830	1302	15599	30
11	**Ganjam**	52792	33115	21513	15650	123070	8529	114541	30028	7062	37090	9836	74677	32
12	**Jagatsinghpur**	20734	9595	2328	16026	48683	3654	45029	21813	1899	23712	2563	20653	53
13	**Jajpur**	39472	4761	7385	8786	60404	3471	56933	26128	2347	28476	3181	27624	50
14	**Jharsuguda**	14605	1572	0	1600	17777	986	16791	3984	1459	5443	1830	10977	32
15	**Kalahandi**	49321	15576	0	15088	79985	5074	74911	12049	4137	16187	9644	53218	22
16	**Kandhamal**	46661	5696	16364	5610	74331	4065	70266	8704	1679	10383	2580	58982	15
17	**Kendrapara**	5926	4318	179	7282	17705	924	16781	9147	625	9772	830	6804	58
18	**Keonjhar**	67852	5920	4720	7605	86097	4774	81323	20630	4069	24699	6407	54286	30
19	**Khurda**	27948	7316	8884	6639	50787	3169	47618	11286	5341	16627	8317	28015	35
20	**Koraput**	56710	7072	4249	5587	73618	4501	69117	5317	2489	7806	3928	59872	11
21	**Malkangiri**	25865	5111	1091	3824	35891	2293	33598	2845	1136	3981	1860	28893	12
22	**Mayurbhanj**	87685	31446	10090	29333	158554	10360	148194	40751	5556	46307	8989	98454	31
23	**Nabarangapur**	46035	1724	3730	1615	53104	2798	50306	5446	2918	8364	6815	38045	17
24	**Nayagarh**	25801	6297	6747	6714	45559	2877	42682	9224	2036	11260	2854	30604	26
25	**Nuapada**	25491	5113	0	5314	35918	2232	33686	6311	1489	7800	3262	24113	23
26	**Puri**	35384	7829	11480	8202	62895	4089	58806	10249	3066	13315	5170	43387	23
27	**Rayagada**	42949	10007	7779	9408	70143	4462	65681	8809	1984	10793	3332	53540	16
28	**Sambalpur**	34746	10749	0	10989	56484	3964	52520	7200	2440	9640	3403	41917	18
29	**Subarnapur**	17161	2348	607	2531	22647	1218	21429	3443	1238	4681	1843	16143	22
30	**Sundergarh**	65419	9060	0	7621	82100	4775	77325	14154	4466	18621	6542	56628	24
	Total (ham)	**1129184**	**252704**	**132835**	**262862**	**1777585**	**108671**	**1668914**	**414464**	**87310**	**501774**	**134701**	**1119749**	**30**
	Total (bcm)	**11.29**	**2.53**	**1.33**	**2.63**	**17.78**	**1.09**	**16.69**	**4.14**	**0.87**	**5.02**	**1.35**	**11.20**	**30**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

Punjab

Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1	**Amritsar**	31505	105098	8276	49958	194837	19484	175354	214857	5758	220615	7888	-47391	126
2	**Barnala**	12048	38649	2261	15396	68354	6835	61518	117876	1323	119200	1758	-58117	194
3	**Bathinda**	27287	63805	5024	61883	157998	13823	144175	130255	3123	133378	4467	9453	93
4	**Faridkot**	12423	38807	2169	14883	68281	6828	61453	94880	3313	98193	3730	-37157	160
5	**Fatehgarh Sahib**	16051	35729	3631	9852	65263	6526	58737	109995	2034	112028	2412	-53670	191
6	**Fazilka**	20520	45701	3239	34232	103693	10369	93323	85719	2807	88526	3882	3722	95
7	**Ferozepur**	17728	101830	5275	26383	151215	13716	137499	196392	1935	198327	2588	-61481	144
8	**Gurdaspur**	40050	102020	10846	28731	181648	17175	164473	198971	4466	203437	5301	-39799	124
9	**Hoshiarpur**	48129	28410	12080	12010	100629	9523	91106	85840	4403	90242	4966	301	99
10	**Jalandhar**	36029	73150	8248	27473	144900	14490	130410	264505	7425	271930	9404	-143499	209
11	**Kapurthala**	21525	45859	5835	9741	82960	8296	74664	148991	3806	152797	4183	-78511	205
12	**Ludhiana**	47978	128976	10154	49196	236305	23630	212674	333230	10605	343835	13512	-134069	162
13	**Mansa**	17805	55495	3548	38062	114911	11491	103420	143197	13	143210	13	-39791	138
14	**Moga**	21767	84416	4225	19114	129522	12952	116570	239509	1855	241363	2360	-125299	207
15	**Muktsar**	20742	28362	3859	31619	84583	8458	76125	51061	2460	53521	2460	22604	70
16	**Nawanshahr**	20792	32784	4903	16002	74481	7448	67033	69991	1457	71448	1612	-4570	107
17	**Patiala**	43509	88156	9210	29245	170120	17012	153108	285530	4332	289862	6381	-138803	189
18	**Pathankot**	14456	9214	4240	6170	34081	2121	31959	18497	1827	20324	2173	11288	64
19	**Ropar**	18105	14211	4265	9337	45918	3845	42073	43686	2425	46111	2752	-4365	110
20	**Mohali**	19373	6173	4231	2404	32181	3218	28963	23323	5051	28374	6735	-1095	98
21	**Sangrur**	39861	107177	8902	36856	192796	19280	173517	362759	3668	366426	4795	-194037	211
22	**Tarn Taran**	26846	87490	7185	35168	156689	15669	141020	185665	2531	188196	3736	-48381	133
	Total (ham)	**574527**	**1321512**	**131607**	**563716**	**2591363**	**252191**	**2339172**	**3404726**	**76617**	**3481343**	**97110**	**-1162664**	**149**
	Total (bcm)	**5.75**	**13.21**	**1.32**	**5.64**	**25.91**	**2.52**	**23.39**	**34.05**	**0.77**	**34.81**	**0.97**	**-11.63**	**149**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Rajasthan														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Ajmer	27309.03	1516.75	0.00	6547.90	35373.68	3307.53	32066.15	42400.35	4740.12	47140.47	4780.69	0.00	147
2	Alwar	68629.55	4480.48	7513.86	13315.30	93939.20	8435.34	85503.86	136205.42	12664.60	148870.02	12082.26	50.35	174
3	Banswara	10629.26	1569.69	0.00	15633.94	27832.89	4174.92	23657.97	9537.99	1932.88	11470.87	2424.15	11695.83	48
4	Baran	37057.95	4656.56	0	14457.27	56171.78	5617.20	50554.58	55493.89	5112.36	60606.25	8983.58	5470.07	120
5	Barmer	25719.48	628.44	0.00	1453.28	27801.20	2597.76	25203.44	24351.04	6863.60	31214.64	6529.73	2160.73	124
6	Bharatpur	37978.78	2589.64	1655.10	8383.04	50606.56	4906.06	45700.50	47429.31	6854.81	54284.12	7838.00	880.95	119
7	Bhilwara	33289.91	2408.94	0.00	11926.62	47625.47	4595.18	43030.29	56126.45	4144.95	60271.40	2896.95	3.64	140
8	Bikaner	24223.55	235.12	0.00	1025.65	25484.32	1274.21	24210.11	26932.98	8948.70	35881.68	8774.35	4508.77	148
9	Bundi	21518.51	2170.96	0.00	16751.00	40440.47	5507.80	34932.67	30468.89	2729.94	33198.83	3790.10	4939.32	95
10	Chittaurgarh	25987.41	1986.27	0.00	10099.00	38072.68	3687.47	34385.21	44922.51	1497.53	46420.04	5035.95	0.00	135
11	Churu	14182.21	0.00	0.00	0.00	14182.21	709.11	13473.10	9945.78	2529.00	12474.78	5779.65	3046.77	93
12	Dausa	21801.67	1788.35	339.46	4312.94	28242.42	2808.83	25433.59	39022.94	2554.22	41577.16	2906.12	0.00	163
13	Dhaulpur	23243.56	1344.36	0.00	5362.63	29950.56	2418.52	27532.04	30952.17	2914.52	33866.69	3577.71	1751.59	123
14	Dungarpur	8068.92	1288.02	0.00	5320.37	14677.30	1344.53	13332.77	8675.70	904.29	9579.99	3575.29	1637.16	72
15	Ganganagar	2732.70	14447.22	664.23	22568.46	40412.61	4041.27	36371.34	15726.90	594.30	16321.20	1485.75	19512.59	45
16	Hanumangarh	2849.45	5091.16	314.31	10004.48	18259.40	1825.95	16433.45	13355.91	749.00	14104.91	1123.51	1954.05	86
17	Jaipur	59950.28	2416.02	3294.11	6439.52	72099.93	7021.11	65078.82	117891.64	31596.29	149487.93	37904.13	502.88	230
18	Jaisalmer	6949.03	15.30	0.00	52.27	7016.60	654.60	6362.00	12558.56	3273.23	15831.79	2561.01	2393.45	249
19	Jalor	41074.54	1131.80	0.00	4474.38	46680.72	4036.01	42644.71	78962.16	4196.76	83158.92	4288.38	1150.76	195
20	Jhalawar	45084.69	2537.51	0.00	18855.84	66478.04	11797.37	54680.67	52181.92	1757.09	53939.01	2643.15	3328.69	99
21	Jhunjhunun	21482.60	494.46	3493.13	2089.63	27559.81	2483.55	25076.26	46268.45	10405.13	56673.58	9289.82	322.65	226
22	Jodhpur	39439.14	698.81	1595.88	2156.24	43890.07	4337.78	39552.29	77929.93	12828.90	90758.83	13192.70	5109.17	229
23	Karauli	31628.47	1092.42	0.00	3149.59	35870.48	3462.12	32408.36	42186.98	5217.52	47404.50	5337.46	857.82	146
24	Kota	32091.51	3481.93	0.00	22098.44	57671.87	5446.21	52225.66	49673.66	5020.15	54693.81	9099.44	6706.06	105
25	Nagaur	50680.13	510.73	4126.04	2203.50	57520.39	5604.86	51915.53	82336.25	19293.25	101629.50	19588.62	4137.78	196
26	Pali	27194.32	841.59	0.00	4627.35	32663.26	3201.41	29461.85	31490.91	3393.70	34884.61	3550.27	1392.72	118
27	Pratapgarh	11381.20	1099.20	0.00	4658.19	17138.59	1585.36	15553.23	17385.76	608.68	17994.44	2824.25	851.68	116
28	Rajsamand	8544.74	951.55	0.00	2933.95	12430.24	1243.05	11187.19	10310.48	1547.63	11858.11	3641.60	69.61	106
29	Sawai Madhopur	34805.98	1513.12	0.00	4919.05	41238.16	3352.84	37885.32	38764.21	8178.26	46942.47	8182.55	358.75	124
30	Sikar	26717.60	538.81	3989.48	1616.39	32862.28	3158.51	29703.77	38040.24	6913.23	44953.47	9332.85	856.04	151
31	Sirohi	26133.76	902.58	0.00	3330.76	30367.11	2848.81	27518.30	30650.67	1108.48	31759.15	1411.88	1163.48	115
32	Tonk	35862.12	3286.11	0.00	9522.62	48670.85	4429.70	44241.15	36519.28	7554.14	44073.42	9246.55	2565.70	100
33	Udaipur	21401.63	1550.48	0.00	9150.44	32102.55	3741.75	28360.80	24143.33	3129.84	27273.17	7839.28	932.33	96
	Total (ham)	**905643.69**	**69264.38**	**26985.59**	**249440.04**	**1251333.69**	**125656.72**	**1125676.97**	**1378842.66**	**191757.10**	**1570599.76**	**231517.73**	**90311.39**	**140**
	Total (bcm)	**9.06**	**0.69**	**0.27**	**2.49**	**12.51**	**1.26**	**11.26**	**13.79**	**1.92**	**15.71**	**2.32**	**0.90**	**140**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Tamil Nadu														
Sl.No	**District**	**Annual Replenishable Ground Water Resource**					**Natural Discharge during non-monsoon season**	**Net Annual Ground Water Availability**	**Annual Ground Water Draft**			**Projected Demand for Domestic and Industrial uses upto 2025**	**Ground Water Availability for future irrigation**	**Stage of Ground Water Development (%)**
		Monsoon Season		**Non-Monsoon Season**		**Total Annual Ground Water Recharge**			**Irrigation**	**Domestic And Industrial uses**	**Total**			
		Recharge from rainfall	**Recharge from other sources**	**Recharge from rainfall**	**Recharge from other sources**									
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
1	**Ariyalur**	18501.09	14472.61	3331.68	2863.20	39168.58	3916.86	35251.72	13264.47	2269.52	15534.00	2416.32	19570.93	44
2	**Chennai**	1507.57	0.00	155.66	0.00	1663.23	166.32	1496.90	0.00	2768.26	2768.26	4783.40	-3286.49	185
3	**Coimbatore**	23854.87	9918.47	6088.47	10083.55	49945.37	4994.54	44950.83	37775.17	5131.28	42906.45	5695.72	1479.94	95
4	**Cuddalore**	54122.89	76991.16	7290.33	4367.91	142772.29	14277.23	128495.06	51766.31	34160.25	85926.56	34550.88	42177.87	67
5	**Dharmapuri**	18300.67	14245.02	3936.29	4262.08	40744.07	4074.41	36669.66	45262.44	1903.07	47165.51	2163.03	-10755.81	129
6	**Dindigul**	28201.76	14717.19	6753.51	14790.50	64462.96	6446.30	58016.67	60102.31	2468.30	62570.61	2978.07	-5063.718677	108
7	**Erode**	18150.67	44594.91	4734.24	6991.57	74471.40	7447.14	67024.26	57638.30	6029.53	63667.83	6446.14	2939.82	95
8	**Kancheepuram**	39764.25	60450.45	3891.37	13057.96	117164.02	11716.40	105447.62	63406.00	5062.76	68468.76	7056.19	34985.43	65
9	**Kanniyakumari**	6482.034	13913.175	3186.222	3039.248	26620.679	2662.068	23958.611	3192.9875	1059.93	4252.92	1498.70	19266.92533	18
10	**Karur**	12827.83	14656.08	4171.08	3152.98	34807.98	3480.80	31327.18	28365.87	1921.71	30287.58	2184.21	777.09	97
11	**Krishnagiri**	18866.13	11874.79	5051.48	3568.81	39361.20	3936.12	35425.08	38331.30	2158.18	40489.48	2455.17	-5361.39	114
12	**Madurai**	19000.09	38423.45	4474.74	8988.35	70886.63	7088.66	63797.96	39040.31	4010.38	43050.69	4777.33	19980.32	67
13	**Nagapattinam**	7699.06	8453.34	962.84	1267.11	18382.35	1838.24	16544.12	15718.30	1005.90	16724.20	1139.70	-313.88	101
14	**Namakkal**	15068.67	16547.67	3698.31	5142.05	40456.71	4045.67	36411.04	43872.62	2194.58	46067.20	2394.94	-9856.52	127
15	**Nilgiris**	11489.20	206.52	2718.84	99.91	14514.46	1451.45	13063.02	602.00	533.38	1135.38	599.48	11861.53	9
16	**Perambalur**	9886.51	9422.31	2002.40	2589.05	23900.27	2390.03	21510.24	25081.84	1162.69	26244.53	1256.82	-4828.41	122
17	**Pudukkottai**	32655.97	53813.23	8591.77	14485.46	109546.43	10954.64	98591.79	36092.10	2184.25	38276.35	2465.30	60034.39	39
18	**Ramanathapuram**	13902.83	31102.99	4557.26	8173.04	57736.13	5773.61	51962.52	5931.04	1403.53	7334.57	1671.89	44359.59	14
19	**Salem**	24823.77	19897.46	5191.89	10763.96	60677.09	6067.71	54609.38	58715.04	4984.54	63699.58	5303.45	-9409.12	117
20	**Sivagangai**	19777.74	58564.75	4809.26	17535.62	100687.37	10068.74	90618.63	17771.25	1401.34	19172.59	1684.34	71163.05	21
21	**Thanjavur**	34518.30	34707.43	5801.61	7919.42	82946.75	8294.68	74652.08	73452.65	2517.97	75970.62	2888.96	-1689.54	102
22	**Theni**	12078.02	14613.10	8342.69	7949.83	42983.63	4298.36	38685.27	29341.10	754.22	30095.32	898.45	8445.72	78
23	**Thirunelveli**	27573.65	56865.41	9166.99	7327.09	100933.15	10093.32	90839.84	56980.26	2011.28	58991.54	2390.86	31468.72	65
24	**Thiruvallur**	25814.59	48563.48	2001.54	1911.55	78291.16	7829.12	70462.05	29548.04	18598.82	48146.86	19141.09	21772.92	68
25	**Thiruvannamalai**	40412.49	73856.89	5223.55	4604.26	124097.19	12409.72	111687.47	99684.23	3278.01	102962.24	3725.78	8277.45	92
26	**Thiruvarur**	14236.15	12665.29	1989.20	4511.77	33402.41	3340.24	30062.17	22440.25	1343.36	23783.61	1526.86	6095.05	79
27	**Thoothukudi**	17749.74	25783.35	5770.64	7011.77	56315.50	5631.55	50683.95	20056.05	1591.15	21647.20	1895.44	28732.46	43
28	**Tiruchy**	22918.12	44440.59	4482.72	6013.11	77854.54	7785.45	70069.09	49515.74	7175.30	56691.04	7451.28	13102.08	81
29	**Tiruppur**	20702.35	14107.38	5114.77	10492.80	50417.29	5041.73	45375.57	47619.24	3319.59	50938.83	3593.61	-5837.28	112
30	**Vellore**	27371.76	28411.08	5009.04	4731.20	65523.07	6552.31	58970.76	54257.79	6548.26	60806.05	7353.64	-2640.67	103
31	**Villupuram**	52900.59	97858.36	6552.43	7989.73	165301.11	16530.11	148771.00	141402.85	5010.48	146413.34	5688.53	1679.61	98
32	**Virudhunagar**	20769.70	22583.37	7014.81	8903.64	59271.52	5927.15	53344.37	31730.44	2017.71	33748.15	2513.11	19100.82	63
	Total (ham)	**711929.05**	**986721.30**	**152067.66**	**214588.55**	**2065306.56**	**206530.66**	**1858775.90**	**1297958.30**	**137979.55**	**1435937.85**	**152588.70**	**408228.90**	**77**
	Total (bcm)	**7.12**	**9.87**	**1.52**	**2.15**	**20.65**	**2.07**	**18.59**	**12.98**	**1.38**	**14.36**	**1.53**	**4.08**	**77**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Telangana														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Adilabad	134072	20183	29299	22680	206234	18764	187470	64218	7503	71721	12632	110620	38
2	Karimnagar	85309	32311	18937	61419	197976	18344	179633	120625	16239	136864	46578	12430	76
3	Khammam	105130	12436	30811	25670	174047	14742	159305	54538	6077	60615	9144	95623	38
4	Mahbubnagar	93749	31386	29192	33697	188024	18730	169294	75667	10747	86414	14617	79010	51
5	Medak	75233	14904	1315	21835	113287	10517	102770	71410	4936	76346	9895	21465	74
6	Nalgonda	100411	44061	667	40360	185499	17248	168251	98868	10087	108955	12590	56794	65
7	Nizamabad	65712	27968	16028	34758	144466	13337	131128	79763	4160	83923	8278	43087	64
8	Rangareddy & Hyderabad	44711	5590	12691	8702	71694	6931	64763	34598	8248	42846	25998	4167	66
9	Warangal	109041	22757	26084	35313	193195	16787	176408	100657	8241	108898	15712	60039	62
	Total (ham)	**813369**	**211597**	**165023**	**284434**	**1474422**	**135399**	**1339022**	**700344**	**76238**	**776582**	**155444**	**483235**	**58**
	Total (bcm)	**8.13**	**2.12**	**1.65**	**2.84**	**14.74**	**1.35**	**13.39**	**7.00**	**0.76**	**7.77**	**1.55**	**4.83**	**58**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Tripura														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**West Tripura**	46162.77	0	21425.38	25363.09	92951.24	8765.18	84186.06	7134	3184.35	10318.35	8462.55	68589.51	12.3
2	**South Tripura**	29306.64	0	21169.87	17200.36	67676.88	3982.73	63694.14	1980	1777.21	3757.21	5624.64	56089.5	5.9
3	**North Tripura**	19082.26	0	16038.83	9046.79	44167.88	3666.86	40501.03	174	1415.89	1589.89	4073.4	36253.62	3.9
4	**Dhalai**	19524.17	0	15117.28	7711.48	42352.93	3833.28	38519.65	30	778.3	808.3	1800.11	36689.54	2.1
	Total (ham)	**114075.84**	**0**	**73751.36**	**59321.72**	**247148.93**	**20248.05**	**226900.88**	**9318**	**7155.75**	**16473.75**	**19960.7**	**197622.17**	**7.3**
	Total (bcm)	**1.141**	**0**	**0.738**	**0.593**	**2.471**	**0.202**	**2.269**	**0.093**	**0.072**	**0.165**	**0.200**	**1.976**	**7.3**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Uttar Pradesh														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Agra	50080.33	12074.69	8142.72	22170.07	92467.81	9002.44	83465.37	85348.20	9658.76	95006.96	11653.20	5875.11	114
2	Aligarh	42336.61	12208.23	8552.59	23752.13	86849.56	7860.75	78988.81	59009.41	7559.84	66569.25	12154.25	11670.63	84
3	Allahabad	87028.66	26082.40	0.00	28959.34	142070.40	7271.37	134799.03	84964.93	16778.90	101743.83	20807.63	29337.92	75
4	Ambedkar Nagar	42481.90	20978.20	10664.25	22976.96	97101.31	7527.60	89573.71	59962.40	4807.74	64770.14	6692.00	22919.31	72
5	Amethi	51069.40	22653.53	3249.26	32600.93	109573.12	9342.25	100230.87	68020.78	5105.59	73126.37	6800.10	25409.99	73
6	Amroha	45283.47	8402.81	7072.47	12756.64	73515.39	6509.25	67006.14	66896.07	3185.71	70081.78	4473.59	0.00	105
7	Auraiya	28171.87	12733.16	0.00	27033.83	67938.86	3396.94	64541.92	41916.30	2846.95	44763.25	4057.70	18567.92	69
8	Azamgarh	67999.46	24632.79	11114.80	33710.25	137457.30	6872.87	130584.44	71691.25	13638.24	85329.49	20477.28	38900.68	65
9	Baghpat	31290.76	8059.28	0.00	14893.12	54243.16	2712.16	51531.00	47274.50	2307.33	49581.83	3063.95	2505.93	96
10	Bahraich	95364.26	5868.41	5581.01	10978.84	117792.52	10243.24	107549.28	53488.56	6797.74	60286.30	12950.95	41109.77	56
11	Ballia	41078.70	16776.44	7060.08	21001.17	85916.39	7911.44	78004.95	47954.04	6950.07	54904.11	12095.51	17955.40	70
12	Balrampur	73414.86	5612.47	0.00	10331.44	89358.77	4467.94	84890.83	37313.54	4218.96	41532.50	5583.47	41993.82	49
13	Banda	54331.20	9728.51	0.00	8661.20	72720.91	3636.05	69084.87	34505.92	2693.36	37199.28	3925.64	30653.31	54
14	Barabanki	95513.81	40082.22	18264.15	71795.39	225655.57	18973.49	206682.08	134488.31	7687.53	142175.84	10576.98	61616.79	69
15	Bareilly	91726.15	27516.99	3544.49	42505.41	165293.04	8264.65	157028.39	109698.77	9438.00	119136.77	9341.86	37987.76	76
16	Basti	62995.49	10255.68	14749.67	14737.90	102738.74	5136.94	97601.80	68133.98	5475.09	73609.07	7723.08	21744.74	75
17	Bijnor	107726.18	9311.85	12093.81	13769.87	142901.70	12853.60	130048.09	84789.02	7027.11	91816.13	10807.73	38051.01	71
18	Budaun	93022.60	11877.92	4793.52	21311.51	131005.55	6550.28	124455.27	95954.07	7157.47	103111.54	10589.69	18902.53	83
19	Bulandshahar	50063.04	36214.02	6766.49	52926.88	145970.43	11935.48	134034.95	115312.17	6228.10	121540.27	8195.17	14677.86	91
20	Chandauli	40171.85	24139.51	0.00	17284.23	81595.59	4079.78	77515.81	26043.90	4197.67	30241.57	5894.83	45577.08	39
21	Chitrakoot	24312.81	1161.89	0.00	1491.71	26966.41	1348.32	25618.09	14323.53	2154.57	16478.10	4205.73	8209.93	64
22	Deoria	64978.75	12673.73	9514.71	19332.95	106500.14	5325.01	101175.13	70802.04	7504.54	78306.58	10006.31	20366.79	77
23	Etah	32150.12	11426.95	5710.80	20577.59	69865.46	6717.14	63148.32	48360.47	4010.88	52371.35	5637.52	10299.72	83
24	Etawah	34022.16	13297.01	0.00	25241.90	72561.07	3628.05	68933.02	32436.12	2596.92	35033.04	3353.12	33143.78	51
25	Faizabad	46994.51	14663.67	9072.61	17237.52	87968.31	4398.42	83569.89	52107.33	3892.20	55999.53	5400.06	26062.50	67
26	Farrukhabad	40816.00	5989.40	4337.43	11085.43	62228.26	3111.41	59116.85	42575.43	3417.09	45992.52	5090.03	11451.39	78
27	Fatehpur	75244.73	21580.95	0.00	28378.39	125204.07	6260.20	118943.87	100112.87	5820.84	105933.71	7666.29	11525.26	89
28	Firozabad	34842.43	13015.73	5702.93	23926.39	77487.48	7748.75	69738.73	76264.44	5684.64	81949.08	7143.52	4814.17	118
29	Ghaziabad	10213.16	7087.85	1366.87	12103.76	30771.64	1538.58	29233.06	26449.00	4802.26	31251.26	9022.51	2621.65	107
30	G.B. Nagar	13693.81	8554.74	1893.95	20836.11	44978.61	3815.72	41162.88	40431.18	1938.07	42369.25	2936.92	2156.26	103
31	Ghazipur	52998.13	27754.96	11596.66	36162.49	128512.24	6425.61	122086.63	82469.80	8120.51	90590.31	11861.97	28263.58	74
32	Gonda	79970.53	9910.61	18433.54	19753.81	128068.49	6403.42	121665.07	74902.26	6725.68	81627.94	9581.83	37180.98	67
33	Gorakhpur	121910.71	12732.43	30276.82	20613.05	185533.01	9276.65	176256.36	88074.03	7181.03	95255.06	13661.18	74521.15	54
34	Hamirpur	32311.43	5399.53	7263.09	12447.73	57421.78	2871.09	54550.69	30692.36	2951.58	33643.94	4943.55	18775.25	62
35	Hapur	20209.27	7170.54	2637.74	13209.41	43226.96	4322.70	38904.26	39067.60	2996.84	42064.44	4051.03	1140.79	108
36	Hardoi	99875.62	31619.44	1470.54	49836.98	182802.58	9140.13	173662.45	116339.31	8680.75	125020.06	11042.19	46280.95	72
37	Hathras	24683.92	12743.07	3964.99	23212.99	64604.96	6025.04	58579.92	53080.26	2802.02	55882.28	5471.03	6723.02	95
38	Jalaun	74345.19	20243.45	10518.55	55488.39	160595.58	8029.78	152565.80	48707.47	4206.81	52914.28	4207.35	99650.98	35
39	Jaunpur	90155.83	24776.55	0.00	36969.62	151902.00	7595.10	144306.90	113843.15	11356.37	125199.52	16612.22	19234.00	87
40	Jhansi	40971.89	4207.03	7044.00	16864.85	69087.77	3454.39	65633.38	38013.13	3953.90	41967.03	6163.60	21456.65	64
41	Kannauj	35237.08	9327.75	3678.09	20581.32	68824.24	6230.02	62594.22	39808.61	3342.67	43151.28	4877.89	21900.31	69
42	Kanpur Dehat	51004.43	13722.01	0.00	22516.53	87242.97	4362.15	82880.82	56920.07	3916.80	60836.87	5777.97	20182.78	73

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT

Uttar Pradesh

Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
43	**Kanpur Nagar**	56638.36	12534.65	0.00	24240.31	93413.32	5524.07	87889.25	56733.14	20555.53	77288.67	26350.86	4805.25	88
44	**Kasganj**	25422.24	10493.16	4531.33	16497.02	56943.75	5176.48	51767.26	41748.22	3466.52	45214.74	4206.05	4346.23	87
45	**Kaushambi**	37505.75	7215.81	1472.37	7853.76	54047.69	2702.38	51345.31	39747.55	3675.87	43423.42	3500.43	9217.80	85
46	**Kushi Nagar**	89472.00	32475.33	11618.19	41691.89	175257.41	8762.87	166494.54	70364.745	7644.09	78008.84	14299.52	81830.27	47
47	**Lakhimpur Khiri**	156998.13	33820.01	39283.60	66101.45	296203.19	14810.16	281393.03	145792.70	10055.27	155847.97	16008.45	119591.88	55
48	**Lalitpur**	33110.91	5259.00	5604.91	14409.24	58384.06	2919.20	55464.86	30810.13	2845.75	33655.88	4825.22	19829.51	61
49	**Lucknow**	42979.95	12170.90	0.00	19133.23	74284.08	4239.25	70044.83	39588.80	16205.47	55794.27	20311.32	10144.71	80
50	**Maharajganj**	56730.16	20124.72	14733.36	26477.93	118066.17	5903.31	112162.86	62941.69	5759.73	68701.42	10069.32	39151.86	61
51	**Mahoba**	13608.13	1222.44	0.00	3613.78	18444.35	922.22	17522.13	17720.33	1686.39	19406.72	2674.69	0.00	111
52	**Mainpuri**	43035.32	16922.09	7561.41	32564.79	100083.61	8500.65	91582.96	74933.22	3612.42	78545.64	5280.12	14890.14	86
53	**Mathura**	40265.47	24646.50	7051.34	44493.96	116457.28	11645.73	104811.55	92383.56	4003.12	96386.68	6189.57	22239.36	92
54	**Maunath Bhanjan**	30417.44	6603.25	6223.62	7593.93	50838.24	2541.91	48296.33	29634.54	4124.54	33759.08	7289.34	11372.45	70
55	**Meerut**	47358.83	26497.45	5769.93	44372.06	123998.27	9133.71	114864.56	77846.01	7997.46	85843.47	9992.67	29539.03	75
56	**Mirzapur**	40894.15	11503.68	0.00	12521.01	64918.84	3381.56	61537.28	32213.04	6409.44	38622.48	10388.07	19554.78	63
57	**Moradabad**	43412.26	11891.98	5599.05	15155.74	76059.02	6966.99	69092.04	61753.55	5019.88	66773.43	7969.26	5800.72	97
58	**Muzzafarnagar**	48007.84	16944.20	9681.94	29703.67	104337.65	9960.59	94377.07	58207.39	3845.71	62053.10	8288.64	31711.26	66
59	**Pilibhit**	89974.81	19546.07	0.00	27652.98	137173.86	6858.69	130315.17	80601.56	4639.43	85240.99	6779.63	42933.98	65
60	**Pratapgarh**	71491.37	34097.57	12551.25	43332.20	161472.39	9172.20	152300.19	150235.43	7645.22	157880.65	10294.06	14371.19	104
61	**Raebareli**	67465.35	16135.35	6911.31	24569.11	115081.12	5754.06	109327.06	61559.25	5816.59	67375.84	7884.56	39883.25	62
62	**Rampur**	51195.14	9321.59	5789.24	13700.73	80006.70	7013.60	72993.11	66044.29	4307.31	70351.60	6679.75	8904.24	96
63	**Saharanpur**	78255.16	22413.29	12140.50	34239.93	147048.88	12162.48	134886.40	171401.54	5523.42	176924.96	8804.22	325.72	131
64	**Sambhal**	47531.06	7346.19	4613.65	11926.85	71417.75	3570.89	67846.86	63446.21	4139.17	67585.38	6126.30	2964.14	100
65	**Sant Kabeer Nagar**	50457.50	4553.12	12695.04	8106.29	75811.95	3790.60	72021.35	36849.78	3926.89	40776.67	5845.70	29325.87	57
66	**Sant Ravidas Nagar**	24966.10	9118.93	0.00	10936.91	45021.94	2251.10	42770.85	34032.48	4078.72	38111.20	6390.42	2034.84	89
67	**Shajahanpur**	98419.43	15802.84	10945.38	22484.68	147652.33	7382.62	140269.71	78191.38	6957.58	85148.96	11007.88	51070.45	61
68	**Shamli**	21558.92	8123.93	4276.26	12125.91	46085.02	3533.86	42551.16	46799.52	2282.50	49082.02	3457.20	1027.96	115
69	**Shrawasti**	29055.79	3438.91	6987.71	5913.51	45395.92	2269.80	43126.12	27581.50	2277.74	29859.24	4315.27	11229.35	69
70	**Siddharth Nagar**	101866.46	7499.68	4821.79	15007.90	129195.83	6459.79	122736.04	48261.31	5912.46	54173.77	9387.51	65087.22	44
71	**Sitapur**	119147.12	37065.09	0.00	71975.96	228188.17	11409.41	216778.76	133515.17	10508.98	144024.15	16062.38	67201.21	66
72	**Sonbhadra**	19077.30	3378.27	0.00	1438.49	23894.06	2005.13	21888.93	7786.26	1877.55	9663.81	6705.71	7396.96	44
73	**Sultanpur**	52162.64	24231.82	2932.31	32772.43	112099.20	5604.96	106494.24	65089.89	4967.21	70057.10	6914.89	34489.46	66
74	**Unnao**	82455.05	37683.18	0.00	60897.20	181035.43	9051.77	171983.66	117423.82	7797.44	125221.26	11459.29	43100.55	73
75	**Varanasi**	34067.44	7290.49	0.00	9808.71	51166.64	2558.33	48608.31	35106.33	10124.09	45230.42	11497.15	4485.36	93
	Total (ham)	**4197096.69**	**1151639.87**	**459928.13**	**1825339.59**	**7634004.27**	**476516.56**	**7157487.72**	**4834890.90**	**441506.61**	**5276397.52**	**643833.86**	**1901276.44**	**74**
	Total (bcm)	**41.97**	**11.52**	**4.60**	**18.25**	**76.34**	**4.75**	**71.58**	**48.35**	**4.41**	**52.76**	**6.44**	**19.01**	**74**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Uttarakhand														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Dehradun	28303.59	1343.88	5184.58	1782.20	36614.25	156.30	36457.92	4291.97	638.40	4930.37	4060.86	28105.09	14
2	Haridwar	31278.34	15661.27	10140.62	31403.63	88483.86	2353.25	86130.61	40614.23	7992.45	48606.68	2220.02	43296.36	56
3	Udham Singh Nagar	43113.99	4529.02	7702.55	8739.27	64084.83	663.41	63421.38	33912.10	5466.30	39378.40	23543.76	5965.52	62
4	Nainital	7640.93	661.31	1199.30	1191.78	10693.32	92.65	10600.66	5295.20	549.48	5844.68	241.48	5063.98	56
Total (ham)		**110336.85**	**22195.48**	**24227.05**	**43116.88**	**199876.26**	**3265.61**	**196610.57**	**84113.50**	**14646.63**	**98760.13**	**30066.12**	**82430.95**	**50**
Total (bcm)		**1.10**	**0.22**	**0.24**	**0.43**	**2.00**	**0.03**	**1.97**	**0.84**	**0.15**	**0.99**	**0.30**	**0.82**	**50**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
West Bengal														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Coochbehar	185334.09	60379.13	5143.37	12100.71	262957.30	26295.71	236661.59	42261.50	4447.27	46708.77	5988.25	188411.84	20
2	Jalpaiguri	228086.62	65301.46	3939.51	12078.29	309405.88	30940.59	278465.29	8241.20	4395.75	12636.95	5908.97	264315.12	5
3	Darjeeling	39186.21	13052.71	0.00	0.00	52238.92	5223.89	47015.03	1169.10	1478.05	2647.15	2012.74	43833.19	6
4	Uttar Dinajpur	91467.43	22166.67	7541.41	24353.83	145529.34	12014.51	133514.83	78133.60	4811.27	82944.87	7569.33	47811.90	62
5	Dakshin Dinajpur	65504.74	17257.72	6432.72	18756.55	107951.73	9115.64	98836.09	50706.00	2618.71	53324.71	3349.33	44780.76	54
6	Malda	96263.27	21992.81	9181.20	23347.70	150784.98	14697.37	136087.61	59108.60	6392.43	65501.03	9828.37	67150.64	48
7	Murshidabad	137803.88	38349.83	19693.42	53252.88	249100.01	23373.65	225726.36	186187.00	10286.71	196473.71	17323.82	22215.54	87
8	Nadia	113617.65	43916.37	18299.88	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	27207.49	8147.66	25564.50	166246.93	16307.62	149939.31	84524.60	14404.77	98929.37	19035.91	46378.80	66
10	Howrah	18922.39	5987.95	1114.80	6932.33	32957.47	3295.74	29661.73	4970.00	2356.32	7326.32	6038.57	18653.16	25
11	Hooghly	87499.21	24032.23	6344.07	21148.49	139024.00	13902.41	125121.59	54601.80	7171.42	61773.22	10669.27	59850.52	49
12	Burdwan	170643.19	42504.98	13283.39	35214.86	261646.42	24768.66	236877.76	94059.60	9608.01	103667.61	15762.29	127055.87	44
13	Birbhum	83998.75	20743.15	7628.72	16112.27	128482.89	11908.95	116573.94	36191.80	3948.14	40139.94	7780.42	72601.72	34
14	Bankura	98905.53	24886.50	21562.59	32647.44	178002.06	16232.96	161769.10	69980.27	4702.22	74682.48	7362.46	84426.38	46
15	Purulia	53190.45	14077.33	8011.53	4806.45	80085.76	7361.68	72724.08	2232.80	4627.09	6859.89	6411.97	64079.31	9
16	Purba Medinipore	53800.58	15434.60	1957.01	10220.33	81412.52	8141.26	73271.26	21562.40	3047.88	24610.28	4341.44	47367.42	34
17	Paschim Medinipore	241691.73	68840.05	12698.55	40624.33	363854.66	34991.16	328863.50	110919.60	7943.15	118862.75	12907.78	205036.12	36
	Total (ham)	**1871243.01**	**526130.98**	**150979.82**	**384860.18**	**2933213.98**	**277367.28**	**2655846.70**	**1084072.07**	**100356.44**	**1184428.50**	**152892.08**	**1418882.56**	**45**
	Total (bcm)	**18.71**	**5.26**	**1.51**	**3.85**	**29.33**	**2.77**	**26.56**	**10.84**	**1.00**	**11.84**	**1.53**	**14.19**	**45**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Andaman & Nicobar														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Andaman & Nicobar**	38116.025	3824.791	19.559	4.890	41965.266	4196.527	37768.739	14.579	354.783	369.362	1615.437	36138.723	1.0
Total (ham)		**38116.025**	**3824.791**	**19.559**	**4.890**	**41965.266**	**4196.527**	**37768.739**	**14.579**	**354.783**	**369.362**	**1615.437**	**36138.723**	**1**
Total (bcm)		**0.38**	**0.04**	**0.0002**	**0.00005**	**0.420**	**0.0420**	**0.378**	**0.0001**	**0.0035**	**0.0037**	**0.016**	**0.361**	**1**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
Chandigarh														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Chandigarh UT (Ham)	1545	39	488	87	2159	216	1943	0	0	0	0	0	0
	Total (ham)	1545	39	488	87	2159	216	1943	0	0	0	0	0	0
	Total (bcm)	0.015	0.0004	0.005	0.001	0.022	0.0022	0.0194	0	0	0	0	0	0

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
UT of Dadra and Nagar Haveli														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	UT of Dadra & Nagar Haveli	5417.70	219.90	966.61	441.48	7045.69	704.57	6341.12	750.46	1292.4	2042.86	1398.486	4192.178085	32.216055
Total (ham)		**5417.70**	**219.90**	**966.61**	**441.48**	**7045.69**	**704.57**	**6341.12**	**750.46**	**1292.4**	**2042.86**	**1398.486**	**4192.178085**	**32**
Total (bcm)		**0.054**	**0.002**	**0.010**	**0.004**	**0.070**	**0.007**	**0.063**	**0.008**	**0.013**	**0.020**	**0.014**	**0.042**	**32**

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
UT of Daman & Diu														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Daman	777	89	0	93	959	48	911	394	125	519	235	282	56.97
2	Diu	458	23	0	45	526	53	473	377	68	445	80	16	94.08
Total (ham)		1235	112	0	138	1485	101	1384	771	193	964	315	298	70
Total (bcm)		0.012	0.001	0.000	0.001	0.015	0.001	0.014	0.008	0.002	0.010	0.003	0.003	70

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
U.T.of Lakshadweep														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Agatti	-	-	-	-	107.8	72.4	35.4	-	28.0	28.0	-	-	79
2	Amini	-	-	-	-	103	69.0	34.1	-	28.2	28.2	-	-	83
3	Androth	-	-	-	-	192.5	130.2	62.3	-	41.2	41.2	-	-	66
4	Chetlat	-	-	-	-	41.4	27.8	13.6	-	8.6	8.6	-	-	63
5	Kadmat	-	-	-	-	124.1	83.4	40.7	-	19.7	19.7	-	-	48
6	Kalpeni	-	-	-	-	90.7	61.0	29.7	-	16.2	16.2	-	-	55
7	Kiltan	-	-	-	-	64.8	43.1	21.7	-	14.6	14.6	-	-	67
8	Kavaratti	-	-	-	-	144.4	96.0	48.4	-	41.8	41.8	-	-	86
9	Minicoy	-	-	-	-	185.8	121.6	64.2	-	38.9	38.9	-	-	61
Total (ham)		0	0	0	0	1054.5	704.5	350.08		237.2	237.2	0	0	68
Total (bcm)		0	0	0	0	0.01055	0.00704	0.00350	0.00000	0.00237	0.00237	0	0	68

GROUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT														
U.T. of Puducherry														
Sl.No	District	Annual Replenishable Ground Water Resource					Natural Discharge during non-monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			Projected Demand for Domestic and Industrial uses upto 2025	Ground Water Availability for future irrigation	Stage of Ground Water Development (%)
		Monsoon Season		Non-Monsoon Season		Total Annual Ground Water Recharge			Irrigation	Domestic And Industrial uses	Total			
		Recharge from rainfall	Recharge from other sources	Recharge from rainfall	Recharge from other sources									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Puducherry**	7299.24	1961.94	606.49	2294.56	12162.22	1216.22	10946.00	11875.00	2393.13	14268.13	4107.42	nill	130.00
2	**Karaikal**	1995.10	4036.09	281.55	532.32	6845.06	684.51	6160.55	510.83	387.67	898.50	353.54	5296.18	15.00
3	**Mahe**	244.73	0.00	27.50	0.00	272.23	27.22	245.01	0.00	167.78	167.78	209.44	35.57	68.00
4	**Yanam**	Saline												
Total (ham)		**9539.07**	**5998.03**	**915.54**	**2826.88**	**19279.51**	**1927.95**	**17351.56**	**12385.83**	**2948.58**	**15334.41**	**4670.40**	**5331.75**	**88**
Total (bcm)		**0.095**	**0.060**	**0.009**	**0.028**	**0.193**	**0.019**	**0.174**	**0.124**	**0.029**	**0.153**	**0.047**	**0.053**	**88**

ANNEXURE-III

CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKS INDIA (AS ON 31ST MARCH 2013)

CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKS IN INDIA (2013)

Sl. No.	States / Union Territories	Total No. of Assessed Units	Safe		Semi-critical		Critical		Over-exploited		Saline	
			Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%
	States											
1	Andhra Pradesh	670	497	74	54	8	17	3	61	9	41	6
2	Arunachal Pradesh	11	11	100	0	0	0	0	0	0	0	0
3	Assam	27	27	100	0	0	0	0	0	0	0	0
4	Bihar	534	520	97	14	3	0	0	0	0	0	0
5	Chhattisgarh	146	125	86	18	12	2	1	1	1	0	0
6	Delhi	27	5	19	7	26	0	0	15	56	0	0
7	Goa	12	12	100	0	0	0	0	0	0	0	0
8	Gujarat	223	175	78	9	4	6	3	23	10	10	4
9	Haryana	119	30	25	11	9	14	12	64	54	0	0
10	Himachal Pradesh	8	6	75	0	0	1	13	1	13	0	0
11	Jammu & Kashmir	22	22	100	0	0	0	0	0	0	0	0
12	Jharkhand	260	244	94	10	4	2	1	4	2	0	0
13	Karnataka	176	98	56	21	12	14	8	43	24	0	0
14	Kerala	152	131	86	18	12	2	1	1	1	0	0
15	Madhya Pradesh	313	228	73	58	19	2	1	25	8	0	0
16	Maharashtra	353	324	92	19	5	1	0	9	3	0	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	22	22	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	308	98	0	0	0	0	0	0	6	2
22	Punjab	138	26	19	3	2	4	3	105	76	0	0
23	Rajasthan	248	44	18	28	11	9	4	164	66	3	1
24	Sikkim	-	-	-	-	-	-	-	-	-	-	-
25	Tamil Nadu	1139	429	38	212	19	105	9	358	31	35	3
26	Telangana	443	311	70	74	17	12	3	46	10	0	0
27	Tripura	39	39	100	0	0	0	0	0	0	0	0
28	Uttar Pradesh	820	603	74	45	5	59	7	113	14	0	0
29	Uttarakhand	18	16	89	1	6	1	6	0	0	0	0
30	West Bengal	268	191	71	76	28	1	0	0	0	0	0
	Total States	**6533**	**4475**	**68**	**678**	**10**	**252**	**4**	**1033**	**16**	**95**	**1**
	Union Territories											
1	Andaman & Nicobar	34	34	100	0	0	0	0	0	0	0	0
2	Chandigarh	1	1	100	0	0	0	0	0	0	0	0
3	Dadra & Nagar Haveli	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	**51**	**45**	**88**	**3**	**6**	**1**	**2**	**1**	**2**	**1**	**2**
	Grand Total	**6584**	**4520**	**69**	**681**	**10**	**253**	**4**	**1034**	**16**	**96**	**1**

Note

Blocks- Bihar, Chattisgarh, Haryana, Jharkhand, Kerala, M.P., Manipur, Mizoam, Orissa, Punjab, Rajasthan, Tripura, UP, Uttarakhand, WB
Taluks -Karnataka, Goa, Gujarat, Maharashtra
Mandal - 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-Delhi

ANNEXURE-IV

STATE-WISE CATEGORIZATION OF BLOCKS/MANDALS/TALUKAS (AS ON 31ST MARCH 2013)

*Note: The district wise breakup of the states in which all the assessment units have been categorized as 'Safe' are not included in this annexure

CATEGORIZATION OF ASSESSMENT UNITS IN ANDHRA PRADESH									
Sl.No	District		Semi-critical		Critical		Over-exploited		Saline
1	**Srikakulam**	1	Kotabommali			1	Laveru		
						2	Ranasthalam		
2	**East Godavari**							1	Allavaram
								2	I.Polavaram
								3	Kajuluru
								4	Karapa
								5	Katretikona
								6	Malkipuram
								7	Mamadikuduru
								8	Sakhinetipalli
								9	Tallarevu
								10	Uppalaguptam
3	**West Godavari**	1	Lingapalem					1	Nidamarru
		2	T Narsapuram					2	Ganapavaram
								3	Pentapadu
								4	Undi
								5	Akiveedu
								6	Kalla
								7	Bimavaram
								8	Palakoderu
								9	Veeravasaram
								10	Poduru
								11	Palakollu
								12	Yelamanchili
								13	Narasapuram
								14	Mogalturu
4	**Krishna**	1	Nuzvid			1	Musunuru	1	Nandiwada
								2	Mandavalli
								3	Kaikaluru
								4	Kalidindi
								5	Kruthivennu
								6	Bantumilli
								7	Mudinepalli
								8	Gudlavalleru
								9	Pedana
								10	Guduru
								11	Machilipatnam
								12	Koduru
								13	Nagayalanka
5	**Guntur**	1	Nagaram			1	Veldurthi	1	Pedanandipadu
						2	Bollapalle	2	Kakumanu
								3	Vatticherukuru
6	**Prakasam**	1	Tharlapadu	1	Cumbum	1	Bestavaripeta	1	Karamchedu
		2	Komarolu			2	Pedaravidu		
						3	Dornala		
						4	Giddaluru		
						5	Racherla		
						6	Markapuram		
						7	Yerragondapalem		
7	**Chittoor**	1	B.Kothakota	1	Baireddypalli	1	Nindra		
		2	Chittoor	2	Cggallu	2	Pakala		
		3	G.D.Nellore	3	Gudupalli	3	Penumuru		
		4	Gangavaram	4	Palasamudram	4	Pulicherla		
		5	Gurramkonda	5	Peddapanjani	5	Puthalapattu		
		6	Irala	6	Piler	6	R.C.Puram		
		7	Kalikiri	7	V.Kota	7	Ramakuppam		
		8	Karvetinagaram			8	Ramasamudram		
		9	Kurabalakota			9	S.R.Puram		
		10	Kv Palli			10	Santhipuram		
		11	Madanapalli			11	Thavanampalli		
		12	Molakalacheruvu			12	Tirupathi®		
		13	Palamaneru						
		14	Pedda Thippa Samudram						
		15	Punganur						
		16	Sodam						
		17	Y.V.Palem						
		18	Yadamarri						
8	**Kadapa**	1	Atloor	1	Muddanur	1	Chinnamandem		
		2	Kalasapadu	2	Pendlimarri	2	Obulavaripalle		
		3	Kamalapuram			3	Pulivendula		
		4	Kondapuram			4	Pullampet		
		5	L.R.Palle			5	Vallur		
		6	Lingala			6	Vemula		

CATEGORIZATION OF ASSESSMENT UNITS IN ANDHRA PRADESH

Sl No	District		Semi-critical		Critical		Over-exploited	Saline
		7	Porumamilla					
		8	Proddatur					
		9	Rajampet					
		10	Ramapuram					
		11	Rayachoty					
		12	Thondur					
		13	Veeraballi					
		14	Vempalle					
9	**Anantapur**	1	Atmakur	1	Anantapur	1	Agali	
		2	Bk Samudram	2	D Hirehal	2	Amadugu	
		3	Bommanahal	3	Kalyandurg	3	Amarapuram	
		4	Chilmatur	4	Kanaganapalli	4	Bathalapalli	
		5	Gooty	5	Raptadu	5	Bramhasamudram	
		6	Gummagatta	6	Rayadurg	6	Bukkapatnam	
		7	Kudair	7	Roddam	7	Ck Palli	
		8	Penukonda			8	Gandlapenta	
		9	Ramagiri			9	Gorantla	
		10	Somandapalle			10	Gudibanda	
						11	Hindupur	
						12	Kambadur	
						13	Kothacheruvu	
						14	Kundurpi	
						15	Lepakshi	
						16	Madakasira	
						17	Nallacheruvu	
						18	Narpala	
						19	Od Cheruvu	
						20	Parigi	
						21	Peddapappur	
						22	Putlur	
						23	Puttaparthi	
						24	Rolla	
						25	Settur	
						26	Tadimarri	
						27	Tadipatri	
						28	Talupula	
						29	Tanakallu	
						30	Yadiki	
						31	Yellanur	
10	**Kurnool**	1	C Belagal					
		2	Gonegandla					
		3	Krishnagiri					
		4	Oravakal					
		5	Peddakadabur					

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
670	54	17	61	41

CATEGORIZATION OF ASSESSMENT UNITS IN BIHAR						
Sl. No.	**District**		**Semi-critical**	**Critical**	**Over Exploited**	**Saline**
1	**Begusarai**	1	Naokothi			
		2	Bhagwanpur			
2	**Gaya**	1	Gaya Sadar			
		2	Imamgang			
3	**Jehanabad**	1	Kako			
4	**Muzaffarpur**	1	Mushari			
5	**Nalanda**	1	Nagarnausa			
		2	Rajgir			
		3	Silao			
6	**Nawada**	1	Meskaur			
7	**Patna**	1	Sampatchak			
		2	Patna Sadar			
8	**Samastipur**	1	Tajpur			
9	**Vaishali**	1	Hazipur			

Abstract				
No. of Assessed Units	**Semi-critical**	**Critical**	**Over-exploited**	**Saline**
534	**14**	**0**	**0**	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN CHHATTISGARH									
S.No	District		Semi-critical		Critical		Over-exploited		Saline
1	**Balod**	1	Balod			1	Gurur		
2	**Bemetara**	1	Bemetara						
		2	Saja						
3	**Bilaspur**	1	Belha						
		2	Takhatpur						
4	**Dhamtari**	1	Kurud	1	Dhamtari				
		2	Nagari						
5	**Durg**	1	Dhamdha						
		2	Durg						
		3	Patan						
6	**Gariaband**	1	Fingeshwar						
7	**Janjgir-Champa**	1	Malkhroda						
8	**Kawardha**	1	Kawardha						
		2	Pandariya						
9	**Raigarh**	1	Pussore	1	Baramkela				
10	**Raipur**	1	Dharsiwa						
11	**Rajnandgaon**	1	Dongargaon						
		2	Rajnandgaon						

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
146	18	2	1	0

CATEGORIZATION OF ASSESSMENT UNITS IN DELHI								
Sl. No.	**District**		**Semi-critical**	**Critical**		**Over-exploited**	**Saline**
1	**Central**	1	Darya Ganj		1	Karol Bagh	
		2	Pahar Ganj				
2	**East**				1	Preet Vihar	
					2	Vivek Vihar	
3	**New Delhi**				1	Chanakya Puri	
					2	Connaught Place	
4	**North**	1	Kotwali				
5	**North East**				1	Seema Puri	
					2	Shahdara	
					3	Seelam Pur	
6	**North West**	1	Narela		1	Model Town	
		2	Saraswati Vihar				
7	**South**	1	Defence Colony		1	Hauz Khas	
					2	Kalkaji	
8	**South West**	1	Najafgarh		1	Delhi Cantonment	
					2	Vasant Vihar	
9	**West**				1	Patel Nagar	
					2	Rajouri Garden	

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-cxploited	Saline
27	7	0	15	0

CATEGORIZATION OF ASSESSMENT UNITS IN GUJARAT									
Sl.No.	District		Semi-critical		Critical		Over-exploited		Saline
1	**Ahmedabad**	1	Detroj-Rampura	1	City-Daskroi			1	Dhanduka
		2	Virmagam	2	Dholka				
2	**Banaskantha**			1	Palanpur	1	Deesa	1	Bhabar
						2	Deodar	2	Vav
						3	Dhanera		
						4	Kankrej		
						5	Tharad		
						6	Vadgam		
3	**Gandhinagar**					1	Dahegam		
						2	Gandhinagar		
						3	Kalol		
						4	Mansa		
4	**Kachchh**	1	Nakhatrana	1	Anjar	1	Bhachau	1	Gandhidham
				2	Bhuj	2	Mandvi		
5	**Mahesana**			1	Vadnagar	1	Bechraji		
						2	Kadi		
						3	Kheralu		
						4	Mahesana		
						5	Satlasna		
						6	Visnagar		
						7	Unjha		
						8	Vijapur		
6	**Patan**					1	Chanasma	1	Harij
						2	Patan	2	Sami
						3	Siddhpur	3	Radhanpur
								4	Santhalpur
7	**Porbandar**	1	Porbandar						
8	**Rajkot**							1	Maliya
9	**Sabarkantha**	1	Idar						
		2	Prantij						
		3	Talod						
		4	Wadali						
10	**Surendranagar**							1	Lakhtar
11	**Vadodara**	1	Vadodara						

Abstract				
No. of Assessed Units	**Semi-critical**	**Critical**	**Over-exploited**	**Saline**
223	**9**	**6**	**23**	**10**

CATEGORIZATION OF ASSESSMENT UNITS IN HARYANA

Sl. No.	District		Semi-critical		Critical		Over-exploited	Saline
1	**Ambala**	1	Ambala Ii			1	Barara	
		2	Shazadpur			2	Naraingarh	
						3	Saha	
2	**Panchkula**			1	Raipur Rani			
3	**Fatehabad**	1	Bhuna			1	Bhattu Kalan	
						2	Fatehabad	
						3	Ratia	
						4	Tohana	
						5	Jakhal	
4	**Bhiwani**			1	Bhawani Khera	1	Badra	
				2	Bhiwani	2	Kairu	
				3	Dadri-I	3	Loharu	
				4	Dadri-Ii	4	Behal	
						5	Tosham	
5	**Hissar**	1	Uklana	1	Hansi-I	1	Adampur	
				2	Hansi-Ii (Bass)	2	Narnaund	
6	**Gurgaon**			1	Gurgaon	1	Farukhnagar	
						2	Pataudi	
						3	Sohna	
7	**Mewat**			1	Punhana	1	Tauru	
8	**Faridabad**			1	Faridabad	1	Ballabhgarh	
9	**Palwal**	1	Hathin	1	Hassanpur	1	Palwal	
		2	Hodel					
10	**Jind**	1	Julana	1	Uchana	1	Alewa	
						2	Jind	
						3	Narwana	
						4	Safidon	
11	**Kaithal**					1	Gulha	
						2	Kaithal	
						3	Kalyat	
						4	Pundri	
						5	Rajaund	
						6	Siwan	
12	**Karnal**					1	Assandh	
						2	Gharaunda	
						3	Karnal	
						4	Nilokheri	
						5	Nissang	
13	**Kurukshetra**					1	Babain	
						2	Ladwa	
						3	Pehowa	
						4	Ismailabad	
						5	Shahbad	
						6	Thaneswar	
14	**Mahendragarh**	1	Ateli			1	Kanina	
		2	Nangal Chaudary					
15	**Panipat**					1	Bapoli	
						2	Israna	
						3	Madlauda	
						4	Panipat	
						5	Samalkha	
16	**Rewari**					1	Khol	
						2	Rewari	
17	**Sirsa**					1	Baraguda	
						2	Dabwali	
						3	Ellenabad	
						4	Ns Chopta	
						5	Odhan	
						6	Rania	
						7	Sirsa	
18	**Sonepat**	1	Gohana			1	Ganaur	
		2	Kharkhoda			2	Rai	
						3	Sonepat	
19	**Yamunanagar**			1	Bilaspur	1	Jagadhri	
				2	Chachrauli	2	Mustafabad	
						3	Radour	
						4	Sadhuara	

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
119	**11**	**14**	**64**	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN HIMACHAL PRADESH								
Sl.No.	**District**	**Semi-critical**		**Critical**		**Over-exploited**		**Saline**
1	**Sirmour**				1	Kala Amb Valley		
2	**Una**		1	Hum Valley				

Abstract				
No. of Assessed Units	**Semi-critical**	**Critical**	**Over-exploited**	**Saline**
8	**0**	**1**	**1**	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN JHARKHAND									
Sl. No.	**District**		**Semi-critical**		**Critical**		**Over-exploited**		**Saline**
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	Ormanjhi						
		4	Ratu						

Abstract				
No. of Assessed Units	**Semi-critical**	**Critical**	**Over-exploited**	**Saline**
260	**10**	**2**	**4**	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN KARNATAKA								
Sl. No	**District**		**Semi-critical**		**Critical**		**Over-exploited**	**Saline**
1	**Bagalkote**	1	Hungund			1	Badami	
		2	Mudhol			2	Bagalkote	
2	**Bangalore Rural**					1	Devenhalli	
						2	Dodaballapur	
						3	Hoskote	
						4	Nelamangala	
						5	Anekal	
						6	Bangalore East	
						7	Bangalore North	
						8	Bangalore South	
3	**Belgaum**	1	Bailahongal	1	Chikodi	1	Athani	
		2	Gokak			2	Ramdurg	
		3	Raybag			3	Saundatti	
4	**Bellary**	1	Kudligi	1	Hadagalli	1	H.B.Halli	
5	**Bidar**	1	Bhalki					
6	**Bijapur**	1	Basavana Bagevadi					
		2	Bijapur					
		3	Indi					
7	**Chamrajnagara**	1	Yelandur			1	Gundlupet	
8	**Chikballapur**				Bagepalli	1	Chikballapur	
						2	Chintamani	
						3	Gauribidalur	
						4	Gudibanda	
						5	Sidlaghata	
9	**Chikmagalur**					1	Kadur	
10	**Chitradurga**			1	Hosadurga	1	Challakere	
						2	Chitradurga	
						3	Hiriyur	
						4	Holalkere	
11	**Dakshin Kannada**			1	Puttur			
12	**Davangere**	1	Harihar	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	1	Arsikere	
16	**Haveri**	1	Hirekerur	1	Byadgi			
				2	Ranibennur			
17	**Kolar**					1	Bangarpet	
						2	Kolar	
						3	Malur	
						4	Mulbagal	
						5	Srinivaspur	
18	**Koppal**			1	Yelbarga			
19	**Mysore**			1	Mysore			
20	**Raichur**	1	Lingsugur					
		2	Raichur					
21	**Ramanagara**			1	Channapatana	1	Kanakapura	
				2	Magadi	2	Ranmanagara	
22	**Tumkur**	1	Pavagada	1	Sira	1	Chicknayakanhalli	
						2	Koratagere	
						3	Madhugiri	
						4	Tiptur	
						5	Tumkur	
23	**Uttar Kannada**	1	Haliyal					
24	**Yadgir**	1	Yadgir					

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
176	**21**	**14**	**43**	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN KERALA									
Sl.No	**District**		**Semi-critical**		**Critical**		**Over-exploited**		**Saline**
1	**Idukki**	1	Kattappana						
		2	Nedumkandam						
2	**Kannur**	1	Kannur						
		2	Panur						
		3	Thalassery						
3	**Kasargod**	1	Manjeswar	1	Kasaragod				
4	**Kollam**	1	Mukhathala						
5	**Kozhikode**	1	Ballussery						
		2	Kunnamangalam						
6	**Malappuram**	1	Tanur						
		2	Thriurangadi						
		3	Vengara						
7	**Palakkad**	1	Pattambi	1	Malampuzha	1	Chittur		
8	**Trivandrum**	1	Athiyannur						
		2	Chirayinkil						
		3	Parassala						
9	**Thrissur**	1	Chowannur						
		2	Mathilakom						

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
152	18	2	1	0

CATEGORIZATION OF ASSESSMENT UNITS IN MADHYA PRADESH

S. No.	District		Semi-critical		Critical		Over-exploited	Saline
1	**Agar**	1	Agar			1	Nalkhera	
		2	Barod			2	Susner	
2	**Barwani**	1	Thikari			1	Panesmal	
						2	Rajpur	
3	**Bhopal**	1	Phanda					
4	**Betul**	1	Betul					
5	**Burhanpur**	1	Burhanpur					
6	**Chhatarpur**	1	Badamalhara					
		2	Buxwaha					
		3	Chhatarpur					
		4	Nowgaon					
		5	Rajnagar					
7	**Chhindwara**	1	Chindwara					
8	**Damoh**	1	Hatta					
		2	Patheriya					
9	**Dewas**	1	Khategaon			1	Dewas	
						2	Sonkutch	
10	**Dhar**	1	Manawar			1	Badnawar	
		2	Tirla			2	Dhar	
						3	Dharampuri	
						4	Nalcha	
11	**Gwalior**	1	Morar					
12	**Indore**	1	Mhow			1	Depalpur	
						2	Indore	
						3	Sanwer	
13	**Khargone**	1	Barwaha					
		2	Khargone					
		3	Mahashwar					
14	**Khandwa**	1	Chhegaon Makhan					
15	**Mandsaur**	1	Bhanpura			1	Mandsaur	
		2	Malahargarh			2	Sitamau	
16	**Morena**	1	Morena					
		2	Porsa					
17	**Neemuch**	1	Jawad	1	Neemuch			
18	**Narsinghpur**	1	Gotegaon					
		2	Narsinghpur					
19	**Panna**	1	Ajaygarh					
20	**Rajgarh**	1	Biora					
		2	Khilchipur					
		3	Narsinghgarh					
		4	Sarangpur					
21	**Ratlam**	1	Sailana			1	Alote	
						2	Jaora	
						3	Piploda	
						4	Ratlam	
22	**Rewa**	1	Sirmour					
23	**Satna**	1	Maihar	1	Sohawal	1	Rampur Baghalan	
		2	Nagod					
		3	Amarpatan					
24	**Sagar**	1	Banda					
25	**Sehore**	1	Ashta					
		2	Sehore					
26	**Shajapur**	1	Kalapipal			1	Mohan Berodia	
		2	Shajapur			2	Shujalpur	
27	**Shivpuri**	1	Badarwas					
		2	Khanniyadhana					
		3	Karera					
		4	Narwar					
		5	Pichor					
28	**Sidhi**	1	Sidhi					
29	**Tikamgarh**	1	Baldeogarh					
		2	Jatarah					
		3	Niwari					
		4	Palera					
		5	Tikamgarh					
30	**Ujjain**	1	Khachrod			1	Badnagar	
		2	Mahidpur			2	Ghatia	
						3	Ujjain	

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
313	**58**	**2**	**25**	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN MAHARASHTRA								
Sl.No.	District		Semi-critical		Critical		Over-exploited	Saline
1	**Ahmednagar**	1	Kopargaon			1	Rhata	
		2	Newasa			2	Sangamner	
		3	Shrigonda					
2	**Amravati**	1	Achlapur			1	Chandur Bazar	
		2	Morshi			2	Daryapur	
						3	Warud	
3	**Buldhana**	1	Motala			1	Jalgaon	
4	**Jalgaon**	1	Bodwad			1	Raver	
		2	Muktainagar			2	Yawal	
		3	Parola					
5	**Latur**	1	Latur					
6	**Nashik**	1	Chandwad					
		2	Deola					
		3	Niphad					
		4	Sinnar					
7	**Osmanabad**	1	Osmanabad					
8	**Pune**	1	Baramati					
		2	Purandhar					
9	**Sangli**	1	Miraj	1	Kavathe Mahankal			
10	**Satara**	1	Khatav					
11	**Solapur**					1	Malshiras	

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
353	19	1	9	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN ODISHA						
Sl. No	**District**	**Semi Critical**	**Critical**	**Over-exploited**		**Saline**
1	**Bhadrak**				1	Chandbali
2	**Jagatsinghpur**				1	Ersama
3	**Kendrapara**				1	Mahakalpada
					2	Marshaghai
					3	Rajkanika
					4	Rajnagar

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
314	**0**	**0**	**0**	**6**

CATEGORIZATION OF ASSESSMENT UNITS IN PUNJAB								
Sl. No	District		Semi-critical		Critical		Over-exploited	Saline
1	**Amritsar**			1	Majitha	1	Ajnala	
						2	Chogawan	
						3	Harsha China	
						4	Jandiala	
						5	Rayya	
						6	Tarsika	
						7	Verka	
2	**Barnala**					1	Barnala	
						2	Mahal Kalan	
						3	Sehna	
3	**Bathinda**					1	Phul	
						2	Maur	
						3	Bathinda	
4	**Faridkot**					1	Faridkot	
						2	Kot Kapura	
5	**Fatehgarh Sahib**					1	Khera	
						2	Sirhind	
						3	Amloh	
						4	Bassi Pathana	
						5	Khamanon	
6	**Fazilka**					1	Fazilka	
						2	Jalalabad	
7	**Ferozepur**			1	Guru Har Sahai	1	Ferozpur	
						2	Ghall Khurd	
						3	Makhu	
						4	Mamdot	
						5	Zira	
8	**Gurdaspur**	1	Gurdaspur			1	Batala	
						2	Fatehgarh Churian	
						3	Kahnuwan	
						4	Kalanaur	
						5	Qadian	
						6	Sri Hargobindpur	
						7	Dera Baba Nanak	
						8	Dhariwal	
9	**Hoshiarpur**	1	Mukerian			1	Dasuya	
						2	Garhshankar	
						3	Hoshiarpur-I	
						4	Tanda	
10	**Jalandhar**					1	Adampur	
						2	Bhogpur	
						3	Rurka Kalan	
						4	Jalandhar-East	
						5	Jalandhar-West	
						6	Lohian	
						7	Nakodar	
						8	Nur Mahal	
						9	Phillaur	
						10	Shahkot	
11	**Kapurthala**					1	Nadala	
						2	Dhilwan	
						3	Kapurthala	
						4	Phagwara	
						5	Sultanpur Lodhi	
12	**Ludhiana**					1	Dehlon	
						2	Doraha	
						3	Jagraon	
						4	Khanna	
						5	Ludhiana	
						6	Mangat	
						7	Pakhowal	
						8	Raikot	
						9	Samrala	
						10	Sidhwan Bet	
						11	Sudhar	
13	**Mansa**			1	Jhunir	1	Bhikhi	
						2	Budhlada	
						3	Mansa	
						4	Sardulgarh	
14	**Moga**					1	Bagha Purana	
						2	Dharamkot (Kot Isa Khan)	
						3	Moga I	
						4	Moga II	
						5	Nihal Singh Wala	
15	**Nawan Shahr**			1	Nawan Shahr	1	Aur	

CATEGORIZATION OF ASSESSMENT UNITS IN PUNJAB									
Sl. No	District		Semi-critical		Critical		Over-exploited		Saline
						2	Banga		
16	Patiala					1	Bhuner Heri		
						2	Ghanaur		
						3	Nabha		
						4	Patiala		
						5	Rajpura		
						6	Samana		
						7	Sanaur		
						8	Patran		
17	Ropar	1	Anandpur Sahib			1	Morinda		
						2	Nurpur Bedi		
18	Mohali					1	Dera Bassi		
						2	Kharar		
19	Sangrur					1	Ahmedgarh		
						2	Andana		
						3	Bhiwanigarh		
						4	Dhuri		
						5	Lehraghaga		
						6	Maler Kotla		
						7	Sangrur		
						8	Sherpur		
						9	Sunam		
20	Tarn Taran					1	Bhikhiwind		
						2	Chola Sahib		
						3	Gandiwind		
						4	Khadur Sahib		
						5	Naushehra Panuan		
						6	Patti		
						7	Tarn Taran		
						8	Valtoha		

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
138	3	4	105	0

CATEGORIZATION OF ASSESSMENT UNITS IN RAJASTHAN									
Sl.No.	District		Semi-critical		Critical		Over-exploited		Saline
1	**Ajmer**					1	Arain		
						2	Bhinai		
						3	Jawaja		
						4	Kekri		
						5	Kishangarh (Silora)		
						6	Masuda		
						7	Peesangan		
						8	Srinagar		
2	**Alwar**					1	Bansur		
						2	Behror		
						3	Kathumar		
						4	Kishangarh Bas		
						5	Kotkasim		
						6	Laxmangarh		
						7	Mandawar		
						8	Neemrana		
						9	Rajgarh		
						10	Ramgarh		
						11	Reni		
						12	Thanagazi		
						13	Tijara		
						14	Umren		
3	**Baran**	1	Anta			1	Atru		
		2	Kishanganj			2	Baran		
		3	Shahbad			3	Chhabra		
						4	Chhipabarod		
4	**Barmer**			1	Chohtan	1	Baetu		
						2	Balotra		
						3	Dhorimanna		
						4	Sheo		
						5	Sindhari		
						6	Siwana		
5	**Bharatpur**			1	Deeg	1	Bayana		
				2	Nagar Pahari	2	Kaman		
						3	Kumher		
						4	Nadbai		
						5	Rupbas		
						6	Sewar		
						7	Weir		
6	**Bhilwara**					1	Asind		
						2	Banera		
						3	Hurda		
						4	Jahazpur		
						5	Kotri		
						6	Mandal		
						7	Mandalgarh		
						8	Raipur		
						9	Sahara		
						10	Shahpura		
						11	Suwana		
7	**Bikaner**					1	Bikaner	1	Khajuwala
						2	Dungargarh		
						3	Nokha		
8	**Bundi**	1	Bundi			1	Hindoli		
						2	Nainwa		
9	**Chittaurgarh**					1	Bari Sadri		
						2	Begun		
						3	Bhadesar		
						4	Bhainsrogarh		
						5	Bhopalsagar		
						6	Chittaurgarh		
						7	Dungla		
						8	Gangrar		
						9	Kapasan		
						10	Nimbahera		
						11	Rashmi		
10	**Churu**					1	Rajgarh	1	Tara Nagar
						2	Sujangarh		
11	**Dausa**					1	Bandikui		
						2	Dausa		
						3	Lalsot		
						4	Mahwa		
						5	Sikrai		
12	**Dhaulpur**	1	Bari			1	Dholpur		

CATEGORIZATION OF ASSESSMENT UNITS IN RAJASTHAN									
Sl.No.	**District**		**Semi-critical**		**Critical**		**Over-exploited**		**Saline**
		2	Baseri			2	Rajakhera		
13	**Dungarpur**	1	Simalwara						
14	**Hanumangarh**							1	Rawatsar
15	**Jaipur**			1	Phagi	1	Amer		
						2	Bassi		
						3	Chaksu		
						4	Dudu		
						5	Govindgarh		
						6	Jamwa Ramgarh		
						7	Jhotwara		
						8	Kotputli		
						9	Sambhar		
						10	Sanganer		
						11	Shahpura		
						12	Viratnagar (Bairath)		
16	**Jaisalmer**					1	Jaisalmer		
						2	Sam		
						3	Sankra		
17	**Jalor**			1	Chitalwana	1	Ahore		
						2	Bhinmal		
						3	Jalore		
						4	Jaswantpura		
						5	Raniwara		
						6	Sanchore		
						7	Sayla		
18	**Jhalawar**	1	Bakani			1	Khanpur		
		2	Jhalrapatan						
		3	Manohar Thana						
		4	Pirawa						
19	**Jhunjhunun**					1	Alsisar		
						2	Buhana		
						3	Chirawa		
						4	Jhunjhunun		
						5	Khetri		
						6	Nawalgarh		
						7	Surajgarh		
						8	Udaipurwati		
20	**Jodhpur**					1	Balesar		
						2	Bawari		
						3	Bhopalgarh		
						4	Bilara		
						5	Mandor		
						6	Osian		
						7	Phalodi		
						8	Shergarh		
21	**Karauli**					1	Hindaun		
						2	Karauli		
						3	Sapotra		
						4	Todabhim		
22	**Kota**	1	Ladpura	1	Itawa	1	Khairabad		
		2	Sultanpur			2	Sangod		
23	**Nagaur**			1	Ladnu	1	Degana		
				2	Nagaur	2	Didwana		
						3	Jayal		
						4	Kuchaman City		
						5	Makrana		
						6	Merta		
						7	Mundwa		
						8	Parbatsar		
						9	Riyan		
24	**Pali**	1	Rohat			1	Bali		
		2	Sumerpur			2	Desuri		
						3	Jaitaran		
						4	Marwar Junction		
						5	Raipur		
						6	Rani		
						7	Sojat		
25	**Pratapgarh**			1	Dhariyabad	1	Arnod		
						2	Chhotisadri		
						3	Pratapgarh		
26	**Rajsamand**	1	Deogarh			1	Amet		
		2	Khamnor			2	Bhim		
		3	Kumbhalgarh			3	Railmagra		
						4	Rajsamand		
27	**Sawai Madhopur**					1	Bamanwas		

CATEGORIZATION OF ASSESSMENT UNITS IN RAJASTHAN								
S.No.	**District**		**Semi-critical**	**Critical**		**Over-exploited**		**Saline**
					2	Bonli		
					3	Gangapur		
					4	Khandar		
					5	Sawai Madhopur		
28	**Sikar**	1	Fatehpur		1	Danta Ramgarh		
					2	Dhod		
					3	Khandela		
					4	Lachhmangarh		
					5	Neem Ka Thana		
					6	Piprali		
					7	Sri Madhopur		
29	**Sirohi**	1	Abu Road		1	Reodar		
		2	Pindwara		2	Sheoganj		
					3	Sirohi		
30	**Tonk**				1	Malpura		
					2	Niwai		
					3	Uniara		
31	**Udaipur**	1	Girwa		1	Badgaon		
		2	Gogunda		2	Bhindar		
		3	Jhadol		3	Mavli		
		4	Kherwara					
		5	Lasadiya					
		6	Salumbar					
		7	Sarada					

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
248	**28**	**9**	**164**	**3**

CATEGORIZATION OF ASSESSMENT UNITS IN TAMIL NADU

Sl.No	District		Semi-critical		Critical		Over-exploited		Saline
1	**Ariyalur**	1	Sendurai						
		2	Suthamalli						
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-Ii		
						7	Kottai - Thondiarpet-Iii		
						8	Kottai - Thondiarpet-Iv		
						9	Mambalam - Guindy-I		
						10	Mambalam - Guindy-Ii		
						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-Ii		
						19	Purasawalkam - Perambur-Iii		
						20	Purasawalkam - Perambur-Iv		
3	**Coimbatore**	1	Alandurai	1	Annur(S)	1	Annur(N)		
		2	Karamadai	2	Sarkar Samakulam	2	Anupparpalayam		
		3	Kottur			3	Coimbatore South		
		4	Madukkarai			4	Ganapathi		
		5	Marchinaickenpalayam			5	Karumathampatti		
		6	Mettupalayam			6	Kinathukatavu		
		7	Perur			7	Kolarpatti		
		8	Saravanampatti			8	Kovilpalayam		
						9	Ottakkal Mandabam		
						10	Perianegamam		
						11	Periyanaickenpalayam		
						12	Pollachi(N)		
						13	Pollachi(S)		
						14	Ramapattinam		
						15	Selakkarichal		
						16	Singanallur		
						17	Sulur		
						18	Thondamuthur		
						19	Thudialur		
						20	Vadachittur		
						21	Varapatti		
4	**Cuddalore**	1	Manjakkuppam	1	Nellikuppam	1	Kammapuram(E)	1	Parangipettai
		2	Panruti	2	Pennadam	2	Kammapuram(W)		
		3	Sethiyathope			3	Retty Chavadi		
		4	Sirupakkam			4	Thiruvanthipuram		
		5	Tittagudi (E)			5	Umangalam		
						6	Virudhachalam (S)		
5	**Dharmapuri**	1	Dharmapuri	1	Morappur	1	Bommidi		
		2	Harur	2	Nallampalli	2	Indur		
		3	Krishnapuram	3	Pappireddipatty	3	Kadathur		
		4	Sunjalnatham			4	Kambainallur		
		5	Theerthamalai			5	Karimangalam		
						6	Marandahalli		
						7	Palacode		
						8	Palayam		
						9	Papparapatty		
						10	Pennagaram		
						11	Perumbalai		
						12	Pulikarai		
						13	Thenkaraikottai		
						14	Vellichandai		
6	**Dindigul**	1	Athoor	1	Dharmathupatti	1	Ayyalur		
		2	Ayakudi	2	Dindigul South	2	Ayyampalayam		
		3	Dindigul North	3	Oruthattu	3	Chinnakkampatti		
		4	Kambiliampatti	4	Pillaiyarnatham	4	Chinnalpatti		
		5	Korikadavu	5	Thoppampatti	5	Devathur		
		6	Natham			6	Eriodu		
		7	Pappampatti			7	Kallimanthayam		
		8	Reddiapatti			8	Kottanatham		
		9	Senthurai			9	Kovilur		
						10	Nilakottai		
						11	Oddanchathram		
						12	Palakkanoothu		

CATEGORIZATION OF ASSESSMENT UNITS IN TAMIL NADU									
Sl.No	District		Semi-critical		Critical		Over-exploited		Saline
						13	Palayam		
						14	Puliyurnatham		
						15	Reddiarchatram		
						16	Shanarpatti		
						17	Silvathur		
						18	Vadamadurai		
						19	Vatlagundu		
						20	Vedasandur		
						21	Viruveedu		
7	**Erode**	1	Bhavani	1	Ammapettai	1	Anthiyur		
		2	Kanjikoil	2	Arachalur	2	Bhavanisagar		
		3	Kasipalayam	3	Arasur	3	Chennimalai		
		4	Kavandapadi	4	Athani	4	Elathur		
		5	Kilampadi	5	Erode West	5	Erode East		
		6	Kurichi			6	Erode North		
		7	Kuthiyalathur			7	Kodumudi		
		8	Sathyamangalam			8	Modakurichi		
		9	Siruvalur			9	Nambiyur		
		10	Thalavadi			10	Perundurai		
		11	Thingalur			11	Punjaipuliampatti		
						12	Vellode		
8	**Kancheepuram**	1	Acchirupakkam	1	Appur	1	Govindhavadi		
		2	Chengalpattu	2	Arumpuliyur	2	L.Endathur		
		3	Cheyyur	3	Mangadu	3	Singaperumalkoil		
		4	Chithamur	4	Nerumbur	4	Sirukaveripakkam		
		5	Guduvancheri	5	Orathi	5	Walajabad		
		6	Jameenendathur	6	Thirukazhukundram				
		7	Kaliyampoondi	7	Thiruppu Kuzhi				
		8	Kattankulathur	8	Thirupulivanam				
		9	Kunnavakkam						
		10	Mamallapuram						
		11	Onampakkam						
		12	Perumpakkam						
		13	Ponvilayanthakalathur						
		14	Uthiramerur						
		15	Vandalur						
9	**Kanniyakumari**	1	Rajakkamangalam						
10	**Karur**	1	Karur	1	Kattalai	1	K.Paramathy		
				2	Pugalur	2	Kadavur		
				3	Thalapatti	3	Mailampatti		
						4	Pallapatti		
						5	Panjapatti		
						6	Thennilai		
						7	Thogaimalai		
						8	Thoranakalpatti		
						9	Vangal		
						10	Velliyanai		
11	**Krishnagiri**	1	Barur	1	Hosur	1	Alapatti		
		2	Berigai			2	Bargur		
		3	Mathigiri			3	Guruparapalli		
		4	Nagarasampatti			4	Kallavi		
		5	Periyamuthur			5	Krishnagiri		
		6	Rayakottai			6	Mathur		
		7	Shoolagiri			7	Palepalli		
		8	Uthanapalli			8	Pochampalli		
						9	Samalpatti		
						10	Singarapettai		
						11	Uthangarai		
						12	Veppanapalli		
12	**Madurai**	1	Athipatti	1	Kokkulam	1	A.Vellalapatti		
		2	Elumalai	2	Kottampatti	2	Muduvarpatti		
		3	Kalligudi	3	Madurai West	3	Palamedu		
		4	Karumathur	4	Sedapatti	4	Usilampatti		
		5	Madurai East	5	Sindhupatti	5	Uthappanaickanur		
		6	Nagamalali Pudukotta						
		7	Neerathan						
		8	Pannikkundu						
		9	Peraiyur						
		10	Thenkarai						
		11	Thirumangalam						
		12	Valanthur						
		13	Vellalur						
13	**Nagapattinam**			1	Madhanam	1	Kuttalam	1	Kangalancheri
						2	Manganallur	2	Kariyapattinam
						3	Mayiladuthurai	3	Keelaiyur

CATEGORIZATION OF ASSESSMENT UNITS IN TAMIL NADU

Sl.No	District		Semi-critical		Critical		Over-exploited		Saline
						4	Melaiyur	4	Kilvelur
						5	Palaiyur	5	Nagappattinam
						6	Pattavarthi	6	Nirmulai
						7	Puthur	7	Thagatur
						8	Sembanarkoil	8	Thalainayar
						9	Sirkali	9	Therkupoigainallur
						10	Thiruvilaiyattam	10	Thevoor
						11	Vaitheeswaran Koil	11	Thillayadi
								12	Thirukkuvalai
								13	Thirumarugal
								14	Thiruvengadu
								15	Valivalam
								16	Vedaranyam
								17	Velanganni
14	**Namakkal**	1	Jedarpalayam	1	Elachipalayam	1	Alanganatham		
		2	Kumarapalayam	2	Pallapatti	2	Erumaipatti		
		3	Manickampalayam			3	Kalappanaikanpatti		
		4	Molasi			4	Mallasamudram		
		5	Tiruchengode			5	Mangalapuram		
						6	Mohanur		
						7	Mullukurichi		
						8	Nallipalayam		
						9	Nallur		
						10	Namagiripettai		
						11	Namakkal		
						12	Pandamangalam		
						13	Paramathi		
						14	Puduchatram		
						15	Rasipuram		
						16	Sellappampatti		
						17	Senthamagalam		
						18	Vaiyappamalai		
						19	Valaiyapatti		
						20	Vennandur		
15	**Perambalur**	1	Kolakanatham			1	Chettikulam		
		2	Koothur			2	Keelapuliyur		
						3	Kurumbalur		
						4	Pasumbalur		
						5	Perambalur		
						6	Valikandapuram		
						7	Vengalam		
16	**Pudukkottai**	1	Alangudi					1	Kottaipattinam
		2	Arasarkulam					2	Perumaruthur
		3	Karaiyur					3	Sinkavanam
		4	Keeramangalam						
		5	Viralimalai						
17	**Ramanathapuram**	1	Perunkulam					1	Kadaladi
								2	Mangalakudi
								3	Melachelvanur
								4	Mudukulathur South
								5	S.Tharaikudi
								6	Sayalkudi
								7	Sikkal
								8	Thirupullani
								9	Thondi
18	**Salem**	1	Belur	1	Poolampatti	1	Attur		
		2	Karupur	2	Suramangalam	2	Edappadi		
		3	Kolathur			3	Ernapuram		
		4	Mettur			4	Gangavalli		
		5	Pottaneri			5	Kadayampatti		
		6	Thevur			6	Karippatti		
		7	Veeraganoor			7	Kattukkottai		
						8	Konganapuram		
						9	Malliyakarai		
						10	Mecheri		
						11	Nangavalli		
						12	Omalur		
						13	Palamalai		
						14	Panamarathuppatti		
						15	Pethanaickanpalayam		
						16	Salem Town		
						17	Sankari East		
						18	Sankari West		
						19	Semmandappatti		
						20	Thalaivasal		

CATEGORIZATION OF ASSESSMENT UNITS IN TAMIL NADU									
Sl.No.	District		Semi-critical		Critical		Over-exploited		Saline
						21	Tharamangalam		
						22	Thirumalaigiri		
						23	Valasaiyur		
						24	Vazhappadi		
						25	Veerapandi		
						26	Vembadithalam		
						27	Yethapur		
19	**Sivagangai**	1	Varappur						
20	**Thanjavur**	1	Adirampattinam	1	Kabisthalam	1	Aduthurai		
		2	Andikkadu	2	Pattukkottai	2	Ammapet		
		3	Budalur	3	Thanjavur	3	Avanam		
		4	Cholanmaligai	4	Thirukkattupalli	4	Ayyampettai		
		5	Kavalipatti	5	Thirumangalakottai	5	Devanancheri		
		6	Kurichi			6	Kandiyur		
		7	Nambivayal			7	Kathiramangalam		
		8	Perambur			8	Kumbakonam		
		9	Sillathur			9	Kuruvikarambai		
		10	Thambikkottai			10	Melattur		
		11	Ulur			11	Murukkangudi		
						12	Nachiyarkoil		
						13	Nadukaveri		
						14	Nanjikottai		
						15	Pandanallur		
						16	Papanasam		
						17	Ramapuram		
						18	Thiruvaiyaru		
						19	Thiruvidamarudur		
						20	Thondarampattu		
						21	Thuvarankurichi		
						22	Tiruchitrambalam		
						23	Tiruppanandal		
						24	Vallam		
21	**Theni**	1	Devathanapatti	1	Andipatti	1	Erasakkanaickanur		
		2	Theni	2	Rajathani	2	Kandamanur		
		3	Thenkarai			3	Kodivilarpatti		
		4	Uthamapalayam			4	Thevaram		
22	**Thirunelveli**	1	Alankulam	1	Ayikudi	1	Kallurani		
		2	Kadayanallur	2	Gudalur	2	Karisal Kulam		
		3	Levinjipuram	3	Thiruvengadem	3	Karivaklamvandanallur		
		4	Manur	4	Venkadampatti	4	Karuvantha		
		5	Sivanthipatti	5	Puliyankudi	5	Keezhapavoor		
		6	Thalaiyuthu	6	Radhapuram	6	Kurukkalpatti		
		7	Tisayanvilai			7	Nettur		
		8	Vasudevanallur			8	Pazhankottai		
		9	Veerakeralampudur			9	Pazhavoor		
						10	Sankarankoil		
						11	Sernthamangalam		
						12	Surandai		
						13	Uthumalai		
						14	Vannikonenthal		
						15	Veerasigamani		
23	**Thiruvallur**	1	Ammanambakkam	1	Balapuram	1	Ambattur	1	Minjur
		2	Avadi	2	Erumbi	2	Cherukkanoor		
		3	Kanagammachattram	3	Gummidipoondi	3	R.K.Pet		
		4	Kattur	4	Kadambathur	4	Vengathur		
		5	Madhavaram	5	Kannigaipair				
		6	Morai	6	Mappedu				
		7	Pallipattu	7	Thiruninravur				
		8	Periyapalayam	8	Uthukkottai				
		9	Poonamallee						
		10	Poonimangadu						
		11	Pothattur Pettai						
		12	Thirumazhisai						
		13	Tiruttani						
		14	Velakapuram						
24	**Thiruvannamalai**	1	Agrapalayam	1	Chennavaram	1	Chengam		
		2	Anakavoor	2	Desur	2	Cheyyar		
		3	Dusi	3	Eraiyur	3	Kilpennathur		
		4	Kadaladi	4	Kelur	4	Malaiyur		
		5	Kalasapakkam	5	Kettavarampalayam	5	Melpallipattu		
		6	Kannamangalam	6	Kilkodungalur	6	Osur		
		7	Mandakolathur	7	Kolappalur	7	Pachal		
		8	Mangalam	8	Nayadumangalam	8	Pudupalayam		

CATEGORIZATION OF ASSESSMENT UNITS IN TAMIL NADU

Sl.No.	District		Semi-critical		Critical		Over-exploited		Saline
		9	Modayur	9	Nedungunam	9	Somaspadi		
		10	Mullipattu	10	Peranamallur	10	Thandarampat		
		11	Nateri	11	Santhavasal	11	Thurinjapuram		
		12	Polur	12	Thachambadi	12	Vandavasi		
		13	T.V.Malai (South)	13	Thanipadi	13	Veraiyur		
		14	T.V.Malai (North)	14	Thatchampattu				
		15	Thellar	15	Vadathandalam				
		16	Thethurai	16	Vanapuram				
		17	Vakkadai						
		18	Vettavlam						
		19	Vinnamangalam						
25	**Thiruvarur**	1	Koothanallur	1	Thiruvizhimazhalai	1	Agarathirumalam	1	Alathampadi
		2	Nannilam			2	Alangudi	2	Edaiyur
		3	Sannanallur			3	Avoor	3	Muthupet
						4	Kodavasal	4	Thiruthuraipoondi
						5	Koradacheri		
						6	Kulikkarai		
						7	Peralam		
						8	Thirukkannamangai		
						9	Valangaiman		
26	**Thoothukudi**	1	Kadambur	1	Parivallikottai	1	Ilayarasanendal		
		2	Kayathar			2	Pallakurichi		
		3	Ottapidaram			3	Udangudi		
		4	Sattankulam						
27	**Trichy**	1	Ealurpatti	1	Eragudi	1	Kannanur		
		2	Mannachanallur	2	Manapparai	2	Kariyamanickam		
		3	Musiri	3	Pannappatti	3	Kattuputhur		
		4	Sirugambur	4	Peruvalpur	4	Koppampatti		
		5	Uppiliyapuram	5	Sengattuppatti	5	Manikandam		
				6	Thottiyam	6	Marungapuri		
				7	V.Periyapatti	7	Pulivalam		
						8	Thathaiyangarpettai		
						9	Thumbalam		
						10	Thuraiyur		
						11	Thuvarangurichi		
						12	Vaiyampatti		
						13	Valaieduppu		
28	**Tiruppur**	1	Alangiyam	1	Cheyur	1	Avinashi(E)		
		2	Dharapuram	2	Nathakadaiyur	2	Avinashi(W)		
		3	Kurichikottai	3	Tiruppur (N)	3	Avinashipalayam(S)		
		4	Thungavi	4	Vellakoil	4	Gudimangalam		
		5	Udumalpet			5	Kangeyam		
						6	Kannivadi		
						7	Karadivavi		
						8	Kundadam		
						9	Kunnathur		
						10	Mulanur		
						11	Palladam		
						12	Periavalavadi		
						13	Perumanallur		
						14	Pethappampatti		
						15	Pongalur		
						16	Ponnapuram		
						17	Samalapuram		
						18	Sankarandampalayam		
						19	Tiruppur (S)		
						20	Uthiyur		
						21	Uthukuli		
29	**Vellore**	1	Andiyappanur	1	Agaram	1	Ambalur		
		2	Arakonam(South)	2	Alangayam	2	Ambur		
		3	Banavaram	3	Kandhili	3	Ammanankoil		
		4	Koratti	4	Kaniyambadi	4	Anaicut		
		5	Mambakkam	5	Kaveripakkam	5	Arcot		
		6	Melpadi	6	Melasannankuppam	6	Gudiyatham (West)		
		7	Natrampalli	7	Melpatti	7	Gudiyatham(East)		
		8	Pallur	8	Odugathur	8	Jolarpet		
		9	Panapakkam			9	K.V.Kuppam		
		10	Paranji			10	Kalavai		
		11	Pernampattu			11	Katpadi		
		12	Ranipet			12	Madhanur		
		13	Sholinghur			13	Nemili		
		14	Thiruvalam			14	Pallikonda		
		15	Velam			15	Pennathur		
		16	Visharam			16	Pudupadi		
		17	Walajah			17	Sathuvachari		

CATEGORIZATION OF ASSESSMENT UNITS IN TAMIL NADU					
Sl.No.	District	Semi Critical	Critical	Over Exploited	Saline
				18 Thenvellore	
				19 Thuthipattu	
				20 Timiri	
				21 Tirupathur	
				22 Ussoor	
				23 Vadavellore	
				24 Vaduganthangal	
				25 Valathur	
				26 Vaniyambadi	
30	**Villupuram**	1 Arakandanallur	1 Chinnaselam	1 Anniyur	
		2 Kallakurichi	2 Kanjanur	2 Arasur	
		3 Kalvarayan Malai	3 Vanur	3 Avalurpettai	
		4 Kanai	4 Villupuram	4 Brammadesam	
		5 Kandamangalam		5 Chithalingamadam	
		6 Mailam		6 Elavanasurkottai	
		7 Manalurpettai		7 Eraiyur	
		8 Mugaiyur		8 Gingee	
		9 Sengurichi		9 Indili	
		10 Thirukoilur		10 Kalamarudur	
		11 Vadakanandal		11 Kiliyanur	
				12 Marakanam	
				13 Melmalayanur	
				14 Melolakkur	
				15 Nagalur	
				16 Nainarpalayam	
				17 Nemili	
				18 Olakkur	
				19 Sathampati	
				20 Sathiyamangalam	
				21 Sithalampattu	
				22 Siruvadi	
				23 T.V.Nallur	
				24 Thiyagadurgam	
				25 Tindivanam	
				26 Ulundurpettai	
				27 Uppuvelur	
				28 Vadasiruvalur	
				29 Vallam	
				30 Vikkiravandi	
31	**Virudhunagar**	1 Amathur	1 Mallankinar	1 Cholapuram	
		2 Elayiram- Pannai	2 Mangalam	2 Ethirkottai	
		3 Iyankollankondan	3 Salwarpatti	3 Keelarajakularaman	
		4 Kottaiyur	4 Vatchakara-Patti	4 Nathampatti	
		5 Malli		5 Pillaiyarkulam	
		6 Nalli			
		7 Ondipulinaickanur			
		8 Rajapalayam			
		9 Sivakasi			
		10 Srivilliputtur			
		11 Watrap			

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
1139	212	105	358	35

CATEGORIZATION OF ASSESSMENT UNITS IN TELANGANA

Sl. No.	District		Semi-critical		Critical		Over-exploited	Saline
1	**Adilabad**	1	Bhainsa	1	Chennur	1	Nirmal	
		2	Dilawarpur			2	Laxmanchanda	
		3	Lokeshwaram					
2	**Khammam**					1	Tirumalayapalem	
3	**Karimnagar**	1	Chandurthi	1	Bejjanki	1	Bheemadevarpalle	
		2	Elkathurthi			2	Chigurmamidi	
		3	Sircilla			3	Gangadhara	
		4	Ellanthakunta			4	Husnabad	
		5	Velgatoor			5	Kathlapur	
		6	Vemulawada			6	Kodimial	
						7	Konaraopeta	
						8	Mallial	
						9	Medipalle	
						10	Mustabad	
						11	Ramadugu	
						12	Shankarapatnam_Keshavapatna	
4	**Mehaboobnagar**	1	Amangal	1	Addakal	1	Midjil	
		2	Balanagar	2	Keshampeta			
		3	Bijinapalle					
		4	Bomraspeta					
		5	Dhanwada					
		6	Doulatabad					
		7	Jadcherla					
		8	Kalwakurthy					
		9	Koilkonda					
		10	Kondurg					
		11	Kothur					
		12	Maddur					
		13	Nawabpet					
		14	Shadnagar					
		15	Tadoor					
		16	Talakondapalle					
		17	Thimmajipeta					
		18	Uppununthala					
		19	Wanaparthy					
5	**Medak**	1	Chegunta	1	Mulugu	1	Chinnakodur	
		2	Doulthabad	2	Narsapur	2	Dubbak	
		3	Jagdevpur			3	Hathnura	
		4	Ramayampet			4	Kondapak	
		5	Rc Puram			5	Mirdoddi	
		6	Zaheerabad			6	Nanganur	
						7	Nyalkal	
						8	Raikode	
						9	Siddipet	
						10	Thoguta	
						11	Wargal	
						12	Kowdipally	
6	**Nalgonda**	1	Bhongir	1	Chityala	1	Chandur	
		2	Bibinagar	2	Atmakur (S)	2	Gundala	
		3	Chintha Palle			3	Mothey	
		4	Gurram Pode			4	Munugode	
		5	Kanagal			5	Nakrekal	
		6	Nampalle					
		7	Narayanapur					
		8	Nuthankal					
		9	Sali Gouraram					
		10	Thirumalgiri					
		11	Thungathurthi					
7	**Nizamabad**	1	Biknoor	1	Sadashivanagar	1	Kamareddy	
		2	Domakonda			2	Velpoor	
		3	Machareddy					
		4	Morthad					
8	**Ranga Reddy & Hyderabad**	1	Ibrahimpatnam			1	Hyderabad	
		2	Kandukur					
		3	Maheshwaram					
		4	Manchal					
		5	Medchal					
		6	Shabad					

CATEGORIZATION OF ASSESSMENT UNITS IN TELANGANA								
Sl. No.	District		Semi-critical		Critical		Over-exploited	Saline
		7	Shamshabad					
		8	Shankarpally					
9	**Warangal**	1	Cherial	1	Lingala Ghanpur	1	Bachannapet	
		2	Devaruppula	2	Rayaparthy	2	Chennaraopet	
		3	Dharmasagar	3	Narmetta	3	Duggondi	
		4	Nellikudur			4	Geesugonda	
		5	Parvatagiri			5	Jangaon	
		6	Stn Ghanpur			6	Kodakandla	
		7	Zaffergadh			7	Maddur	
		8	Atmakur			8	Raghunathpally	
		9	Dornakal			9	Thorrur	
		10	Hasanparthy			10	Wardhannapet	
		11	Mahabubabad					
		12	Maripeda					
		13	Mogullapally					
		14	Narsampet					
		15	Palakurthy					
		16	Sangem					
		17	Shayampet					

Abstract				
No. of Assessed Units	**Semi-critical**	**Critical**	**Over-exploited**	**Saline**
443	**74**	**12**	**46**	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN UTTAR PRADESH								
Sl. No.	District		Semi-critical		Critical		Over-exploited	Saline
1	**Agra**	1	Jagner			1	Achhnera	
		2	Kheragarh			2	Akola	
						3	Barauli Ahir	
						4	Bichpuri	
						5	Etmadpur	
						6	Fatehabad	
						7	Fatehpur Sikari	
						8	Khandauli	
						9	Saiyan	
						10	Shamsabad	
2	**Aligarh**					1	Chandaus	
						2	Iglas	
3	**Allahabad**			1	Bahadurpur	1	Baheria	
				2	Holagarh	2	Chaka	
				3	Pratappur	3	Dhanupur	
						4	Mau-Aima	
4	**Ambedkar Nagar**	1	Jahangirganj					
5	**Amethi**	1	Bhadar					
		2	Sangrampur					
6	**Amroha**					1	Amroha	
						2	Dhanaura	
						3	Gajraula	
						4	Hasanpur	
						5	Joya	
7	**Azamgarh**			1	Palhani	1	Sathiaon	
8	**Baghpat**	1	Baraut	1	Baghpat	1	Binauli	
				2	Chaprauli	2	Pilana	
				3	Khekra			
9	**Ballia**	1	Rasara					
10	**Banda**		Tindwari					
11	**Bareilly**		Ram Nagar					
12	**Bijnor**			1	Aaku (Nehtaur)	1	Budhanpur (Seohara)	
						2	Jaleelpur	
						3	Noorpur	
13	**Budaun**	1	Asafpur	1	Islamnagar	1	Ambiapur	
		2	Bisauli	2	Quadar Chowk			
				3	Sahaswan			
				4	Ujhani			
14	**Bulandshahar**	1	Debai	1	B.B.Nagar	1	Bulandshahar	
		2	Jahangirabad	2	Danpur	2	Gulauthi	
		3	Siyana	3	Khurja	3	Sikandrabad	
		4	Unchagaon	4	Pahasu			
				5	Shikarpur			
15	**Chitrakoot**					1	Karvi	
16	**Etah**	1	Awagarh	1	Nidholi Kalan	1	Jalesar	
17	**Fatehpur**	1	Hathgaon	1	Airayan	1	Bhitaura	
				2	Amauli			
				3	Bahua			
				4	Dhata			
				5	Haswa			
				6	Malawan			
				7	Teliyani			
18	**Firozabad**			1	Aron	1	Firozabad	
						2	Khairgarh	
						3	Narkhi	
						4	Shikohabad	
						5	Tundla	
19	**G B Nagar**	1	Dadri			1	Bisrakh	
		2	Dankaur			2	Jewar	
20	**Ghaziabad**					1	Bhojpur	
						2	Loni	
						3	Razapur	
21	**Ghazipur**	1	Barachawar	1	Ghazipur			
		2	Deokali	2	Manihari			
		3	Sadat	3	Muhammadabad			
22	**Hamirpur**	1	Sumerpur					
23	**Hapur**					1	Garh	
						2	Hapur	
						3	Simbholi	
24	**Hathras**	1	Sadabad	1	Hathras	1	Mursan	
						2	Sahpau	
						3	Sasni	
25	**Jaunpur**	1	Barsathi	1	Buxa	1	Badlapur	
		2	Dharmapur	2	Dobhi	2	Karanja Kalan	
		3	Madiyahun			3	Kerakat	

CATEGORIZATION OF ASSESSMENT UNITS IN UTTAR PRADESH								
Sl. No.	**District**		**Semi-critical**		**Critical**		**Over-exploited**	**Saline**
		4	Ram Nagar			4	Maharajganj	
		5	Rampur			5	Muftiganj	
						6	Sikrara	
						7	Sirkoni	
26	**Kannauj**					1	Jalalabad	
						2	Talgram	
27	**Kanpur Nagar**	1	Ghatampur			1	Kalyanpur	
		2	Sarsaul					
		3	Shivrajpur					
28	**Kasganj**	1	Ganj Dundwara			1	Kasganj	
		2	Soron			2	Sahawar	
29	**Kaushambi**			1	Kara	1	Chail	
				2	Manjhanpur	2	Moorat Ganj	
				3	Newada	3	Sirathu	
30	**Lucknow**					1	Chinhat	
						2	Sarojini Nagar	
31	**Mahoba**			1	Charkhari	1	Jaitpur	
				2	Kabrai	2	Panwari	
32	**Mainpuri**					1	Barnahal	
33	**Mathura**			1	Farah	1	Baldeo	
						2	Nohjhil	
						3	Raya	
34	**Meerut**			1	Machhara	1	Kharkhoda	
				2	Meerut	2	Rajpura	
				3	Parichhat Garh			
35	**Mirzapur**	1	City	1	Chanbey			
		2	Sikhar	2	Kon			
				3	Majhawan			
36	**Moradabad**			1	Bhagatpur Tanda	1	Bilari	
				2	Chhajlet	2	Dilari	
37	**Muzaffarnagar**			1	Shahpur	1	Bhaghara	
						2	Budhana	
						3	Charthawal	
38	**Pratapgarh**			1	Baba Bekhernath	1	Aspur-Deosara	
						2	Gaura	
						3	Lakshmanpur	
						4	Lalganj	
						5	Mandhata	
						6	Mangraura	
						7	Patti	
						8	Pratapgarh Sadar	
						9	Rampur-Sangramgarg	
						10	Sandwa -Chandrika	
						11	Shivgarh	
39	**Raibareli**			1	Sareni			
40	**Rampur**					1	Chamraua	
						2	Saidnagar	
						3	Shahabad	
						4	Swar	
41	**Saharanpur**			1	Muzafarabad	1	Baliakheri	
				2	Puwarka	2	Deoband	
						3	Gangoh	
						4	Nagal	
						5	Nakur	
						6	Nanauta	
						7	Rampur	
						8	Saduli Qudim	
						9	Sarsawa	
42	**Sambhal**			1	Asmoli	1	Bahjoi	
				2	Gunnaur	2	Baniakhera	
				3	Junawai	3	Pawansa	
						4	Sambhal	
43	**St. Ravidas Nagar**	1	Abholi	1	Bhadohi			
		2	Aurai	2	Gyanpur			
		3	Deegh					
		4	Suriyawan					
44	**Shamli**			1	Shamli	1	Kairana	
				2	Thana Bhawan	2	Kandhala	
						3	Un	
45	**Sonbhadra**	1	Ghorawal					
46	**Unnao**	1	Sikandar Sirausi					
47	**Varanasi**	1	Baragaon	1	Pindra	1	Arajiline	
		2	Chiraigaon			2	Harhuwa	
		3	Cholapur					

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
820	45	59	113	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN UTTARAKHAND							
Sl.No	**District**		**Semi-critical**		**Critical**	**Over-exploited**	**Saline**
1	**Udham Singh Nagar**	1	Khatima	1	Kashipur		

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
18	**1**	**1**	**0**	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN WEST BENGAL						
Sl.No	**District**		**Semi-critical**	**Critical**	**Over-exploited**	**Saline**
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	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			
		5	Kolaghat (Panskura-Ii)			
		6	Moyna			
		7	Panskura-I			
		8	Potashpur-I			
		9	Potashpur-Ii			
10	**Paschim Medinipore**	1	Chandrakona-Ii			
		2	Dantan-Ii			

CATEGORIZATION OF ASSESSMENT UNITS IN WEST BENGAL					
Sl.No	**District**	**Semi-critical**	**Critical**	**Over-exploited**	**Saline**
	3	Daspur-li			
	4	Debra			
	5	Ghatal			
	6	Pingla			
	7	Sabang			

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
268	76	1	0	0

Categorization of Assessment Units In UT of Daman & Diu					
Sl. No	UT	Semi-critical	Critical	Over-exploited	Saline
1	Daman & Diu		1 Diu		

Abstract				
No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
2	0	1	0	0

Categorization of ISLANDS In Lakshadweep						
Sl.No.	**Island**		**Semi-critical**	**Critical**	**Over-exploited**	**Saline**
1	**Lakshadweep Islands**	1	Agatti			
		2	Amini			
		3	Kavaratti			

Abstract

No. of Assessed Units	Semi-critical	Critical	Over-exploited	Saline
9	**3**	**0**	**0**	**0**

CATEGORIZATION OF ASSESSMENT UNITS IN UT OF PUDUCHERRY							
Sl.No.	**District**	**Semi-critical**	**Critical**	**Over-exploited**		**Saline**	
1	**UT of Puducherry**			1	Puducherry	1	Yanam

Abstract				
No. of Assessed Units	**Semi-critical**	**Critical**	**Over-exploited**	**Saline**
4	**0**	**0**	**1**	**1**

APPENDICES

APPENDIX A

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

Government of India
Ministry of Water Resources, River Development, Ganga Rejuvenation
Shram Shakti Bhawan, Rafi Marg, New Delhi

****

File No. T-13014/3/2014-GW **Dated: 28th August, 2014**

RESOLUTION

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

The last assessment of state-wise annual replenishable ground water resources for the entire country has been made as on 31st March 2011 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, 2013) 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 Planning Commission -	Member
(xii)	Joint Secretary, Ministry of Agriculture -	Member
(xiii)	Joint Secretary, Ministry of Environment & Forests -	Member
(xiv)	Joint Secretary, Ministry of Rural Development - (Watershed Development Programme)	Member
(xv)	Joint Secretary, Department of Drinking Water Supply	-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, M/o Ag.& Coop. -	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

11/9/14

Contd..2..

(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 of 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 2013. 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 2013 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, 2013.

(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) .

(R.K. Gupta) 23/8/14
Director (GW)
Tele No. 23708153
email: dirgw-mowr@nic.in

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ORDER

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

(R.K. Gupta)
Director (GW)
Tele No. 23708153
email: dirgw-mowr@nic.in

To

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

Copy to:

1. PS to Minister(WR,RD&GR), New Delhi
2. PS to MoS (WR), MoWR, New Delhi
3. Sr. PPS to Secretary (WR).
4. PS to Additional Secretary(WR), MoWR, New Delhi
5. All Wing Heads, Ministry of Water Resources, New Delhi
6. All Organization Heads of Ministry of Water Resources, New Delhi.
7. Concerned Committee members.

Copy also to:

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

(R.K. Gupta)
Director (GW)
Tele No. 23708153
email: dirgw-mowr@nic.in

APPENDIX B

APPROVALS OF GROUND WATER RESOURCES ASSESSMENT REPORTS BY THE STATE LEVEL COMMITTEES

Andhra Pradesh

MINUTES OF THE 2nd STATE LEVEL COMMITTEE MEETING ON RE-ESTIMATION OF DYNAMIC GROUND WATER RESOURCES OF ANDHRA PRADESH STATE AS ON MARCH, 2013

The State Level Committee meeting on re-estimation of dynamic ground water resources of Andhra Pradesh State (As on March 2013) was held on 16.06.2016 at 12.30 P.M. in the Mini- conference Hall, Ground Floor, "J" Block, Secretariat, Government of Andhra Pradesh, Hyderabad. Sri Shashibhushan Kumar, I.A.S, Secretary to Government of Andhra Pradesh, Water Resources Department chaired the Meeting.

The following members have attended the meeting:

1. Sri A D Rao, Regional Director, CGWB
2. Dr K.Venugopal, Director, GWD
3. Dr D V Reddy, Chief Scientist, NGRI
4. Sri B Srinivas Rao, Dy. Director, Industries Department
5. Sri Siva Prasad Reddy, Minor Irrigation
6. Sri A Murali Krishna Reddy, Dy. Chief Engineer, Minor Irrigation
7. Sri K Venkateswarlu, Joint Managing Director, APSIDC
8. Ms M Nirmala, ADE, AP TRANSCO
9. Sri A K Sinha, Manager, NABARD
10. Sri K Kanna Babu, Dy Director, DES
11. Sri Satya Narayana Reddy, Dy EE, Panchayat Raj Dept.

At the outset, Shri A.D. Rao, Regional Director, CGWB and Member-Secretary, GEC welcomed the Chairman and other members to the meeting. He informed that ground water estimation is done once in two years as per the directives of the Ministry of WR, RD & GR, Government of India. He also informed that the last estimation was done with the base year 2010-11 as on March 2011 and now estimation for the base year 2012-13 is completed and the same is placed before committee for approval.

Dr. K. Venugopal, Director, Ground Water Department congratulated all officers of State Ground Water Department and Central Ground Water Board for the efforts put in by them in successfully completing the assessment report. He outlined the methodology used for computations and data used. He felt that this estimation would be useful in taking appropriate measures to address the area specific problems related to ground water.

Later, Sri N. Srinivas, Dy. Director, Ground Water Department gave a presentation on the Resource Estimation through a power point presentation. He explained briefly on methodology followed and summarized results of the findings of the Report. He briefed that, on the basis of village-wise data, the assessment was carried out for 748 watersheds and later apportioned to mandal level and recharge calculation was carried out. He also briefed that the net availability of the resource was 18,474 MCM and stage of ground water development of the State, as a whole increased from 37% to 44%. He said that there is 2.2% fall in the net ground water availability and 15.7% rise in the annual draft in the state in comparison to 2011 estimates. He clarified that it is due to less rainfall and increase in area under ground water irrigation during the period 2012-2013. In all 61 mandals are categorized as over exploited, 18 as critical and 52 as semi critical category in the State.

Secretary, WRD, suggested that the ground water resource estimation be done on yearly/monthly basis, as it is a dynamic resource, so that appropriate plans can be put into place. He raised certain queries on the net annual resource availability in relation to net increase in water levels in the current exercise, assessing inflow and outflow of the ground water from the basin and constraints in periodical assessment of ground water resources. Director GWD, Dr D.V.Reddy, NGRI, RD, CGWB clarified the queries.

Secretary, WRD also advised to include the percentage contribution of each parameter of the recharge (like rainfall recharge/canal recharge) to the total recharge in the report. He felt that the computations and results should reflect the ground reality, facilitating planners and administrators for chalking out suitable plans in a pragmatic manner.

(Action: Director, GWD/RD, CGWB)

Members expressed that a dedicated software is required for precise and periodical groundwater resource estimations. Secretary, WRD, agreed for the proposal and advised Dy. Director, GWD, Visakhapatnam to coordinate the activity and do the needful in the matter.

(Action: Director, GWD)

Director, GWD, felt the need for geo-tagging of existing 15,00,000 agricultural bore wells for planning groundwater based schemes in the state. Secretary, while agreeing the need for taking up the activity, suggested GWD to obtain the list of S.C.No (unique code) wise existing electrical connection details of agricultural wells from APTRANSCO Department. He also explained the process that can be followed for completion of total geo-tagging activity in the state.

(Action: Director, GWD)

Members expressed that in the high rainfall districts like Srikakulam, Vizianagaram, Visakhapatnam where ground water development is less than 50%, regulation on groundwater abstraction structures and spacing norms may be relaxed. Secretary advised the Director, GWD, to examine the exiting provisions of APWALTA for relaxation on notification in such districts within the ambit of APWALTA regulations.

(Action: Director, GWD)

Secretary, WRD, advised all Members of the Committee to provide required data for computation of resources for 2014-15 & 2015-16 and advised the Director, GWD to address letters to all the Heads of Departments for doing the needful in the matter.

(Action: Director, GWD & all related departments)

Secretary, WRD asked the scientific community to find out and suggest solutions for State specific ground water problems. He asked to suggest ways and means for increasing water levels from present 12 m in pre monsoon to 8 m and post monsoon water level to 3m. Sri A.D. Rao, R.D, CGWB felt that it can be achieved by regulating ground water pumpage from deeper wells and augmenting ground water recharge by increasing surface irrigation.

Sri A. VaraPrasada Rao, Joint Director(FAC), Ground Water Department, briefed about the case study carried out at Musnoor Mandal, Krishna District for improvement in ground water levels.

After thorough deliberations, the Committee approved the report on 'Re-estimation of Dynamic Ground Water Resources of Andhra Pradesh state as on March 2013'.

The meeting ended with vote of thanks by Dr. P.N. Rao, Superintending Hydrogeologist, CGWB, SR, Hyderabad.

(Sri A.D.Rao)	(Dr K Venugopal)	(Sri Shashibhushan Kumar,I.A.S.)
Regional Director	Director	Secretary to Government of A.P.
CGWB	GWD	Water Resources Department

Arunachal Pradesh

ANNEXURE-I

4050
23/9/10

GOVERNMENT OF ARUNACHAL PRADESH
WATER RESOURCES DEPARTMENT
CIVIL SECRETARIAT : ITANAGAR.

ORDER

No. SWRD –(G.W)-13/2010 Dated Itanagar, the 25th Aug'2010.

The Governor of Arunachal Pradesh is pleased to constitute State Level Committee (SLC) for Assessment of Dynamic Ground Water Resources (AoDGWR) in Arunachal Pradesh comprising of following members:-

1.	Secretary Water Resources Deptt., Govt. of A.P.	:- Chairman
2.	Chief Engineer WRD (A.P)	:- Member
3.	Chief Engineer Eastern Zone, PHED (Sanitation & Rural Water Supply), Itanagar.	:- Member
4.	Director Agriculture, A.P. Naharlagun	:- Member
5.	Superintending Engineer Drilling/Ground Water W.R. Circle Itanagar.	:- Member
6.	Representative from NABARD, Itanagar	:- Member
7.	Regional Director, Central Ground Water Board (CGWB) North East Region, Guwahati.	:- Member

Sd/-
Tabam Bam
Chief Secretary
Govt. of Arunacal Pradesh
Itanagar.

Memo No. SWRD –(G.W)-13/2010/1587-97 Dated Itanagar, the 1st September' 2010.
Copy to:-

1. The Secretary to His Excellency the Governor of A.P. Itanangar.
2. The PS to all Hon'ble Ministers/Parliamentary Secretaries, Govt. of A.P. Itanagar.
3. The P.S to Chief Secretary, Govt. of A.P. Itanagar.
4. The Secretary (WRD), Govt. of A.P., Itanagar for information and necessary action please.
5. The Chief Engineer (WRD), Arunachal Pradesh, Itanagar, for information & necessary action.
6. The Chief Engineer (Eastern Zone), PHED (Sanitation & Rural Water Supply), Arunachal Pradesh, Itanagar, for information and necessary action.
7. The Director (Agriculture), Arunachal Pradesh, Naharlagun, for information and necessary action.
8. The Superintending Engineer Drilling/Ground Water, W R Circle Itanagar, for information and necessary action.
9. The General Manager, NABARD Bank, Arunachal Pradesh Regional Office, Bank Tinali, T.T Marg, Itanagar – 791111 for information and necessary action.
10. The Regional Director, Central Ground Water Board (CGWB), North East Region, Guwahati, for information and necessary action.
11. The Order Book.
12. Office Copy.

i) The resource computations are done for the **ground water year 2012-13**

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 irrigation project in the state, the entire state has been taken as non-command area.

iv) **Ground Water Draft:**

a) **Domestic draft:** Draft per person for rural & Urban area has been taken as 60 lpd

b) **Irrigation draft:** This has been calculated only for Eight District as other districts do not have ground water irrigation

c) **Industrial Draft:** This has not been considered, as the information is not available.

v) The recharge from rainfall has been computed using the **Rainfall infiltration factor method.** As most of the area of the state is covered by consolidated and semi-consolidated formations the Rainfall infiltration factor considered is 0.22. Water Level Fluctuation Method for Resource Estimation could be adopted for five districts viz., Papumpare, Changlang, Tirap, Lohit and East Siang.

vi) **Total annual ground water recharge** has been obtained as the arithmetic sum of Recharge from rainfall and the recharge from sources other than rainfall.

vii) **Net annual ground water availability** has been obtained after deducting the unaccounted natural discharge from the total annual recharge. Since recharge has been computed by the Rainfall infiltration factor method, unaccounted natural discharge has been taken as 10% of annual recharge as recommended by GEC97.

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

Stage = (100* Gross Groundwater draft for all uses)/ Annual available 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.

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: 4.43 BCM

b) Net Annual Ground Water Availability: 3.39 BCM

c) Gross Ground Water Draft for all uses: 0.0092 BCM

   i) Irrigation Draft: 0.0022 BCM

   ii) Annual Domestic Draft: 0.0071 BCM

d) Annual allocation for Domestic and Industrial uses: 0.0202 BCM

e) Stage of ground water development: 3.325%

The comparison of the figures with the last reconciled data of 2011 shows that there is a decrease in total annual ground water recharge by - 0.08 BCM in the 2010-11 estimate. This difference in resource may be attributed to the fact that during 2012-13 rainfall was decrease in Lohit, Lower Dibang Valley, Papum Pare districts of Arunachal Pradesh.

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 said that all the districts of Arunachal Pradesh stage of Ground water development is under safe category. The towns like Itanagar, Tezu, Longding is facing acute water problem. The ground water resource assessment unit is taken as district area. As the district area is a big unit so the district resource shows a big value. But in the Urban areas population is more, therefore urban areas are facing more water scarcity. So, in future ground water resources of all towns of Arunachal Pradesh should be calculated separately. Area specific study for Arunachal Pradesh is very much essential. The Hon'ble Chairman of the Committee is also supported the proposal.

Shri L.Kri, Chief Engineer (E/Z) , Public Health Engineering & W.S.S Department expressed that in the report ground water level of Lohit district shows rising trend, but he has observed that in that district water level is falling in last few years. So, he suggested to check the data again before finalizing the report.

Shri K. Jagadeesh, Asst. General Manager, NABARD suggested that CGWB should put necessary suggestion in the report if any problematic area is identified.

Committee opined that the existing strength of CGWB, SUO may be upgraded.

The Committee approved the Dynamic Ground Water Assessment Report, 2013 of Arunachal Pradesh with the above observations. Shri. V.N.Pandey, Superintending Engineer (GW & TW), Water Resources Department offered Vote of Thanks.

(G.Padu)
Secretary,
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

(L. Kri)
Chief Engineer (E/Z),
Public Health Engg. & W.S.S Dept,
Govt. of Arunachal Pradesh,
& Member

(K.Riram)
Deputy Director
Agriculture Department
Govt. of Arunachal Pradesh,
& Member

(K. Jagadeesh)
Asst, General Manager
NABARD, Itanagar
& Member

(V.N. Pandey)
Superintending Engineer
Water Resources Department
(GW & TW), Itanagar
Govt. of Arunachal Pradesh,
& Member

(R.K.Kalita)
Scientist-D & O.I.C
Central Ground Water Board
State Unit Office
Govt. of India
& Member

Assam

INUTES OF THE STATE LEVEL COMMITTEE (Ground Water Resource Estimation) MEETING D ON 30th OCTOBER, 2015, IN THE CHAMBER OF THE SECRETARY, IRRIGATION, GOVT. OF ASSAM FOR RECONCILIATION OF THE DYNAMIC (2013)FOR THE STATE OF ASSAM

A State Level Standing Committee (SLSC) meeting for Ground Water Assessment hasbeen ened for reconciliation of the Dynamic Ground Water Resources,as on 31st March, 2013 for the state ssam. The meeting was held on 30th October 2015 in the chamber of the Secretary, Irrigation, Govt. ssam. The Secretary, Irrigation, Govt. of Assam chaired the meeting. The following members nded the meeting:

i) Sh Kujendra Doley, Secretary, Irrigation Department, Govt. of Assam
ii) Sh M.K.Borah,Under Secretary(C), Water Resources Department, Govt. of Assam
iii) Sh L.C Pathak, Chief Engineer, Irrigation Department, Govt. of Assam
iv) Sh M.M.Boro, Chief Engineer(MI), Irrigation Department, Govt. of Assam
v) Sh A.K.Sarma, E.E., Department of Agriculture, Govt. of Assam
vi) Sh H.A.Ahmed, Addl.C.E. Public Health Engineering Department, Govt. of Assam
vii) Sh P Kalita, Sr Hg, CGWB, NER, Guwahati
viii) Sh M. Konwar, Sc D, CGWB, NER, Guwahati
ix) Debajyoti Choudhury, Dy Secy(W)(i/c), Irrigation Department, Govt. of Assam
x) Amit Pandey, Manager, NABARD, Guwahati
xi) Bornali Choudhury, Geologist, DGM, Govt. of Assam
xii) Barnalee Nath, Geologist, DGM, Govt. of Assam

The draft assessment, prepared by CGWB,was circulated among the members. The Chairman of the mittee Sh. K. Doley, Secretary, Irrigation Department, Govt. of Assam welcomed all the members to meeting. Sh. P. Kalita, Sr. Hydrogeologist, CGWB, NER has briefed the ground water resources of m State. Sh. M. Konwar, Scientist-D explained elaborately the methodology of Dynamic Ground r Resources Estimation.

A detailed discussion was held and the following decisions were taken:

1. Sh.H.A.Ahmed, Addl.C.E. Public Health Engineering Department suggested the domestic draft for rural population should be taken as 70 lpcd for the next resource assessment.
2. Sh.L.C.Pathak, Chief Engineer, Irrigation Department suggested for scientific assessment of the well before construction.
3. Members of DGM suggested for proper coordination among the participating departments.

Currently, the assessment of Dynamic Ground Water Resources, as on March, 2013, has been ired for 27 districts of Assam. The net dynamic ground water resourcesavailableis28.90BCM (2013), llocation for domestic and industrial usesupto the year 2025 is 0.84BCM,where asthe ground water for all uses is 4.74BCM. The net ground water resources for future irrigation uses are24BCM. The of ground water development is 19% and all districts are falling under Safe category.

The Ground Water Resources Estimate as on 31st March 2013 for the state of Assam is approved ccepted by the State Level Standing Committee.

Memo No.ION (W) 61/2012/ 31 - A Dated, Dispur, the 27th February'2015

Copy to :

1 The Commissioner (SP), Government of India, Ministry of Water Resources, Shram Shakti Bhawan, Rafi Marg, New Delhi with reference to D.O.letter No.T-13014/2014-GW dtd. 22-8-2014.
2. The S.O.to Chief Secretary, Assam for favour of kind information.
3. The Addl. Chief Secretary to Government of Assam, Irrigation Department, Dispur for favour of kind information.
4. The Chief Engineer, Water Resources Department, Chandmari, Guwahati-3 for information and necessary action
5. The Director, Department of Agriculture, Khanapara, Guwahati-22 for information and necessary action.
6. The Chief Engineer, Public Health Engineering Department, Hengrabari for information and necessary action.
7. The Chief Engineer, Minor Irrigation, Assam, Chandmari, Guwhati-3 for information and necessary action.
8. The Director, Department of Industries, for information and necessary action.
9. The General Manager, NABARD, Guwahati-6 for information and necessary action.
10. The Regional Director, Central Ground Water Board, Ministry of Water Resources, North Eastern Region, Bhujal Bhawan,Betkuchi, Opposite ISBT, Guwahati-35 for information and necessary action.

By Order etc.,

27/2/15

Secretary to the Govt.of Assam.
Irrigation Department, Dispur.

30/10/15

(K. Doley)
Secretary, Irrigation
Govt. of Assam
& Chairman, SLSC

30/10

Sh L G Pathak)
hief Engineer,
rigation Department,
ovt. of Assam

30/10/15

(Sh M.M.Boro)
Chief Engineer (MI)
Irrigation Department
Govt. of Assam

30/10

Sh H A Ahmed)
dd.C.E
HED
ovt. of Assam

(Sh.A.K.Sarma)
Executive Engineer
Department of Agriculture
Govt. of Assam

30/10

Sh M K.Borah)
nder Secretary(C),
ater Resources Department,
ovt. of Assam

30/10/15

(Amit Pandey)
Manager
NABARD, Guwahati

30/10

Sh P Kalita)
r Hydrogeologist
GWB, NER, Guwahati

30/10/2015

(Bornali Choudhury)
Geologist
Directorate of Geology and Mining
Govt. of Assam

Chhattisgarh

MINUTES OF THE MEETING OF THE STATE LEVEL COMMITTEE FOR RE-ESTIMATION OF GROUND WATER RESOURCE AS ON 2013. Held on 16/09/2015

The meeting of the State Level Committee for re-estimation ground Water Resources for approval of 'Dynamic Ground Water Resources of Chhattisgarh as on March 2013' was held in the office of the Secretary, Water Resources, Govt of Chhattisgarh on 16th September 2015 at 15:00 hours. The meeting was chaired by Secretary, Water Resources, Govt. of Chhattisgarh. The meeting was attended by representatives from 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 participants 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 to give a brief introduction about the re-assessment of ground water resources of Chhattisgarh state.

1. Shri C. Paul. Prabhakar, Regional Director, CGWB, NCCR, Raipur as the member secretary for the committee gave a brief introduction on ground water resource estimation in the state and informed that in every two years the ground water resources of Chhattisgarh state to be re-estimated. The recent estimations has carried out taking 2012-13 as the base year and the methodology adopted is GEC '97 as earlier resources for 2011 was estimated. In the assessments, administrative block was taken as unit of assessment and command and non-command area in block was taken as sub unit.
2. Secretary, Water Resources & the Chairman of the Committee pointed out for the necessity of re-estimation of resource in every two years. To this, Shri C. Paul. Prabhakar, Regional Director informed that the changes in ground water development within two years can be assessed in highly developed blocks and suitable measures may be taken up for further development accordingly.
3. Shri C. Paul. Prabhakar, Regional Director explained comparative point wise scenario of Dynamic Ground Resources of Chhattisgarh between 2011 and 2013 assessment. The Secretary, Water Resources invited opinion from all members of the committee. In Annexure II 52 response, the PHED was agreed on assessment carried out based on data as on March 2013.
4. Shri H. R. Kutare, Engineer–In–Chief, Water Resources Department, Govt. of Chhattisgarh pointed out the Gross ground draft and Stage of ground water development for Dhamtari block is in critical categorization. However the block falling under good canal networking. Shri C. Paul. Prabhakar, Regional Director explained that the data received from state shows higher development in the blocks where scope of draft is much more. The 'Recharge from canal seepage in command area' is a part of methodology and it is incorporated in the report in respect of Dhamtari district.
5. Shri H. R. Kutare, Engineer–In–Chief, Water Resources Department, Govt. of Chhattisgarh accepted the changes observed in the assessment as on March 2013. He emphasized on implementation of Artificial Recharge Schemes in rural area of Semi critical, Critical and overexploited blocks in the state. The Secretary Water Resources, & Chairman of the Committee, advised that Rain Water Harvesting and Artificial Recharge Schemes to be implemented in all critically developed blocks in the state.
6. Shri S. Suseendar, Manager NABARD was agreed on outcome of the present estimation carried out for the state. The representative from the Directorate of Industries was also in the same opinion and agreed on present resource assessment.

7. All the members of State Level Ground Water Re-estimation Committee forDynamic Ground Water Resources of Chhattisgarh (As on March' 2013)appreciated the work carried out by State Ground Water Department, Govt. ofChhattisgarh & Central Ground Water Board, Govt. of India for bringing out thereport on "Dynamic Ground Water Resources of Chhattisgarh as on March 2013"which will be helpful for proper development and management of ground waterresources in the state of Chhattisgarh and finally the committee approved thereport.

The meeting ended with thanks to the chair.

C. PaulPrabhakar
RegionalDirector, CGWB&Member
Secretaryof the Committee

Dr. B.L. Tiwari,
Secretary, WaterResources, GovtofCG
&Chairmanofthe Committee

List of participants in the first meeting of the State Level Committee for re-estimation of ground Water Resources, as on March 2013 for Chhattisgarh, held on 16/09/2015.

Sl. No.	Name	Designation and department
1.	Dr. B.L. Tiwari	Secretary,Water Resources, Govt.of Chhattisgarh and Chairman of the Committee
2.	Shri C.Paul Prabhakar	Regional Director, CGWB, Govt. of India and Member Secretary,
3.	Shri Shri. H.R.Kutare	ENC, Water ResourcesDepartment, Govt. of Chhattisgarh
4	Shri J.Pawar	Chief Engineer, Mahanadi Godavari Basin, WRD, Govt. of Chhattisgarh
5	Shri D.K.Jha	OSD, Water Resources Department, Govt. of Chhattisgarh
6	Shri A.K.Patre	Scientist C, CGWB, NCCR, Raipur
7	Shri S. Jha	General Manager, NABARD
8	D.R.Wadhwani	Directorate of industries, Raipur
9	Shri S.Suseendar	Manager, NABARD
10	Shri K.K.Markam	Sub Engineer, Public Health Engineering Department, Govt. of Chhattisgarh

Delhi

Minutes of the 1st Meeting of the State Ground Water Co-ordination Committee for Re-Estimation of Ground Water Resources (as on March, 2013) & National Project on Aquifer Mapping & Management held on 7th April, 2015

The 1st meeting of the State Ground Water Co-ordination Committee for Re-Estimation of the Ground Water Resources (as on March, 2013) & National Project on Aquifer Mapping & Management for NCT, Delhi was held on 7th April, 2015 at 4.00 P.M. in the Conference Room of the Principal Secretary, Urban Development, Govt. of NCT, Delhi. The meeting was chaired by Shri Narender Kumar, Principal Secretary, Urban Development, Govt. of NCT, Delhi. At the outset Principal Secretary, Urban Development welcomed all the participants. Thereafter, he requested Central Ground Water Board Officials to initiate the Agenda Items for the said meeting.

List of participants is annexed.

Part A : Ground Water Resource Estimation

A brief presentation on Ground Water Resource Estimation was made by the CGWB to the Committee members. The issue of number of assessment units to be taken for re-estimation of Ground Water Resources (as on March, 2013) was discussed, in view of the recent notification of Department of Revenue, Govt. of NCT, Delhi on the bifurcation of districts of NCT, Delhi from 9 districts with 27 tehsils to 11 districts with 33 tehsils. It was agreed by the committee members that the Ground Water Resource Estimation for the year 2013 would be taken up for 27 Tehsils of 9 districts, since the revised boundaries of 11 districts with 33 Tehsils is yet to be finalized and vetted by Revenue Department, Govt. of NCT, Delhi. It was also informed that the assessment of the Ground Water Resources requires multiple data pertaining to ground water from different State Govt. agencies.

CGWB emphasized that it is imperative to have the exact and authenticated data/figuresfor estimating draft and recharge figures. In this respect, number of State Govt. departments namely DJB, NDMC, DCB, DDA, MCD, PWD, I&FC, Department of Industries, Development Department, Labour Dept., VAT Dept etc. are the Nodal agencies for providing the requisite input data.

It was pointed out by the Principal Secretary, Urban Development that though the Government agencies are maintaining figures of draft from the public tubewells for domestic usage. However, bulk ground water users are from the private tubewells installed in Group Housing Societies, Big Complexes/Malls, Farm Houses, Hotels, Hospitals etc., for which, availability of data may be cumbersome, data of such extraction may be obtained from the respective agencies by CGWB. Shri T.P. Singh, Department of Industries, Government of NCT, Delhi mentioned that ground water withdrawal is also being made by the DTC Depots, DMRC, Automobiles Service Stations, Mother Diary, Slaughter Houses, Railways, bottling plants, MCD/DDA parks etc. It was decided that CGWB would request the concerned Departments for providing the data and the office of Principal Secretary, Urban Development would ensure that this data is being provided to the CGWB by the concerned Departments. It was unanimously agreed upon by the committee members that necessary data pertaining to ground water abstraction will be provided to the CGWB.

As regard to the domestic draft, Shri A K Gupta, SE, DJB agreed that data on number of public tubewells with discharge installed by DJB in different tehsils of NCT, Delhi would be made available to CGWB. He informed that record of permissions granted for construction of tubewell by the Advisory Council is available with DJB, which will be provided to CGWB. He further mentioned that areas which are not under the jurisdiction of DJB, CGWB may approach the concerned departments namely Delhi Cantonment Board, NDMC, DDA etc. for data on ground water abstraction from the tubewells under their respective jurisdictions.

For Industrial draft, it was informed by Shri T.P. Singh, Department of Industries, Government of NCT, Delhi that CGWB may obtain the data on industrial ground water consumption either from Labour Dept., Govt. of NCT, Delhi which provides factory license to different factories/industries in NCT, Delhi or from the VAT, Department, Govt. of NCT, Delhi. Further, Principal Secretary, Urban Development indicated that data on bottling plants and polluting industrial units is available with the DPCC, for which CGWB may approach separately.

As regards to Irrigation draft, it has been agreed upon by the Joint Director, Agriculture Dept, Govt. of NCT Delhi that requisite data in respect of cropping pattern and utilization of quantum of ground/surface water for each block/tehsil would be provided to CGWB. Principal Secretary, Urban Developmentexpressed his concern over the large ground water withdrawal being made by the tubewells in farm houses and enquired whether record of such withdrawal is being maintained by any department. On this, it has been mentioned that DDA/MCD may be approachedby CGWB for the obtaining the details of ground water structures and its draft.

For recharge estimation due to seepage from canals and drains, Chief Engineer, I&FC has agreed to provide all the requisite details of lined and unlined canals/drains of NCT, Delhi to CGWB. Details& designs of rainwater harvesting structures and water conservation structures installed by the different departments in NCT, Delhi would be provided by the concerned departments viz NDMC, MCD, DJB etc.

Shri Narender Kumar, Principal Secretary, Urban Development stressed upon the importance of the re-estimation of ground water resources being taken up by CGWB and has desired that all the concerned departments must co-operate to provide the necessary data to CGWB.

Part B : National Project of Aquifer Mapping and Management for NCT, Delhi

Thereafter, a brief presentation on the National Project of Aquifer Mapping and Management for NCT, Delhi was made by CGWB. During the presentation, the basic purpose of preparation of Aquifer maps was explained to the committee members and the objectives and methodology of this project were highlighted. The committee members were informed that main aim of this project is to prepare aquifer map of the entire NCT, Delhi (1483 sq. km) in the scale of 1:50,000 scale in GIS platform by depicting aquifer geometry in 2D/3D and ground water modeling & development of aquifer management plan. Principal Secretary, Urban Development mentioned that full-fledged cooperation would be required from all concerned department for strengthening the input data for the better implementation of this project. The Aquifer Mapping and Management plan will be fruitful to the respective State Govt. Agencies considering the warranted ground water scenario and dependency on ground water in NCT, Delhi

Further, the Aquifer Management plan would address the issues of saline water up-coning and its relation with fresh water, pollutant migration from drain and stream – aquifer relationship. Principal Secretary, Urban Development suggested that outcome of the project may also include impact of rain water harvesting structures installed in different parts of Delhi on ground water quality and quantity.   He also suggested that Experimental studies may be taken up for recharge of storm water runoff from the roads and footpaths through installation of pre-fabricated structures between roads and footpath.

Thereafter, Sh. Prakash Chandra, Joint Secretary, Urban Development, Govt. of NCT Delhi took over the charge of the meeting and discussed regarding the nomination of Members from District Collectors and NGOs. It was decided that during next meeting the District Magistrate of South, South-West and West are to be invited. As regards to nominations of NGOs, name of INTACH was unanimously agreed upon. For nomination of other, NGOs which are engaged in field of ground water may suitably be considered by CGWB itself. Dr. S.K. Mishra, NABARD agreed upon to forward suitable list of NGOs which can be considered by CGWB especially for formulating the Participatory Aquifer Management Plan.

As regards to nomination of Nodal agency, Sh. A.K. Gupta, SE, DJB expressed his concern for nominating DJB as Nodal Agency as their department does not have specialized personnel or expertise in domain of groundwater.CGWB explained in detail the exact role and function of the Nodal Agency and subsequently it was agreed that DJB would be the Nodal Agency for the NCT Delhi as they are the main custodian of ground water of the State.

The meeting ended with the vote of thanks to the Chair and it has been agreed upon that after obtaining the requisite data from the concerned departments, CGWB would approach the Office of Urban Development, Government of NCT, Delhi for next meeting.

LIST OF PARTICIPANTS

1. Shri Narender Kumar, Principal Secretary, Urban Development, Govt. of NCT, Delhi.
2. ShriPrakash Chandra, Joint Secretary, Urban Development, Govt. of NCT, Delhi
3. Shri K. Sambhamurti, Chief Engineer (I&FC) Zone II, Irrigation and Flood Control Deptt., Govt. of NCT Delhi, 4th Floor, ISBT Building, Kashmeri Gate, New Delhi.
4. ShriV.K.Jain, Chief Engineer (I&FC), Zone I, Irrigation and Flood Control Deptt., Govt. of NCT Delhi, 4th Floor, ISBT Building, Kashmeri Gate, New Delhi.
5. Shri S. Das, Director (Plg.), DDA, VikasSadan, INA, New Delhi.
6. Shri T.P. Singh, Dy. C.I., Department of Industries, Govt. of NCT, Delhi, 419 UdyogSadan, FIE, Patparganj, Delhi- 110 092.
7. Sh. S.R. Kinra, Director (P), PWD, Office of Engineer in Chief, Govt. of NCT, Delhi, 12th Floor, MSO Building, New Delhi-2
8. Sh. A.K. Gupta, SE (Plg.) Water/ GWC, DJB, Varunalaya, Karol Bagh, New Delhi.
9. Sh. A.P. Saini, Joint Director (Agriculture), Development Deptt., 5/9, Under Hill Road, Delhi.
10. Shri Vijay Kumar, Director, DDA, VikasSadan, INA, New Delhi
11. Shri Vinod, AC (Plg.)/DDA, VikasSadan, INA, New Delhi.
12. Sh. M. Khan, NDMC, Palika Kendra, SansadMarg, New Delhi – 110 001.
13. Shri Ramesh Bansal, NDMC, Palika Kendra, SansadMarg, New Delhi – 110 001.
14. Dr. S.K.Mishra, NABARD, NABARD Tower, 24, Rajendra Place, New Delhi.
15. Shri P.N. Singh, Sr. Hydrogeologist, CGWB, JN House, Mansingh Road, New Delhi.
16. Sh. D. Chakraborty, Sr. Hydrogeologist, CGWB, JN House, Mansingh Road, New Delhi.
17. Shri Rajesh Chandra, Sr. Hydrogeologist, CGWB, JN House, Mansingh Road, New Delhi.
18. Smt. SoniaKapur, AGP, CGWB, JN House, Mansingh Road, New Delhi.

Goa

MINUTES OF THE STATE LEVEL COMMITTEE FOR ESTIMATION OF DYNAMIC GROUNDWATER RESOURCES OF GOA HELD ON 09.02.2016

The meeting of the State level Committee for Estimation of Dynamic Ground water Resources of Goa was held on 09.02.2016 at 11.30 hrs at the Mini Conference Hall of Principal Secretary (Water Resources), State Secretariat, Porvorim, Goa. Shri. R.K. Srivastava IAS, Chief Secretary & Principal Secretary, Water Resources Department, Government of Goa Chaired the meeting. The meeting was attended by the following members.

Shri. R.K. Srivastava, IAS	Principal Secretary, Water Resources, Govt. of Goa	Chairman
Shri. S.T. Nadkarni	Chief Engineer, WRD, Govt. of Goa	Member
Shri. S.D. Patil	S.E (CPO), WRD, Govt. of Goa	Member
Shri. A.D. Faterpenkar	Sr. Hydrogeologist, WRD, Govt. of Goa	Member
Shri. P.D. Vedpathak	Asst. General Manager, NABARD	Member
Shri. A.G. Bhagwat	Surveyor of Works, WRD, Govt. of Goa	Member
Shri. S.B. Ghantkar	Representative of S.E, I, WRD, Govt. of Goa	Member
Shri. Rajan Kamble	Asst. Surveyor of Works, WRD, Govt. of Goa	Member
Dr. K. R. Sooryanarayana	Suptdg. Hydrogeologist, CGWB, SWR, Bangalore	Member Secretary
Dr. J. Davithuraj	Scientist 'B', CGWB, SUO, Belgaum	Member
Shri.J. Sivaramakrishnan	AHG, CGWB, SWR, Bangalore	Member

Chief Engineer, WRD Sh. S.T. Nadkarni welcomed the Principal Secretary and other members of the committee. The members of the committee were introduced by Chief Engineer, WRD to the Chairman. He also gave a brief background of the estimation of Dynamic Groundwater resources of Goa. Dr.K.R. Sooryanarayana, Suptdg. Hydrogeologist, CGWB, Bangalore gave a presentation on the Dynamic Groundwater resources of Goa estimated as on March 2013. The Dynamic Resources were estimated once in two years based on the Guidelines / Format circulated by the Central Ground Water Board, Central Head Quarters. The State Level committee headed by the Principal Secretary, Water Resources as Chairman was constituted by the Government of Goa vide Order U. No. Secy (WRD) 3066/F, dt. 24/11/2014 for reconciliation and approval of the Dynamic Ground Water Resources.

Shri. R.K. Srivastava, IAS, Principal Secretary and Chairman of the Committee enquired about the increase in number of dug wells from 2011 to 2013, increase in stage of ground water development, details of bore wells/dug wells/dug cum borewells closed in the recent past and its reasons. The chairman also stressed to create a system on monitoring ground water quality on the registered wells either by WRD/PWD/Pollution control Board, etc. The Chairman also informed that the Dynamic Ground Water Resources Report should contain a foot note which explains the reasons for increase/decrease in Bore well / Dug well/ Dug cum Bore well.

The chief Engineer replied to the queries raised by the Chairman, that the increase in number of dug wells from 2011 to 2013 is due to registration of dug wells by WRD and the wells are mapped and also based on actual field survey. Further, the increase in Stage of Ground Water Development is due to increase in dug wells and it is more realistic.

Member from NABARD, Sh. P.D. Vedpathak informed that Salcete taluk even though is in Safe cateroy, it is close to becoming Semi-critical. Remedial measures are required to bring the Stage of Ground Water Development below and regulatory measures needed to keep a tab on not crossing 70% SGWD.

Members also requested to prepare the resource for newly formed taluk, ie. Darbandra and include in the present report. Member Secretary Dr. K.R. Sooryanarayana informed the members the new taluk will be included in the present report provided the details like taluk area, hilly area, poor ground water quality area, command/non command area, population, geology, details of ground water abstraction structures, etc are provided. Chief Engineer, WRD informed that the details will be given within a week time.

All the points raised by the committee members were clarified and the members of the committee agreed on the Dynamic Ground Water Resources estimated for the Goa with 2013 as base year
The committee has approved the Dynamic Ground Water Resources of Goa (as on March 2013), after the deliberations.

The reconciled and approved Ground Water Resource for the State of Goa is as follows.

Dynamic Ground Water Resources in Goa State (As On March, 2013)

- Net Ground Ground Water Availability – 14625 ham
- Existing Ground Water Irrigation Draft - 2148 ham
- Ground Water Draft for All uses – 5377 ham
- Stage of Ground Water Development in Goa State – 37%

The meeting ended thanks to the Chair.

(S.T. Nadkarni)
Chief Engineer (WRD)

Gujarat

Minutes of the meeting with the Secretary (WR), Narmada Water Resources, Water Supply and Kalpsar Department on 05/05/2016 at 11.00 Hrs in the Committee Room of N, WR, WS & K Department, Block No-9/2, Secretariat, Gandhinagar

A meeting was held with the Secretary (WR), Narmada Water Resources, Water Supply and Kalpsar Department on 05.05.2016 at 11.00 Hrs in the Committee Room of N, WR, WS & K Department, New Sachivalaya, Block – 9/2, Gandhinagar. Following members of the State Level Committee attended the meeting.

1	Shri M K Jadav – Secretary(WR) Narmada , Water Resources, Water Supply &Kalpsar Department - **Chairman**
2	Shri D.K. Patel, Chief Engineer (Panchayat) & Additional Secretary, Narmada, Water Resources, Water Supply &Kalpsar Department - **Member**
3	The Director (Agriculture), Directorate of Agriculture, Gandhinagar-**Member** Shri S. J. Solanki, Joint Director (Agri): Representative
4	Shri K. B. Rabadia, The Managing Director, Gujarat Water Resources Development Corporation Ltd. – **Member**
5	The Chief General Manager NABARD-**Member** Ms. KinjalParmar, Manager, NABARD: Representative
6	The Member Secretary, Gujarat Water Supply and sewerage Board, **Member** Shri N H Patel, Chief Engineer (Tech) Representative
7	Shri Anoop Nagar, Regional Director– **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 Anoop Nagar, Regional Director, CGWB, WCR, Ahmedabad welcomed all the members present in the meeting. With the permission of the Chair, Sri H N Tiwari, Scientist-D, made the presentation regarding the Dynamic Ground Water Resources of Gujarat as on March 2013 including the methodology adopted for computation and the status as on March 2013.
2. The Chairman was of the opinion that while reporting the ground water resource scenario of the current assessment year, a comparative study of the previous and the current scenario should be brought out to have a clear picture of the improvement and/or deterioration in the recharge/draft component. Also it was suggested to compare pre-2000 scenario with the current so that the impact of the water conservation and recharge works taken up by the WRD, GoG can be assessed properly.
3. The Managing Director, GWRDC Ltd., was of the opinion that refinement of norms based on actual field studies may be done periodically to come out with more accurate estimation.

4. He further opined that the water level data with GPS data (co-ordinates) being maintained by Gujarat Engineering and Research Institute (GERI) in the canal command area may be incorporated for further refinement of the estimation.
5. The Additional Secretary and Chief Engineer (Panchayat), N, WR, WS & K department, GoG suggested that methodology may be worked out for data acquisition by outsourcing as the staff strength is very much depleted. However intermittent field checking is a must for validation of data obtained by outsourcing.
6. The Regional Director, CGWB and Suptdg.Engineer (Geo), GWRDC Ltd. were of the opinion that Automatic Water Level Recorder (AWLR) may be installed at least in one monitoring station in each talukas/assessment units for monitoring of water level at desired time interval so that accurate water level data can be obtained.
7. It was further suggested to keep track of the trends in ground water development in the areas where rapid developmental activities are taking place and caution is to be issued where situation is rapidly deteriorating.
8. All the members present were of the opinion that help of advanced technology like creation of Mobile App may be considered for field data collection efficiently.
9. The reports on Dynamic Water Resources of Gujarat state as on March 2013 was approved by the State Level Committee.
10. With the permission of the Chair, the work carried out in Gujarat under National Aquifer Mapping Project and its importance in refinement of resources estimation was briefed. A presentation was made on the Aquifer Management plan of Porbandar district. It was decided that detailed presentation will be made before the concerned CEs of N,WR, WS & K department for further deliberation.
11. The Meeting ended with vote of thanks.

Annexure-I

List of Officers present during the meeting of the State Level Committee on Ground Water Resource Assessment held on 05.05.2016 at 11.00 Hrs in the Committee Room of Narmada, Water Resources, Water Supply and Kalpsar Department, Gandhinagar.

1	**Shri M K Jadav, Secretary (WR)**	Narmada Water Resources , Water Supply and Kalpsar Department
2	Shri D K Patel, Chief Engineer (Panchayat) and Additional Secretary	Narmada Water Resources , Water Supply and Kalpsar Department
3	Shri K. B. Rabadia, Managing Director	GWRDC Ltd., Gandhinagar
4	Sh. Anoop Nagar, Regional Director	Central Ground Water Board
5	Shri N H Patel, Chief Engineer	GWSSB, Gandhinagar
6	Shri S J Solanki, Joint Director	Directorate of Agriculture, Gandhinagar
7	Ms. KinjalParmar, Manager	NABARD. Ahmedabad
8	Shri J K Trivedi, Suptdg. Engineer	GWRDC Ltd., Gandhinagar
9	Shri D K Pandya, Suptdg. Geohydrologist	GWSSB, Gandhinagar
10	Shri Ashok Kumar, Sr. Hydrogeologist	Central Ground Water Board
11	Shri H N Tiwari, Scientist-D	Central Ground Water Board
12	Shri BiswarupMohapatra, Scientist-C	Central Ground Water Board
13	Shri Alok Ku. Sinha, AsstHydrogeologist	Central Ground Water Board
13	Shri H B Shelot, Geologist	GWRDC Ltd., Gandhinagar
14	Shri K J Patel, Jr. Geologist	GWRDC Ltd., Gandhinagar
15	Shri G GVahiya, Geohydrologist	GWRDC Ltd., Gandhinagar
16	Shri R. Shivkumar, Geohydrologist	GWRDC Ltd., Gandhinagar

Haryana

From

The Director of Agriculture and Farmers Welfare Department,
Haryana, Panchkula

To,

The Regional Director, Central Ground Water Board,
Sector-27A, Madhya Marg,
Bhujal Bhawan, Chandigarh

Memo No. 790 /GWC Dated: 01-08-2016

Subject: Approval of rectification made in Estimation of Groundwater resources potential as on 31.03.2013-regarding.

In reference with your email dated 18.07.2016 vide which it was informed that, Estimation of Ground Water Resource Potential as on 31st March, 2013 are scrutinized by Member (TT & WQ), CGWB, Faridabad and corrected some calculation mistakes, the summarized details, details of corresponding mail from Member (TT & WQ), CGWB, Faridabad and modified calculation sheets were also submitted for taking approval from Additional Chief Secretary to Govt. Haryana, Agriculture and Farmers Welfare Department.

In this context, it is informed that, Additional Chief Secretary to Govt. Haryana, Agriculture and Farmers Welfare Department has approved the same (copy of noting enclosed).

This is for your kind information and further necessary action.

Encls: As above.

Forward to MC (WQ&TT) with covering letter
Sh S. K. ... SED 1/9/16
Sh Tarun ... (CGWB)
1/8/16

Prakash
AWDS, 1/8/16 TA (GWC)
for Director of Agriculture and Farmers Welfare,
Haryana, Panchkula

Subject: **Approval of rectification made in Estimation of Ground Water Resource Potential as on 31st March, 2013.**

PUC may kindly be pursue which is a Email received from Sh. Tarun Mishra, Scientist-B, Central Ground Water Board (CGWB), Chandigarh, wherein it is informed that, Estimation of Ground Water Resource Potential as on 31st March, 2013 are scrutinized by Member (TT & WQ), CGWB, Faridabad and corrected some calculation mistakes. The summarized details, Details of corresponding mail from Member (TT & WQ), CGWB, Faridabad and modified calculation sheets are enclosed for taking approval from worthy Additional Chief Secretary to Govt. Haryana, Agriculture Department.

In this context it is informed that, this report has been compiled jointly by Ground Water Cell of Agriculture and Farmers Welfare Department and Central Ground Water Board, Chandigarh. The report has already been approved from worthy ACS on 03.05.2016 (***Noting Page-27***). Now the report is scrutinized by Member (TT & WQ), CGWB, Faridabad, the summarized details of report is placed at flag 'A' for approval of worthy ACS, Agriculture, Haryana.

Please see for information and Submitted for taking approval from worthy ACS, Agriculture.

WDS (GWC)

Worthy DA

CPMS 210720 16
13125

No. 13175 ACS Agri.
Dt. 27/7/16

ACS (A)

B. SINGH
Director

DA

Summary of the Dynamic ground water resource estimation of Haryana State as on 31.03.2013.

1.	Net ground water availability	10,29,666 Ham
2.	Existing ground water draft for irrigation	13,31,722 Ham
3.	Existing ground water draft for domestic and industries	59,852 Ham
4.	Existing ground water draft for all uses	13,91,574 Ham
5.	Provision for domestic & industrial requirement supply to 2025	56,347 Ham
6.	Net ground water availability for future irrigation development	(-) 3,58,403 Ham
7.	Stage of ground water development	135%
8.	Categorization of blocks: • Total blocks assessed • Over exploited (% development more than 100) • Critical blocks (% development between 90-100) • Semi critical blocks (% development between 70-90 • Safe (% development less than 70)	 119 64 14 11 30

Himachal Pradesh

Minutes of 7th Meeting of State Level Committee on "Ground Water Resource Estimation of Himachal Pradesh as on March 2013" on 23.06.2016 (12.00 Noon) under the Chairmanship of Secretary (I&PH) to Govt. of Himachal Pradesh

7th Meeting of State Level Committee on "Ground Water Resource Estimation of Himachal Pradesh as on March 2013" held at HP Secretariat, Shimla on 23.06.2016 (12.00 Noon) under the Chairmanship of Secretary (I&PH) to Govt. of Himachal Pradesh. The list of participants is given in Annexure-I.

At the outset of the meeting, on behalf of the Member Secretary & Regional Director, Central Ground Water Board, Dharamsala, Sh. N.P.S. Nagi welcomed the Secretary (I&PH) & Members and introduction of Members was held. Thereafter, with the permission of the chair proceedings started by way of presentation explaining the details of the Dynamic Ground Water Resource Estimation as on March, 2013 as compiled by Central Ground Water Board in co-ordination with State Ground Water Organization, I&PH Deptt., Himachal Pradesh. The Aquifer Mapping progress till date by Central Ground Water Board has also been discussed by presentation. After detailed discussions, decisions taken during the meeting are as under:

A) Ground Water Resource Estimation as on March, 2013:

1. Sh. K.S. Mandhotra, Senior Hydrogeologist, I&PH Deptt made the presentation on Dynamic Ground Water Resource Estimation as on March, 2013.
2. The report on Dynamic Ground Water Resource Estimation as on March, 2013 has been approved by the committee.
3. The Chairman of the committee has advised Engineer-in-Chief (I&PH) to write letter to all field formations i.e. Chief Engineer, Superintending Engineers & Executive Engineers of the respective valleys for providing authentic ground water draft data as on March, 2015 for calculating Dynamic Ground Water Resource Estimation as on March, 2015.
4. Chairman also advised ENC (I&PH) that Zonal level meeting with concerned Chief Engineers may be organized for checking the ground water draft data submitted by concerned Executive Engineers for thoroughly scrutinizing the same and after that the report may be compiled by CGWB & IPH Deptt. and to be place for its approval at State level committee .
5. The proforma for submitting ground water draft has been devised as per the Groundwater Estimation Committee (GEC) 2002 and the columns for that have been made accordingly. In the format monsoon period has to be considered for 4 months and non- monsoon for 8 months for Domestic, Irrigation and Industrial purpose separately.

(B) Aquifer Mapping in Himachal Pradesh:

1. The work done by CGWB in Himachal Pradesh was discussed through slides by presentation made by Dr. SK Mahammad Sartaj Basha, Senior Technical Assistant, CGWB, Dharamsala and Chairman & Members of the committee appraised the detail work done till date.
2. The concerned departments like I&PH Deptt, Agriculture department, Forest department, Industry Department etc. were requested to submit the available data as per the format given.
3. ENC (I&PH) & Senior Hydrogeologist informed that tube well data upto 150 and 200 m are available and will be submitted to CGWB for Aquifer mapping work.
4. Chairman advised the ENC (IPH) to write letter to field formations to all Chief Engineers for providing the above data and also other data as per the format for accelerating the Aquifer mapping work.
5. Meeting ended with the vote of thanks to the chair.

****

Annexure-I

The list of the Officers who attended the 7th Meeting of State Level Committee on "Ground Water Resource Estimation of Himachal Pradesh as on March 2013" held on 23.06.2016 under the Chairmanship of Secretary (I&PH) to Govt. of Himachal Pradesh at Shimla

1. Smt. Anuradha Thakur, Secretary, I&PH Department, Govt. of Himachal Pradesh.
2. Sh. Anil Bahri, ENC, I&PH Department, Shimla.
3. Dr. Sushil Kapta, Special Secretary, I&PH Department.
4. Sh.R.K.Jarhyen, Chief Engineer (D&M), I&PH Deptt, Shimla.
5. Sh. R.M.Mukul, Chief Engineer, Shimla Zone, I&PH Department
6. Sh. Suman Vikrant, Chief Engineer, Hamirpur Zone, I&PH Department.
7. Sh. Rajesh Bakshi, Chief Engineer, Mandi Zone, I&PH Department.
8. Sh. Raghubir Singh, Chief Engineer, Dharamsala Zone, I&PH Deptt.
9. Sh. Mogesh Chauhan, P.D. UNA (IWMD), RDD.
10. Sh. Som Raj Kalia, Director Agriculture, Shimla
11. Sh.Chetana Khadwal, Joint Director, Urban Development Department.
12. Sh.Vishal Pathak, Town Planner (SLTC), Urban Development Department.
13. Sh.Sanjeev Kaul, S.E. (P&I), I&PH Department
14. Sh. Dharmendra Gill, S.E. WS&S, IPH Deptt, Shimla
15. Sh.M.M. Jassal, Under Secretary, I&PH Department.
16. Sh. Naresh Sharma, E.E (P&I-II), Shimla -9
17. Sh. Vijay Kashyap, E.E. Hydrology C&M, Div. IPH Deptt, Shimla-4
18. Sh. Representative from Industry Department, Shimla.
19. Sh. K.S. Mandhotra, Senior Hydrogeologist, Una, I&PH Department.
20. Sh. N.P.S. Nagi, Regional Director, CGWB,NHR, Dharamsala
21. Dr. Sk.Md.Sartaj Basha, STA (Hg.), CGWB,NHR, Dharamsala

Jammu Kashmir

Minutes of the meeting of State Level Committee to re-estimate Ground Water Resources of Jammu & Kashmir State held on 20th April 2015.

A meeting of the State Level Committee (SLC) on re-estimation of the Ground Water Resources of Jammu & Kashmir State was held under the Chairmanship of Secretary to Government, Public Health Engineering Department, Irrigation & Flood Control Department, on 20th April 2015 at 15hrs in his office Chamber.

Following members attended the meeting.

1. Sh. Sunil Gupta, Superintending Engineer (M) Urban Circle, PHE, Jammu
2. Sh. Ashok Gupta Superintending Engineer (M), PHE, North Srinagar
3. Sh. H.C. Jerath, Superintending Engineer, Irrigation & FC, Jammu
4. Sh. Rajesh Gupta, Executive Engineer, Tube well Irrigation Department, Jammu
5. Chief Engineer, Irrigation & FC, Srinagar
6. Director, Department of Agriculture, Jammu
7. The Director, Department of Agriculture, Srinagar
8. Sh. Azhar Amin Zaryas (KAS), Assistant Director, Industries Department, Jammu
9. Sh.R.K. Srivastava, Dy. Gen. Manger, NABARD, Jammu
10. Sh.S.K Gupta , Assistant Gen. Manger, NABARD, Jammu
11. Sh.N.R.Bhagat, Regional Director In-charge, CGWB, NWHR Jammu
12. Sh. A.K.Murdia, Junior Hydrogeologist (Scientist –C), CGWB, NWHR Jammu.
13. Dr. R. K. Prasad, Hydrometeorologist (Scientist –B),CGWB, NWHR Jammu.

The Commissioner Secretary asked the Regional Director, In-charge CGWB, NWHR Jammu to explain the concept of Dynamic and In- storage ground water resources and salient features of re-estimation of ground water resources, to the members of the committee. A presentation of on Dynamic Ground Water resources as on March 31st 2013 of Jammu & Kashmir State was made.

All the members deliberated on the methodology of re-estimation of ground water resources which is computed for 22 districts of J & K State for March 31st 2013 in place of 14 districts of J & K State for March 31st 2011.

Ground Water draft data from different groundwater abstraction structures are to be registered by state department as per the format given in **Annexure I.** PHE, Irrigation, Industries & Agriculture Departments consented.

(Action: Chief Engineers, PHE, I&FC Jammu/Kashmir,

Director, Industries, Agriculture, NABARD Jammu/Kashmir)

The Regional Director mentioned that there is an increase in Stage of ground water development (%) for Srinagar and Jammu. Since the surface water component of water supply to the population/habitation has not been considered while its computation. The Commissioner/Secretary asked the concerned departments to provide the data as per **Annexure II.**

(Action: Chief Engineers, PHE Jammu/Kashmir)

The Superintending Engineer (M), PHE, North Srinagar requested to include the poor ground water quality areas of Srinagar district in assessment unit. Regional Director asked the Superintending Engineer (M), PHE, North Srinagar to provide the details.

(Action: Chief Engineers, PHE Jammu/Kashmir)

The Regional Director also mentioned that the category of ground water development also changes as Stage of ground water development (%) increases and trend of long term water levels. The Commissioner Secretary asked for different groundwater development categories. The Regional Director informed the members of the committee about the different groundwater development categories of assessment units.

The assessment unit as mentioned in the Ground Water Estimation Committee-1997 (GEC-97) has not been considered in the J&K State because of mountainous terrain and Inter - mountainous valleys. Instead, only Plain and the Valleys of the J&K State have been considered for re-estimation of dynamic resources. However, the Commissioner/Secretary emphasized the need for resource computation on Block as assessment unit. Regional Director appreciated the Secretary's view point and mentioned that the work of aquifer mapping and management of groundwater has been under taken by the Central Ground Water Board in its National Aquifer Mapping Programme (NAQUIM) under the XII plan on the scale of 1:50,000 and the same will be incorporated in the re-assessment of dynamic and total groundwater resources as on march 2015.

Since, the State Groundwater Board is not in position as yet in the J&K state unlike other states, which usually provides the micro-level scientific and technical data to re-estimate the dynamic groundwater resources in every two years. The Regional Director informed that presently 257 hydrograph network stations exist in the J&K State. Central Ground Water Board is monitoring four times a year. Carrying out block wise assessment requires data at micro-level as per **Annexures II-A, II-B & III.**

(Action: Chief Engineers, PHE, I&FC Jammu/Kashmir,

Director, Industries, Agriculture, NABARD Jammu/Kashmir)

The meeting ended with vote of thanks to the chair.

(J.N.Bhagat)
Senior Hydrogeologist
(Scientist –C)
For Head of Office &
Member Secretary (SLTC)

Jharkhand

MINUTES OF THE FINAL MEETING (2nd Meeting) DATED 23/05/2016 FOR ESTIMATION OF DYNAMIC GROUND WATER RESOURCES FOR THE STATE OF JHARKHAND AS ON 31ST MARCH, 2013

The meeting held in the Conference hall of Water Resources Department, Govt. of Jharkhand at 11.00 hrs on 23/05/2016.The meeting was chaired by the Principal Secretary, Water resources Dept., Govt. of Jharkhand. A presentation on Dynamic ground water Resources 2013 was made by Dr. Indranil Roy, Sc-c before the committee members. After the presentation a discussion has been held among the committee members about various points raised during presentation. The clarifications were answered by ShriT.B.N.Singh, Sc-D. The committee members finally agreed upon the following points/issues.

1. In present estimation a total numbers of 260 administrative units are assessed. These 260 administrative blocks/ units of assessment represent 260 sub units of non-command area. In absence of areas to be considered as command area, these sub-units directly represent the related assessment units

2. Total Replenishable Ground Water resource as on 31st March 2013 is ***6.56 BCM***. Considering natural discharge of ***0.57 BCM***, Net Annual Ground Water Availability for the state of Jharkhand is ***5.99 BCM***. The annual ground water draft in the state of the Jharkhand is ***1.35 BCM***. Irrigation draft is ***0.63 BCM***, ***0.50 BCM*** is drawn to meet up the drinking water demand and remaining ***0.22 BCM*** ground Water use for industrial processes. The average Stage of Ground Water Development as on March 2013 is **22.56 %**. The net ground water available for future irrigation is ***5.19 BCM***. Monsoon has got an overwhelming control over recharge of Jharkhand state. Monsoon rainfall contributes about 85.45% of total recharge and non-monsoon rainfall contributes another 11.14% of total recharge. Only 3.42% of the total recharge is from the sources other than rainfall like recharge as return seepage from irrigation and from water harvesting structures

3. The committee members observed that most of the blocks has been assessed using RIF method (191 blocks) in comparison to WLF method (69 blocks).It indicated comparative insignificance of trend component in categorisation of blocks. Hence the below mentioned categorisation scheme has been approved by the committee.

4. Based on categorisation scheme following blocks have been categorised other than safe. Details status of blocks are given below-

Table 1. List of blocks categorised other than *'Safe'* in Jharkhand State based on Dynamic Groundwater Resource Assessment (as on 31st march, 2013)

Sl.	District		Block	SOD %	Category
1	Bokaro	1	Bermo	156.30	Over Exploited
		2	Chandrapura	71.39	Semi-Critical
		3	Chas	71.84	Semi-Critical
2	Dhanbad	1	Baghmara	91.74	Critical
		2	Baliapur	78.24	Semi-Critical
		3	Dhanbad	107.50	Over Exploited
		4	Jharia	127.00	Over Exploited
		5	Topchanchi	98.45	Critical
3	East Singbhum	1	Golmuri cum Jugsalai (Jamshedpur)	147.42	Over Exploited
4	Ramgarh	1	Mandu	76.51	Semi-Critical
		2	Patratu	74.96	Semi-Critical
		3	Ramgarh	73.61	Semi-Critical
5	Ranchi	1	Kanke	79.53	Semi-Critical
		2	Khelari	77.79	Semi-Critical
		3	Ormanjhi	72.92	Semi-Critical
		4	Ratu	70.80	Semi-Critical

5. Present exercise resulted into changes in block-wise categorization reflecting temporal variation in ground water recharge/discharge/draft pattern.Earlier estimation (2011) categorized 11 blocks other than 'Safe' out of 210 assessed blocks. In contrast present estimation categorized 16 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 and Kanke blocks and due to mining activity in Dhanbad, Jharia, Baghmara, Baliapur, Topchachi, Chandrpura, Khelari, Mandu and Patratu blocks and due to agricultural activities in Ormanjhi and Ratu blocks of Jharkhand state.

6. The principal secretary pointed out that minor irrigation census data should be validated before finalisation of 5 th minor irrigation census Report.

The meeting ended with vote of thanks to committee members.

FINAL MEETING (II MEETING) OF DYNAMIC GROUNDWATER RESOURCE - 2013 OF JHARKHAND STATE ON 23/05/2016

Name	Designation	Signature
1. Shri Sukhdev Singh	Principal Secretary, WRD Govt. of Jharkhand	[signature]
2. Shri Ashok Kumar	Chief Engineer Monitoring, WRD, Govt. of Jharkhand	[signature]
3. Director Industries, Govt. of Jharkhand		[signature] 23/5/16
4. Shri Rambrabesh Sinha	Chief Engineer DWSD, Govt. of Jharkhand	[signature] 23/5
5. T.B.N. Singh	SC-D & OIC CGWB, SUO, Ranchi	[signature] 23/05/2016
6. Dr. Indranil Roy	SC-C, CGWB MER, Patna	[signature] 23/5/16
7. Shri P.B. Giri	Deputy Director GWD, WRD Govt. of Jharkhand	[signature] 23/05/16
8. Ram Deo Sinha	S.E. Mon Cir 3	[signature] 23/5/16
9. SANTOSH KUMAR	E.I.C-I WRD	[signature] 23/5/16

Karnataka

Minutes of the State Level Committee meeting for Estimation of Dynamic Ground Water Resources of Karnataka held on 17-06-2016 at Vikas Soudha, Bangalore

The Meeting of the State Level Committee constituted vide Government Order No.MID 27AaJaAa 2014 Bangalore, dated the 7th October 2014 for reconciliation of the Dynamic Ground Water Resources as on March, 2013 was held on 17-06-2016 in Room No. 118, Vikas Soudha, Bangalore. The meeting was chaired by **Shri. Prabhakar. H. Chini, Secretary, Water Resources (MI), Govt. of Karnataka,** and was attended by the following Members:

S.No	Name & Designation (S/Sri)		Department/Organisation
1	**Prabhakar. H. Chini, Secretary**	-	Water Resources (MI), Government of Karnataka(GoK) **Chairman of the State Level Committee**
2	**K.M. Viswanath, Regional Director**	-	Central Ground Water Board, SWR, Govt. of India (GoI), Bangalore & **Member Secretary of the Committee**
3	Janvekar, C.E	-	M.I. (Bijapur), GoK
4	M. Shivaswamy, CE	-	WRDO, GoK, Member
5	H.N. Srinivas, Suptdg. Engineer	-	RDW&SD., GoK, Member
6	V.S. Balasubramanian, AGM	-	FSPD/FSDD, NABARD, Member
7	Sannaborama, Addl. Director(GW)	-	Directorate of Ground Water., GoK, Member
8	Vijaykumar Chavadannawar, S.E	-	PRED, GoK, Member
9	Kantharajappa, A.E.E (JA) IC, EE	-	M.I. (South)., GoK, Member
10	K. S. Chandrashekar, A.E.E	-	WRDO, GoK., Member
11	C. Hanumantha Reddy, Deputy Director	-	Directorate of Ground Water., GoK, Member
12	Basavaraj Pathi, Chief Geophysicist	-	Directorate of Ground Water., GoK, Member
13	C. Vidyananda, Joint Director of Agriculture	-	Department of Agriculture., GoK, Member
14	N. Srinivasappa, Executive Officer	-	Dept. of Industries & Commerce, GoK
15	H.V. Nanjunda Sharma, Sr. Geologist	-	RDW&SD, GoK
16	Dr.K.R.Sooryanarayana, Suptdg. Hg	-	Central Ground Water Board, SWR, GoI, Bangalore
17	Dr. M.A. Farooqi, Sc.'D'	-	Central Ground Water Board, SWR, GoI, Bangalore
18	T. Rajendiran, Sc.'D'	-	Central Ground Water Board, SWR, GoI, Bangalore
19	H.P. Jayaprakash, Sc.'C'	-	Central Ground Water Board, SWR, GoI, Bangalore
20	J.Sivaramakrishnan, AHG	-	Central Ground Water Board, SWR, GoI, Bangalore
21	M. Jagadeshwari	-	Ground Water Directorate., GoK

Sh. K.M. Viswanath, Regional Director, Central Ground Water Board, Bangalore & Member Secretary welcomed the Chaiman & Members of the Committee and briefed about the exercise on estimation of Dynamic Ground Water Resources and its methodology. Further, he informed the committee that the present ground water resources estimation is jointly carried out by Directorate of Ground Water, Government of Karnataka and CGWB, SWR, Bangalore. Inputs in the Resource Estimation exercise were collected by the District Geologists of Directorate of Ground Water Department. Members of the Committee introduced themselves to the Chairman.

Dr. K.R. Sooryanarayana, Suptg. Hg presented the Ground Water Resources, reconciled with the Ground Water Directorate, GoK., estimated as on March, 2013. He has explained the highlights of the methodology and norms and the values considered in the estimation. He explained the GEC methodology adopted in re-assessing the Dynamic Ground Water Resources as on March 2013. The resources were estimated Watershed wise with 310 assessment Units (Command and Non Command together) which is later apportioned talukwise with Command and Non-command totaling to 270 assessment units (176 taluks have been divided into Command and Non-command, thus adding up to 270 assessment units) to help the administrators. Based on this exercise, the following categories are arrived

Over Exploited	–	30
Critical	–	06
Semi Critical	–	09
Safe	–	65
Mixed	–	66
Total	–	**176**

The categorization of mixed category is made due to difference in stage of Development / Category within a taluk (i.e. Command and Non Command having different categories)

But the members of the Committee, and member from NABARD in particular, opined that the **Mixed** categories are creating confusion to administrators and those blocks with mixed categories are generally eliminated from development projects carried out by NABARD and other line departments. Further, the committee suggested to undo the listing of blocks under mixed category. After deliberations, it is decided to sum up the Command and Non Command part and make it as one assessment unit / Taluk, and categorize it based on the four categories suggested by GEC i.e. Over Exploited, Critical, Semi critical or Safe.

The alternate exercise as per the suggestions of the committee members was already attempted and presented during the meeting. Based on this excercise, the following categories based on the Stage of Ground Water Development is arrived.

Over Exploited	–	43
Critical	–	14
Semi Critical	–	21
Safe	–	98
Total	–	**176**

Chairman and the members of the Committee unanimously accepted and approved the Dynamic Ground Water Resources of Karnataka as on March, 2013. The figures of the ground water resource estimation and the categorization of the taluks are furnished below:-

PARTICULARS	As on March, 2013
Net annual ground water availability (HAM)	1483300
Existing ground water draft for irrigation (HAM)	876343
Existing ground water draft for domestic and industrial water Supply (HAM)	99215
Existing ground water draft for all uses (HAM)	**975558**
Provision for domestic and industrial requirement supply for 2025 (HAM)	**149124**
Stage of ground water development (%)	**66**
Over Exploited Taluks	**43**
Critical Taluks	**14**
Semi-Critical Taluks	**21**
Safe Taluks	**98**

The meeting ended with a vote of thanks to the Chair and other esteemed members of the Committee.

(Prabhakar H Chini)*
Principal Secretary, Water Resources (M.I)
& Chairman of the Committee

* Minutes yet to be approved by the Chairman of the Committee

Kerala

MINUTES OF THE SEVENTH MEETING OF THE STATE LEVEL STANDING COMMITTEE FOR RE-ESTIMATION OF GROUND WATER RESOURCES OF KERALA, HELD ON 27.11.2015.

The seventh meeting of the State Level Standing Committee for Re-estimation of Groundwater resources of Kerala was held at 11.30 hrs in the Chamber of Secretary, Water Resource Department, Govt of Kerala at Thiruvananthapuram on 27.11. 2015. The meeting was chaired by SmtTinkuBiswal, IAS, Secretary (Water Resources), Govt of Kerala. The following members /invitees attended the meeting:

1.	Shri. N.S Harinarayan, Chief Engineer(I&A), Irrigation Department, Government of Kerala	Member
2.	Shri K.S. Madhu, Director (I/C), State Ground Water Department, Government of Kerala, Thiruvananthapuram	Member
3.	Shri. K.K. Naik, Asst General Manager, NABARD, Thiruvananthapuram	Member
4.	Shri V.PrakashTampi, Joint Director, Directorate of Agriculture, Government of Kerala	Member
5.	Shri .K.Balakrishnan, Scientist D, CGWB,KR, Thiruvananthapuram	Invitee
6.	Shri Jose James, Superintending Hydrogeologist, State Ground Water Department, Thiruvananthapuram	Invitee
7.	Smt. T S AnithaShyam, Scientist D, CGWB,KR, Thiruvananthapuram	Invitee
8.	Shri. Harilal.V, Draftsman Gr I(HG), planning, Irrigation Department, Government of Kerala	Invitee
9.	Shri V.Kunhambu, Head of Office, CGWB, Kerala Region, Thiruvananthapuram	Member Secretary

The Chairman of the committee welcomed the members at the outset. Sh. V. Kunhambu, Member Secretary apprised the committee of the completion of the draft report on Dynamic Ground Water Resources of Kerala (as in march 2013) and placed the same for the approval of the committee. The Secretary opened discussions on the report as per the agenda.

Agenda Item No. 7.1: Estimation of Dynamic Ground Water Resources of Kerala (As in March 2013).

The Member Secretary informed the Committee that the Dynamic Ground Water Resources of Kerala as in March 2013 have been assessed following the procedure of GEC 1997 methodology jointly by the Ground Water Department, Government of Kerala and the Central Ground Water Board. Further, Sh.K.Balakrishnan, Scientist D, CGWB explained the various steps involved in the methodology adopted for the estimation of resources and the final results of the computations were deliberated in detail by the committee.

- The committee was informed that the assessment has been carried out for 152 blocks of the State.
- The irrigation draft data has been taken from the 4th Minor Irrigation Census by Minor Irrigation wing of Irrigation Department, and updated with field checks by field Officers of GWD.

- Ground water draft for domestic uses in the assessment units have been updated based on projected population keeping 2011 census as base.
- As per the assessment carried out, the Net Annual Ground Water Availability and Gross Ground Water Draft for all uses in Kerala are of the order of 5.65 bcm and 2.63 bcm respectively. The net Ground Water Availability for Irrigation Development has been computed as 2.94 bcm. The Stage of Ground Water Development, computed as the ratio of Gross Ground Water Draft to Net Ground Water Availability as in March 2013 is 46.62%.
- Based on the assessment of available resources and quantum of ground water extraction, Chittur block in Palakkad district has been categorized as 'Over-exploited'. Two blocks viz. Malampuzha (Palakkad district) and Kasargod (Kasargod district) have been categorized as 'Critical' and 18 blocks, spread over various districts except Alappuzha, Kottayam, Pathanamthitta, Ernakulam and Waynad come under 'Semi-Critical' category. Remaining 131 blocks in the State fall under 'Safe' category as in March 2013.
- A comparison of the major components of dynamic ground water resources of Kerala during 2011 and 2013 indicate a decrease of 6.93 mcm in Net Annual Ground Water Availability and 7.08 mcm in Gross Annual Ground Water Extraction for all uses. Since both have decreased, the stage of ground water development during two periods remains constant at about 47 %. As far as the categorization of assessment units is concerned, the number of Semi-Critical blocks has decreased from 23 in 2011 to 18 in 2013. The number of over-exploited and critical blocks remained the same during both the assessments.

Agenda Item No. 7.2: Any other item with permission of chair:

The Director, GWD opined that the exercise of estimation of ground water resources is presently being estimated every two years. The major component of the gross draft is irrigation draft, the figures of which are computed from the minor irrigation census data which is done only once, every 5 years. As this data will be generated once in 5 years, it would be appropriate if the estimation of ground water resources were also restricted to one in five years. All the members were also in agreement to the suggestion. Chairperson of the committee sought an explanation from Member Secretary on the significance of MI census in Ground water draft calculation and the same is explained in detail. Based on this the committee unanimously decided to request Govt. of India to relook the frequency of Ground Water Resource Estimation at par with that of MI Census .

The assessment of dynamic ground water resources of Kerala as in March 2013 was unanimously approved by the Committee.

The meeting ended with thanks to the Chair.

APPROVED FOR ISSUE

-sd-

(TINKU BISWAL)
SECRETARY (WATER RESOURCES)
GOVT. OF KERALA

Madhya Pradesh

MINUTES OF MEETING OF THE STATE LEVEL GROUND WATER RESOURCE ESTIMATION COMMITTEE

The meeting of the State Level Ground Water Resource Estimation Committee was held on 15.12.2015 in the office of the Additional Chief Secretary, Govt of Madhya Pradesh on 15th December 2015 at 4.30 PM. The meeting was chaired by Shri R.S.Julaniya, Additional Chief Secretary, Water Resources Department, Govt of Madhya Pradesh. The meeting was attended by representatives from CGWB, Water Resources Department, Department of Agriculture, Department of Rural Development and NABARD. The list of participants attended the meeting is appended in Annexure-I.

Shri Parvinder Singh, Regional Director, CGWB and Member Secretary, SLGWRE Committee informed that the Dynamic Ground Water Assessment as on March 2013 is done by Central Ground Water Board, Ministry of Water Resources, RD & GR, Govt of India and Ground Water Survey, Water Resources Department, Govt of Madhya Pradesh.

Shri P K Jain, Scientist D & S K Verma, Scientist –D, Central Ground Water Board, North Central region, Bhopal presented Ground Water Estimation and its comparison with the dynamic ground water resources as on March 2011. The salient features of report are as follows:

S.No	Item	2013	2011	% difference
1	Area of state	3,08,245 Sq. km	3,08,245 Sq. km	
2	Total Number of Districts	51	50	
3	Total Number of Blocks	313	313	
4	Net Annual Ground Water Availability	3400963.07 ham	33,28,860 ham	2.17
5	Existing Gross Ground Water Draft for Irrigation	1799475.38 ham	1748087 ham	2.94
6	Existing Gross Ground Water Draft for Domestic & Industrial water Supply	142135.63 ham	135265 ham	5.08
7	Existing Gross Ground Water Draft for all uses	1941611.01 ham	1883352 ham	3.09
8	Provision for domestic, and industrial requirement supply to next 25 year	246727.11 ham	234250 ham	5.33
9	Net Ground water Availability for future irrigation development	1354760.58 ham	1346522 ham	0.61
10	Stage of Ground water Development	57.09 %	56.58 %	0.90
11	Number of Safe Blocks	230	218	5.30
12	Number of Semi-Critical Blocks (Non Command)	56	67	-16.42
13	Number of Critical Blocks (Non Command)	03	4	-25
14	Number of Over Exploited Blocks (Non Command)	24	24	0

It is informed that the Command area has increased from 1509817 hact during 2011 to 1834141 hact during 2013.

The report was discussed and debated. The Additional Chief Secretary, Govt of Madhya Pradesh pointed out that :

1. The population growth rate is expected to stabilise by the year 2030. Therefore, provision for domestic and industrial requirement for next 25 years should be the same as assessed in Dynamic Ground Water Assessment (As on March'2011).

2. The command area of the report needs to be checked and dynamic ground water resource needs to be re-assessed after incorporating correct command areas.

The Provision for domestic and industrial requirement for next 25 years was frozen at the level as projected during 2011. The command area was corrected as 2225060 hact. With these corrections the report was corrected and modified. The gist of modified report is as follows:

S.No	Item	2013	2011	% difference
1	Net Annual Ground Water Annual Recharge	3415884.20 ham	33,28,860 ham	2.55
2	Existing Gross Ground Water Draft for Irrigation	1794917.63 ham	17,48,087 ham	2.61
3	Existing Gross Ground Water Draft for Domestic & Industrial water Supply	141243.27 ham	1,35,265 ham	4.23
4	Existing Gross Ground Water Draft for all uses	1936160.90 ham	18,83,352 ham	2.72
5	Provision for domestic, and industrial requirement supply to next 25 year	234663.14 ham	2,34,250 ham	0.18
6	Net Ground water Availability for future irrigation development	1386303.43 ham	13,46,522 ham	2.87
7	Stage of Ground water Development	56.68 %	56.58 %	0.18
8	Number of Safe Blocks	228	218	4.80
9	Number of Semi-Critical Blocks (Non Command)	58	67	-13.43
10	Number of Critical Blocks (Non Command)	02	4	-50
11	Number of Over Exploited Blocks (Non Command)	25	24	4

The modified report was approved.

The meeting ended with vote of thanks to the chair.

23.12.15
राधेश्याम जुलानिया
अपर मुख्य सचिव ज.सं.वि.

(Parvinder Singh)

Regional Director
Central Ground Water Board
And Member Secretary, SLGWRE Committee

Maharashtra

MINUTES OF THE 2nd MEETING OF STATE LEVEL COMMITTEE FOR GROUND WATER RESOURCE ASSESSMENT OF MAHARASHTRA AS ON MARCH 2013

The Second Meeting of the State Level Committee (SLC) for Ground Water Resource Estimation as on March 2013 was held under the Chairmanship of Shri Rajesh Kumar, Principal Secretary, Water Supply and Sanitation Department (WSSD), Govt. of Maharashtra, Mumbai on 6th May 2015 at 12.00 noon. 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 the Ground Water Resource Estimation - 2013 (GWRE) 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, Shri D. Subba Rao, Regional Director & Member Secretary, Central Ground Water Board, Central Region, Nagpur welcomed Shri Rajesh Kumar, Principal Secretary & Chairman and other Members of the Committee. He informed that the whole exercise was expedited and completed due to the personal efforts and monitoring by Shri Rupinder Singh, IAS, Director, GSDA, Pune. He also gave an opening remark stating 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-2013. At this juncture Director, GSDA, Pune informed that there is a slight reduction in recharge and draft despite increase in recharge due to WCS and number of wells. He also informed that the justification for this change has been outlined in the report.

Dr. Chandrakant Bhoyar, Senior Geologist, Ground Water Resource Estimation Cell, GSDA, Pune made a detailed presentation on the outcome of the GWRE to the committee. He informed that the ground water assessment of Maharashtra was carried out using the software developed by GSDA in MS Access by following GEC 97 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 meetings with CGWB during 9-10

March 2015 at Pune, 20th March at Nagpur, 10th and 13th April 2015 at Nagpur and 15-20 April 2015 at Pune was held for district-wise reconciliation of data and estimations. During the presentation, the following points were deliberated:

Ground Water Recharge: Dr. Bhoyar informed that overall recharge has reduced from 33.95 BCM to 33.19 BCM. The main reason for this reduction is due to the cascading effect of low rainfall in year 2012 resulting in reduced rainfall recharge. The absence of canal irrigation in some of the districts has also reduced the recharge due to canals and surface water irrigation. The recharge due to water conservation structures has increased from 1.06 to 1.17 BCM as 18000 recharge shaft structures constructed recently by GSDA for Managed Aquifer Recharge (MAR) has been included in recharge computation. Sh. S.M. Deshpande, Dy. Director, Jalswaraj has informed that desilting of existing structures under various schemes increased the recharge due to WCS. Dr. P.K. Jain, Superintending Hydrogeologist, CGWB, Nagpur enquired that has GSDA carried out any R&D study on impact assessment of these structures for computation of recharge factors. In reply to this, Sh. S.M. Deshpande, Dy. Director, Jalswaraj informed that a recharge factor of 0.01 ham was considered for computation of return seepage based on some empirical study. Shri S.B. Khandale, Additional Director, GSDA, Pune informed that a separate R&D study to assess the recharge factor in different terrains/districts will be carried out by GSDA and results will be sent to R&D Advisory Committee of GEC for inclusion in methodology. However, the impact of these recharge structures have been considered for recharge computation based on the preliminary studies.

Ground Water Draft: Dr. Bhoyar informed that for the first time, the abstraction structures in the urban areas have been included in the assessment for working out domestic draft in the urban area. He further informed that the number of ground water abstraction structures have increased, however, the ground water draft has marginally reduced due to reduction in cropping area and practically negligible draft during hot weather season which resulted into reduction in pumping days. Dr. Jain further pointed out that the industrial draft is not reflected properly in the assessment. In reply to this Dr. Bhoyar informed that despite several requests to the Industries dept., the data on industrial draft has not been received. In this regard Sh. Rajesh Kumar instructed GSDA to put up a draft letter to Secretary, Industry so that the matter can be resolved.

Dr. S.N. Das, Director, MRASC, Nagpur informed that MRSAC is carrying out mapping of ground water abstraction structures under Sansad Adarsh Gram Yojana and that will be the additional tool to ascertain the number of ground water abstraction structures as the results of preliminary studies on pilot basis are encouraging. The Chairman of the SLC stressed that the work should be completed and the data shall be made available for next assessment for precise estimation of ground water draft.

Dr. Kulkarni, Secretary, Maharashtra Water Resource Authority, Mumbai wanted to know whether assessment is being carried out for command areas. It was informed by Shri D. Venkateswaran, Scientist-C, CGWB that the assessment is being carried out watershed-wise as basic unit as well as sub-unit wise viz; command, non-command and poor quality units. Dr. Kulkarni also pointed why over exploitation of ground water is not reflected in water scarcity talukas of Latur district. Sh. S.M. Deshpande clarified the fact that there are as many as nine OE watersheds in Latur district. However, as these OE watersheds are falling in different talukas, therefore same is not reflected in taluka categorization. Shri Rahul R. Shende, AHG, CGWB informed that both the watershed-wise and taluka-wise resources are given in the assessment report separately as per requirement of Govt. of Maharashtra and Govt. of India.

The Chairman of the SLC said that there is a simultaneous reduction in both recharge and draft estimations, which can be related to low rainfall during 2012 monsoon but the overall stage of development of the State has increased by 1 % with respect to previous assessment indicating that the demand of ground water has increased in the State. After elaborate deliberations by various Members, the Ground Water Resource Estimation of Maharashtra as on March 2013 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 the Member Secretary.

Second Meeting of State Level Committee for Ground Water Resource Estimation 2013 for the State of Maharashtra.

Date & Time: 6th May 2015 at 12.00 Noon.

Venue: Water Supply and Sanitation Department, 7th Floor, GT Hospital, Crawford Market, LT Marg, Mumbai.

S. No	Name & Designation	Department with Address	Contact Details	e-mail ID	Signature
1.	Shri Rajesh Kumar, IAS Principal Secretary, WSSD and Chairman	Water Supply and Sanitation Department, Govt. of Maharashtra, 7th Floor, GT Hospital, Crawford Market, LT Marg, Mumbai – 400 001	Phone- Fax- 022-22622084 Mobile-	psec.wssd@maharashtra.gov.in wssdpapu15@gmail.com	
2.	Shri Rupinder Singh, IAS Director GSDA	Groundwater Surveys & Development Agency, Shivaji Nagar, Pune.	Phone- 020-25513717 Fax- 020-25533108 Mobile-	director.gsda@gmail.com	
3.	Shri. D. Subba Rao Regional Director	Central Ground Water Board, Central Region Civil Lines, Nagpur – 440 001	Phone-0712-2565314 Fax- 0712- 2564391 Mobile- 9860349145	rdcr-cgwb@nic.in	
4.	Shri. Commissioner S.V. Nagawade Deputy Director, (B.C)	Agriculture Department, Central Building, 3rd Floor, Pune	Phone- 020-26128732 Fax- 020-26125163 Mobile-	agripa.mah@nic.in	
5.	Shri. Commissioner	Department of Industries, New Administrative Building, Opp. Mantralaya, Mumbai	Phone- Fax- Mobile-		
6.	Shri. Chief Engineer & Joint Secretary	Water Resources Department, G.T. Hospital, New Building, Lokmanya Tilak Marg, Mumbai	Phone- 022-22023038 Fax- 022-22831817 Mobile-	ceijs.wrd@gmail.com psecwr.wrd@maharashtra.gov.in	
7.	Shri. B.S. Joshi Chief Engineer Sub Divisional Engineer	Minor Irrigation - Local Sector, 12, Jail Road, Yerewada, Pune	Phone-020-26683656 Fax- 020- 26684148 Mobile-	cemi@dataone.in	
8.	Shri. General Manager	National Bank for Agriculture and Rural Development (NABARD), 54, Wellesley	Phone- Fax- Mobile-		

S. No	Name & Designation	Department with Address	Contact Details	e-mail ID	Signature
8.	Shri. General Manager	National Bank for Agriculture and Rural Development (NABARD), 54, Wellesley Road, Shivaji Nagar, Pune	Phone- Fax- Mobile-		
9.	Shri. Director	Social Forestry, Central Building, Pune	Phone- Fax- 020-25542250 Mobile-	dirsfdpune@vsnl.net	
10.	Shri. Managing Director	Maharashtra State Co-operative Agricultural and Rural Development Bank Ltd, 15-A, Morvi Lane Chowpaty, Girgaon, Mumbai	Phone- Fax- Mobile-		
11.	Shri. Vice Chancellor Representative : Dr. S.D. Dahiwalkar Res. Engr, GW project.	Mahatma Phule Agricultural University, Rahuri	Phone- 02426-~~243215~~ 243268 Fax- 02426-~~243283~~ 243326 Mobile- 9763651195 9881595081	sdgorantiwar@gmail.com sdahiwalkar@yahoo.co.in	
12.	Shri. S.B. Khandale Additional Director	Groundwater Surveys & Development Agency, Pune	Phone- 020-25513717 Fax- 020-25533108 Mobile-	additionaldirector.gsda@gmail.com	
13.	Shri. S. A. Kulkarni ~~Member~~ Secretary M.G. Morane Astt. Director MWRRA	Maharashtra Water Resources and Regulatory Authority, (MWRRA), 9th Floor, Centre, World Trade Centre, Cuffe Parade, Mumbai	Phone- 2215 2019 Fax- Mobile- 9820158353 Mobile- 9623884666	kulsur@gmail.com [illegible]@yahoo.co.in mgmor28@rediffmail.com	
14.	Shri. Chief Engineer	MSEDCL, Bhandup Urban Zone, Vidhyut, 1st floor, Near Asian Paint, L.B.S.Marg, Bhandup, Mumbai	Phone- Fax- Mobile-		

S. No	Name & Designation	Department with Address	Contact Details	e-mail ID	Signature
15.	Shri. Dr. Subrata N. Das Director	Maharashtra Remote Sensing Application Centre (MRSAC), VNIT Campus, South Ambazari Road, Nagpur	Phone- 9657060066 Fax- Mobile- 0712-2220086	director@mrsac.maharashtra.gov.in	
16	Shri. Director	Directorate of Municipal Administration (DMA), 3rd Floor, GTS Building, Sir Pochkhanwala Road, Worli, Mumbai	Phone- Fax- Mobile-		
17	D.M. KOLTE Sr. Resources Scientist	MRSAC, VNIT Campus, Nagpur	Phone-0712-2220086 Fax- Mobile-9890718262	dilip.kolte@mrsac.maharastra.gov.in	
18	K.C. Wankhede J.D(?)	GSDA Pune	Phone- Fax- Mobile-		
19	Shashank Deshpande Dy Dir (JS-2)	GSDA, Pune	Phone- Fax- Mobile-	desaprat2010@gmail.com	
20	Dr. Chandrakant Bhoyar Sr. Geologist	GSDA, Thane	Phone- Fax- Mobile-		
21	Dr. P.K. Jain Suptdg. Hydrogeologist	CGWB, Nagpur	Phone- Fax- Mobile-		6/5/15
22	D. Venkateswaran Scientist - C	CGWB, Nagpur	Phone- Fax- Mobile-		
23	Sh. Rahul Shende Asst. Hydrogeologist	CGWB, Nagpur	Phone- Fax- Mobile-		
24	Dr. C.P. Bhoyar Senior Geologist.	GSDA, Thane/Pune	Phone- Fax- Mobile-	cpbhoyar_71@yahoo.co.in	
25			Phone-		

Meghalaya

No. /T23/SLCGWBWRC/SUO/Shill/2013 Shillong
Dated 28th March, 2013

Sub: Minutes of the Second meeting of the State Level Committee on Ground Water Resources Assessment, Meghalaya

The Second meeting of the State Level Committee on Ground Water Resources Assessment, Meghalaya, convened for reconciliation of the Dynamic Ground Water Resources Assessment of Meghalaya (as on March, 2011) and Total Ground Water Availability in Meghalaya (as on 31st March, 2009), estimated by the Central Ground Water Board, State Unit Office, Shillong was held on 25th March, 2013 at 14:00 hrs in Room No. 317, Committee Room II, Main Secretariat Building, Shillong under the chairmanship of Smt M.H.K. Marak, Commissioner & Secretary, Govt. of Meghalaya, Water Resources, Shillong.. The following members were present

1. Chief Engineer, Water Resources, Govt. of Meghalaya, Shillong.
2. Representative of the Chief Engineer, Water Resources, Govt. of Meghalaya, Shillong.
3. Representative of the Director, Horticulture Department, Directorate of Agriculture, Govt. of Meghalaya, Shillong.
4. Representative of the Regional Director, Central Ground Water Board, North Eastern Region
   Guwahati

Smt M.H.K. Marak, Commissioner & Secretary, Govt. of Meghalaya, Water Resources welcomed the members and with her permission, the meeting started with a presentation of GEC '97 methodology for estimation of Ground Water Resources, the Dynamic Ground Water Resources Assessment of Meghalaya (as on March, 2011) and Total Ground Water Availability in Meghalaya (as on 31st March, 2009), estimated by the Central Ground Water Board, State Unit Office, Shillong by Sri Tapan Chakraborty, Officer-in-Charge, Central Ground Water Board, State Unit Office, Shillong. Shri P.S. Lyngdoh, Chief Engineer, Water Resources, Govt. of Meghalaya, Shillong expressed even if there was no major irrigation project in Meghalaya, that command area of medium and minor irrigation projects be considered as command area for the computations of Ground Water Resources.

Shri Chakraborty put forward the constraint of non availability of data in carrying out the computations, especially command area, water-spread area of various ponds and reservoirs number of ground water structures for irrigation, industrial use and drinking water in Meghalaya State and requested the members to provide the current data on district-wise and preferably block-wise basis for estimation of Ground Water Resources to be taken up during 2013. Shri. P.S. Lyngdoh, Chief Engineer, Water Resources and Shri Choudhary, SE, PHED agreed to provide the data.

All the members of the committee agreed upon the figures on Dynamic Ground Water Resources Assessment of Meghalaya (as on March, 2011) and Total Ground Water Availability in Meghalaya (as on 31st March, 2009).

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

Commissioner & Secretary
Govt. of Meghalaya,
Water Resources
Shillong

Officer-In-Charge
CGWB, Shillong for
Regional Director,
CGWB, NER, Guwahati

Director,
Horticulture Department,
Govt. of Meghalaya
Shillong.

Chief Engineer,
Public Health Engineering,
Govt. of Meghalaya,
Shillong

Chief Engineer,
Water Resources
Govt. of Meghalaya,
Shillong

IW-CE-26/P-101

MINUTES OF THE FIRST MEETING OF STATE LEVEL STANDING COMMITTEE (SLSC) HELD ON 12TH FEBRUARY, 2014 IN THE OFFICE OF THE CHIEF ENGINEER,PWD (WR), KUNJABAN, AGARTALA FOR RE-ESTIMATION OF DYNAMIC GROUND WATER RESOURCE OF TRIPURA AS ON MARCH 2013

First meeting of State Level Standing Committee (SLSC) was held on 12th February, 2014 in the office of the Chief Engineer, PWD (WR), Kunjaban, Agartala for Re-estimation of dynamic ground water resource of Tripura as on march 2013.

The following members were present in the meeting:

1. **Sh. Tapan Lodh**, Chief Engineer, PWD (WR), Govt. of Tripura
2. **Er. T. K. Debnath**, R.D. Department, Govt. of Tripura
3. **Smt. S. Debnath**, Additional Director, Directorate of Industries and Commerce, Govt. of Tripura
4. **Sh. Sunil K. Nayak**, DGM, NABARD, Regional Office Agartala, Tripura
5. **Sh. Tapan Chakrabarty**, Sc. – 'C ', CGWB, SUO, Shillong, Govt. of India
6. **Sh. S.M. Hossain**, Sc. – 'C ', CGWB, SUO, Agartala, Govt. of India

Sh. S.M. Hossain, Sc. – 'C', CGWB informed that as per Annual Action Plan 2013-14, CGWB, NER, Guwahati has taken up the assignment of re-estimation of dynamic ground water resources of Tripura as on March 2013. He further informed that till date, only a slight volume of required technical data have been received from the State Govt. Agencies and most of the departments have not yet provided the requested necessary data, especially various kinds of block wise data, although the administrative block is the recommended assessment unit for computation of Ground Water resource.

Sh. T. Lodh, Chief Engineer, PWD (WR) has elaborated why a change in GEC'97 methodology is needed. It has been shown that 'base-flow' in the rivers of Tripura is much more than 'Un-Accounted Natural Discharge', which is usually deducted from 'Total Annual Ground Water Recharge' as per laid down methodology under GEC 97. This factor ultimately is reflected as huge 'Net Annual Ground Water Availability'. He further stated that this inflated 'Net Annual Ground Water Availability' misguides in proper planning and management of ground water resources in the state of Tripura.

Sh. T. Lodh, CE, PWD (WR) has also suggested that each of the concerned Govt. departments should declare one nodal officer, who will arrange the technical data in a proper format and supply the same to the State Level Standing Committee. He also ensured that the nodal officer of PWD (WR) will accompany the officers of CGWB, SUO, Agartala to jointly visit the identified departments for collecting the relevant and latest data in the regard of up to date ground water resource calculation.

Sh. T. Chakrabarty, Sc. –'C', CGWB has suggested that 'base-flow' factor of the rivers of Tripura should be properly documented, studied and send to R & D Advisory Committee under the GE Committee. He also suggested that since the committee does not have any Hydrologist, Central Water Commission (CWC), being an expert in this field, may be approached to carry out the base-flow component separation from river discharge hydrographs for the state of Tripura.

It has been decided in the meeting that PWD (WR) department will provide the river hydrographs and analysis results thereof for base-flow separation of rivers for continuous 5 years. It has also been decided that representative of Fisheries and Forest departments and TTAADC will be invited in the next SLSC meetings as special invitees.

It has also been decided that when base-flow separation work will be completed after considering all the related factors, these data will be placed before the committee for further discussions.

All the members of the SLSC unanimously arrived at the above mentioned decisions and the meeting ended with Vote of Thanks.

13/02/2014

(S. M. Hossain)
Scientist – 'C '
for Regional Director, CGWB (NER)
Member Secretary, SLSC

Nagaland

Diary 977
Date 18/07/16

MINUTES OF THE STATE LEVEL COMMITTEE (SLC) MEETING ON RECONCILIATION OF DYNAMIC GROUNDWATER RESOURCES (2013) FOR THE STATE OF NAGALAND, HELD ON 8th JUNE 2016 IN THE CHAMBER OF SECRETARY, GEOLOGY AND MINING, GOVT. OF NAGALAND

A State Level Committee (SLC) meeting for Ground Water Resource Assessment has been convened for reconciliation of the Dynamic Ground Water Resources (2013) for the state of Nagaland. The meeting was held on 8th June 2016 in the office Chamber of the Secretary, Geology & Mining, Govt. of Nagaland. The Secretary, Geology & Mining, chaired the meeting.

The Chairman welcomed the all the Members present and appraised the purpose of the meeting. On behalf of the Regional Director, CGWB, NER, Sh. P. Kalita, Superintending Hydrogeologist, CGWB, NER Guwahati has invited the members and briefed the ground water resources for the state of Nagaland. The draft assessment report for both Dynamic Ground Water Resources as on 31st March 2013 was prepared by the Office of the Regional Director and circulated among the members in advance. Sh. P. Kalita, Superintending Hydrogeologist, CGWB, NER Guwahati appraise that the assessment of ground water resources has been computed on the basis of standard methodology given by GEC-97 and based on available field data.

The list of Members attended the meeting were:

1. Shri. Imjung M. Panger, IAS, Secretary G & M
2. Shri Bendangkokba, IAS, Secretary, I & FC
3. Dr. O. Chonchibeni, HG, WSSO, PHED
4. Smt Akumla Chuba, Jt. Secy. PHED
5. Smt P. Kalita, Superintending, Hq. CGWB, NER
6. Shri Thechamo Ezung, Jt. Secy, S & WC
7. Shri M. Konwar, Sc. D. CGWB, NER
8. Shri Imkongneken Ao, Project Directo,r Soil & Water Conservation
9. Shri O. Koratemjen Ao, OSD G&M
10. Shri E. Kikon, Addl. Director, DGM

8/6/16

After thorough deliberation of the Dynamic Ground Water Resources of Nagaland, the members present decided as follows:-

1. All the departments will submit the Ground Water information/data available with the department on or before 1st July, 2016 to the Chairman SLC as per the Minutes Para 4 of Committee Meeting held on 1/8/2012.
2. The Committee also decided that the composition of the Committee should be constituted at the Head of Department level in line with the guidelines given by CGWB, Govt. of India.
3. It was also agreed upon that Ground Water Level Data furnished by the State Nodal Department (DGM) will also be taken into consideration while preparing the final Ground Water Resources estimation.

The salient features of the Dynamic Groundwater Resources are:

1.	Net Groundwater availability	= 1.75 BCM
2.	Gross Groundwater draft	=0.0344 BCM
3.	Provision for Domestic, Industrial & other used	=0.00117
4.	Stages of Ground water development	=1.97 %

A detailed discussion was held and the following decisions were taken:

The Committee after detailed deliberation approved the draft report on Dynamic Groundwater Resources (2013) prepared by CGWB, NER.

8/6/16

(Bendangkokba) IAS
Secretary, I & FC
Member

(Imjung M. Panger) IAS
Secretary (Geology & Mining)
& Chairman

(P.Kalita)
Superintending Hydrogeologist CGWB
& Member Secretary

8/6/16

(Thechamo Ezung)
Jt. Secy. S & WC
Member

(Akumla Chuba)
Jt. Secy. PHED
Member

(M. Konwar)
Sc.D. CGWB, NER
Member

(O.Koratemjen Ao)
OSD G & M
Member

(Dr. O. Chonchibeni)
HG, WSSO, PHED
Member

08/6/2016.

(Imkongneken Ao)
Project Director, S & WC
Member

8/6/16

(E.Kikon)
Addl. Director, DGM
Member

Odisha

Minutes of the
State Level Committee Meeting for Dynamic Ground Water Resources of Odisha
(As on 31.03.2013)
&
State Level Co-ordination Committee Meeting on Implementation of National Aquifer Mapping & Management

12th MAY 2016, Mini Conference Hall of Department of Water Resources, Govt. of Odisha, Rajiv Bhawan, Bhubaneswar

State Level Committee Meeting for Dynamic Ground Water Resources of Odisha (As on 31.03.2013) & State Level Co-ordination Committee Meeting on Implementation of National Aquifer Mapping & Management was held on 12th May 2016, at 1030 hrs, in the Mini Conference Hall of Department of Water Resources, Rajiv Bhawan, Bhubaneswar, under the Chairmanship of the Principal Secretary to Govt., Department of Water Resources, Govt. of Odisha. The list of the members present are given in Annexure – I. The agenda of discussion for the meeting were:

1. Implementation & Outcome of National Aquifer Mapping & Management in the XIIth Plan Period in the State of Odisha
2. Finalization & Approval of the Draft Computations of the Dynamic ground Water Resources of Odisha(As on 31.03.2013)
3. Any other items, with the kind permission of the Chair

Initiating the discussion, Sri D. P. Pati, Regional Director, Central Ground Water Board (CGWB), South Eastern Region (SER), Bhubaneswar & Convener of both the Committees, welcomed the Chairman and all the Members present in the meeting and with the kind permission of the Chair presented the agenda for the meeting and explained the background of conducting the meeting at this anointed hour. He appraised the Chairman and all esteemed members about the activities carried out in the XIIth Plan Period by Central Ground Water Board, South Eastern Region under the National Aquifer Mapping & Management, a flagship programme of Ministry of Water Resources, River Development & Ganga Rejuvenation, Govt. of India.

Dr. N. C.Nayak, Scientist-'D' and Shri A. Choudhury, AHG, presented the outcomeof the NAQUIM carried out in Balasore, Bhadrak and parts of Angul Districts. Chairman expressed his satisfaction on the work done by CGWB and appreciated their efforts in the whole exercise. He desired that further detailed work may be taken up by the Directorate of Ground Water Survey & Investigation (GWS&I) in collaboration with CGWB and other Departments of Govt. of Odisha to fill the minor data gaps and identify problems andprobable solutions for the same. The NAQUIM work carried out by CGWB, SER in Balasore, Bhadrak and parts of Angul was unanimously accepted and approved by the State Level Co-Ordination Committee.

Er. SabyasachiMohanty, Chief Engineer & Director, GWS&I, appraised the gathering about the background of assessment of Dynamic Ground Water Resources of Odisha and also the methodology adopted for arriving at the draft figures, in consonance with the existing guidelines of Govt. of India. The various refinements in estimations methodology as communicated by Central Level Expert Committee through the Central Headquarters of Central Ground Water Board were also discussed.

Er. SitikanthaMahapatra, SE, GWS&I and Shri A. Choudhury, AHG, CGWB, SER presented the draft findings of the computation of the Dynamic Ground Water Resources of Odisha, along with the change analysis with the previous figures. The draft findings were unanimously approved by the State Level Committee.

Shri P. K.Mohapatra, Scientist-'D', CGWB, SER requested that there should be a robust mechanism for active data sharing(preferably web based) among all the Departments and agencies involved in water resource related works, directly or indirectly, for faster co-ordination and increased efficiency in analysis and interpretation. This was agreed upon unanimously for immediate initiation.

The Chairman, at this point desired to know if there are any instances of sea water ingress in Coastal Tracts of Odisha. Dr. N. C.Nayak, Scientist-'D', CGWB, SER, informed that as such there are no reported or observed instances of sea water ingress in Odisha. Most of the salinity pockets are representative of the inherent characteristics of the formation themselves. He also informed about his experiences in the Chandipur area of Balasore, Bhadrak and tidal influence of Rushikulya River in Ganjam District - sometimes salinity also occurs due to faulty well constructions, unsynchronized pumping schedules etc. Er. S. K.Mahapatra, SE, GWS&I pointed out that as per a study conducted by GWS&I, funded by MoWR, Govt. of India, it was found that certain paleo-salinity pockets of connate water were identified in certain parts of Bhadrak District, which was confirmed by carbon dating analysis carried out in the Institute of Physics.

Chairman, emphasized that based on the findings of the work carried out by CGWB, SER in NAQUIM areas of Odisha and by CGWB, SER & GWS&I, in respect of assessment of Dynamic ground Water Resources of Odisha, it is now imperative to pinpoint problems and derive preventive interventional strategies. He advised Chief Engineer & Director, GWS&I, to prepare an advisory for drainage improvements in coastal Odisha, and share the same with the concerned departments and organizations. He desired that in thisregard, special emphasis should be given to the 6 assessment units (Blocks), which are categorized completely as saline. Further, out of the 18 assessment units (Blocks), which have stage of ground water development above 60%, 15 were from coastal areas. They too need to be studied in detail. The dependence of ground water in those places must be decreased and only drinking water usage should be prioritized in those Blocks and ground water usage should be discouraged in those areas for agriculture. To achieve this transition, surface water conservation, repair - renovation – restoration of the existing water bodies including creeks and canal network should be taken up on priority.

Er. J. B.Mahapatra, EIC(WR) and Er. T. D.Sahu, EIC (P&D) conveyed that feasibility and scope for drainage improvement have been taken up and a few locations have been identified for possible interventions in recent future. At this Chairman desired to know if any improvement is visible in the impact assessments that have been carried out in the DoWR projects. Shri S. C.Behera, Scientist-'D', CGWB, SER informed that representative impact assessment studies have been carried out in all projects undertaken by GWS&I, some of the projects of Odisha Watershed Development Mission and RRR under MI Directorate. The available data showed encouraging results in improvements of water levels in post implementation period. Chairman desired that this information may be kept well documented for future reference.

Shri D. P. Pati, Regional Director, CGWB, SER, proposed that for further assessment of dynamic ground water resources of Odisha, the same existing committee may be retained. This was agreed upon unanimously and approved by the Chairman, SLC.

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

Major decisions taken in the meeting:

1. The work carried out by CGWB, SER under XIIthPlan Period NAQUIM Area in Balasore, Bhadrakand in parts of Angul Districts were accepted and approved.
2. The Draft Dynamic Ground Water Resources of Odisha(As on 31.03.2013) was accepted and approved with the following figures :

Annual Ground Water Recharge	:	17,77,507 HM
Annual Natural Discharge	:	1,08,593 HM
Net Annual Ground Water Availability	:	16,68,914 HM
Annual Ground Water Draft for Irrigation	:	4,14,464 HM
Annual Ground Water Draft for Domestic & Industrial use	:	4,466 HM
Annual Gross Ground Water Draft for all uses	:	5,01,774 HM
Stage of Ground Water Development	:	30.07 %
Ground Water Resources Reserved for Domestic & Industrial Use for next 25 Years	:	1,34,701 HM
Balance Ground Water Resources Available For future Irrigation Development	:	11,19,749 HM
Safe Blocks	:	308
Saline Blocks	:	6

Any further modification at the reconciliation stage after scrutiny by the Central Level Expert Group will be accepted and incorporated suomoto. No further approval form the SLC will be required in this regard.

3. In future, as per Govt. of India guidelines, the same State Level Committee will be retained for Reassessment of Ground Water Resources of Odisha (Both Dynamic & In-storage / Static).

4. Directorate of Ground Water Survey & Investigation is to advise Chief Engineer (Drainage) for creating additional storage adjacent to the drainage channels wherever govt land is available in the Coastal Tracts of Odisha - particularly covering the salinity affected Blocks.

5. Blocks which have been categorized as saline(6 Blocks), as well as Block which have stage of ground water development above 60%(18 Blocks - 15 Blocks in Alluvial Formation & 3 Blocks in Hard Rock Formation) should be dealt with caution. The dependence on ground water in these Blocks should be reduced for all sectors. Further construction of bore wells / tube wells in these Blocks for agricultural / industrial use, is not to be promoted, however, defunct ones may be replaced.

6. Preventive intervention strategies need to be formulated and implemented on micro level. Govt. of Odisha will try to pursue the work carried out by CGWB under NAQUIM for further detailed study and supplement the finding of CGWB. The necessary funds for the same may be sought from Govt. of India.

7. Scope and feasibility of water conservation / rain water harvesting / artificial recharge will be explored and vigorously pursued on both short term and long term basis, especially in water table depleted areas and vulnerable urban and peri-urban / industrial / mining pockets of Odisha.

26/05/2016.

(Pradeep Kumar Jena, IAS)

Principal Secretary to Govt,
Department of Water Resources,
Govt. of Odisha, Bhubaneswar.
&
Chairman
State Level Committee for Re-estimation of
Dynamic Ground Water Resources of
Odisha
Cum
Chairman
State Level Co-ordination Committee

In The Chair : **Shri Pradeep Kumar Jena, IAS**
Principal Secretary to Govt.
Department of Water Resources
Govt. of Odisha

MEMBERS PRESENT

Sl. No.	Name & Designation with Organization	Contact No.	Signature
1	Er. J. B.Mahapatra EIC (WR) DoWR, Govt. of Odisha		
2	Er. T. D.Sahu EIC (P&D) DoWR, Govt. of Odisha	9437136031	
3	Shri D. P.Pati Regional Director CGWB, SER, MoWR, RD & GR, Govt. of India	9438133084	
4	Er. SabyasachiMohanty Chief Engineer & Director GWS&I DoWR, Govt. of Odisha	9437228251	
5	Er. S. K.Mahapatra Superintending Engineer GWS&I DoWR, Govt. of Odisha	9437627624	
6	Shri P. K.Mohapatra Scientist-'D' CGWB, SER, MoWR, RD & GR, Govt. of India	9937563105	
7	Shri S. C.Behera Scientist-'D' CGWB, SER, MoWR, RD & GR, Govt. of India	9437215143	
8	DR. N. C.Nayak Scientist-'D' CGWB, SER, MoWR, RD & GR, Govt. of India	9437208977	N.C.Nayak
9	Shri A. Choudhury AHG CGWB, SER, MoWR, RD & GR, Govt. of India	9861150546	

Punjab

Minutes of the meeting of State Level Committee for Estimation of Ground Water Resources Potential held on 07.09.2015 under the chairmanship of Shri. K. S Pannu, IAS, Secretary to Govt., Punjab, Irrigation Department.

The list of participants is annexed as Annexure I.

1. At the very outset, the Chairman welcomed all the participants and requested Regional Director, Central Ground Water Board, North Western Region, Chandigarh to initiate the discussions on the subject.

2. Regional Director, Central Ground Water Board dwelt upon the methodology adopted in estimation of current Ground Water Resource Potential in Punjab as on 31st March, 2013. The Ground Water Resources had been worked out on the basis of the Guidelines of the Groundwater Estimation Committee-1997 jointly by Water Resources & Environment Directorate, Department of Agriculture, Govt. of Punjab and CGWB, NWR, Chandigarh.

3. Dr. S. K Jain, Regional Director made a brief presentation on the resource assessment methodology, norms used for various parameters and results of the assessment. It was informed that linear graph method instead of slabs within the ambit of GEC norms has been used for calculation of the return flow from the applied irrigation method which was agreed in the meeting held on 12.02.2015. The present report has been prepared taking 22 districts and 138 blocks, because the data of the recently carved out blocks was not readily available.

   The presentation included comparison with last assessment as on 31st March, 2011. It was informed that in the current Ground Water Resource Potential for Punjab as on 31st March, 2013, 105 Blocks fall under over-exploited, 04 critical, 03 semi-critical and 26 safe categories. The present ground water estimation shows improvement in comparison to the previous estimation report of 2011. The number of Overexploited Blocks have decreased from 110 (report-2011) to 105 (report-2013) blocks, and overall stage of ground water development (depletion) has come down to 149% (report-2013) from 172% (report - 2011).

1/3

4. After detailed deliberations, the House approved the Draft Report on Dynamic Ground Water Resources as on 31st March, 2013 for Punjab with few observations and suggestions.

a) The Chairman suggested that the data of the recent carved out blocks may be collected from Rural Development Department Govt. of Punjab and it was decided that the Ground Water Resource Potential for Punjab as on 31st March, 2015 will be worked out on the basis of 146 existing blocks.

b) It was suggested that on the basis of lesser draft and improvement of ground water resources in Punjab, the notification of the 45 blocks should be reviewed by the Central Ground Water Authority, New Delhi and reconsidered for de-notification of improved blocks.

c) The implementation of "The Punjab Preservation of Sub-Soil Water Act, 2009" in the year 2009 by the government to preserve the Sub-Soil Water and measure like laser leveling etc has been very effective. Further shifting of transplanting of paddy to 1st July instead of 15th June (synchronized with the onset of monsoon in Punjab) would further improve the ground water resources. Presently short duration paddy is being planted and the shifting of transplanting would not adversely affect the productivity of Rice.

5. The members of the committee discussed various issues related to the management of ground water and its importance for the State and suggested steps to be initiated for the judicious use of ground water.

The following decisions were taken to be included in Guidelines for water conservation, its management and implementation in the State:-

a) Water saving techniques, such as drip & sprinkler irrigation, underground pipe line, laser land leveler, zero tillage etc shall be propagated for enhancing water use efficiency.

b) Consolidation and expansion programme for renovation, repair and rejuvenation of water bodies shall be taken up.

c) Government of India should come out with the latest technology for cleaning of pond/water bodies so that the water from these may be used for recharge.

2/3

Discussion on the DPR of project proposal for recharge of ground water in one block as desired by Govt. of India was discussed. After thorough discussion on the possibility of various blocks for selection of one block that Khera Block of Fatehgarh Sahib district would be ideal for consideration as a Pilot Project on Ground Water Recharge due to following reasons:

a) It is predominantly rural block.
b) It is among the notified block of CWGA with a stage of ground water development more than 200%
c) All three rivers of Punjab are away from this block.
d) It is away from borders of the state.

The proposal was found to be feasible and was recommended for communication to Govt. of India.

7. After detailed deliberations, the House approved the Draft Report on Dynamic Ground Water Resources as on 31st March, 2013 for Punjab.

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

3/3

Annexure I

List of Participants for the meeting of State Level Committee for Estimation of Ground Water Resources Potential held on 07.09.2015 under the chairmanship of Shri. K. S Pannu, IAS, Secretary to Govt., Punjab, Irrigation Department at 12.30 hrs in the Committee Room, 4th Floor, Punjab Civil Secretariat -2, Sector - 9,Chandigarh.

S. No.	Name	Designation	Department
1.	Dr. Rajan Aggarwal	Head, Dept. of Soil & Water Engineering	Punjab Agriculture University, Ludhiana
2.	Sh. P. K. Litoria	Head, Geology, Water Resources & Geoinformatics Division	Punjab Remote Sensing Centre, Ludhiana
3.	Sh. R. K. Garg	Chief Engineer	Irrigation
4.	Sh. P S. Bhogal	Director	WRED
5.	Sh. A.K Aggrawal	OSD	Irrigation
6.	Sh. Vikas Mittal	AGM	NABARD
7.	Sh. Guvinder Singh	XEN	Irrigation
8.	Sh. Kuldeep Singh	Superintendent	Industries & Commerce
9.	Dr. S.K Jain	Regional Director	CGWB, Chandigarh
10.	Dr. Sunil Kumar	Scientist 'C'	CGWB, Chandigarh
11.	Sh. Dinesh Tewari	Scientist 'D'	CGWB, Chandigarh
12.	Sh. Rakesh Rana	Scientist 'D'	CGWB, Chandigarh

Rajasthan

MINUTES OF MEETING OF STATE LEVEL COMMITTEE (SLC) FOR APPROVAL OF REPORT ON GROUND WATER ASSESSMENT OF STATE OF RAJASTHAN HELD ON 10/03/2016

The meeting of State Level committee (SLC) for re-estimation of Groundwater Resource of Dynamic Zone assessed jointly by the Groundwater Department, Govt. of Rajasthan and Central Groundwater Board, Western Region as on 31/03/2013 was held on 10/03/2016 under the Chairmanship of Sh. Subir Kumar, IAS, Secretary, PHED & GWD, Govt. of Rajasthan in his Chamber in the Secretariat at 15.00 hrs. The members of the committee constituted by Government of Rajasthan vide letter No. F.(32)AR/Gr-3/2014 dated 28/10/2014 were invited for the meeting.

The meeting was attended by the following officers

1.	Sh. Rajesh Meena, Manager (Water Resource), NABARD	Member
2.	Sh. P.K. Jain, Joint Director (Industries)	Member
3.	Sh. A.K. Jain, Chief Engineer, PHED	Member
4.	Sh. Suraj Bhan Singh, Chief Engineer, GWD	Member
5.	Sh. P. K. Parchure, Regional Director, CGWB, WR, Jaipur	Member Secretary
6.	Sh. B.K. Maheshwari. Suptg Hydrogeologist, GWD, Jaipur	
7.	Sh. N.K. Vaishnav, Suptg Hydrogeologist, GWAD, Jodhpur	
8.	Sh. R.S.Vyas, Senior Hydrogeologist, GWD, Jodhpur	
9.	Sh. Waseem Ahmad, Scientist 'D' (Sr.Hg), CGWB, WR, Jaipur	

The Chairman welcomed the members of the committee and advised the Member Secretary to present the salient points of the Dynamic Groundwater Resources of Rajasthan as on 31/03/2013. The Regional Director, Central Ground Water Board, Western Region & Member Secretary, SLC briefed the committee about the methodology adopted in computation of ground water resources.

The members of the committee enquired about the ground water resources availability in the State and change in category of assessment units with respect to earlier assessments. It was informed by the Member Secretary that as per the estimates as on 31/03/2013, Rajasthan has Net Groundwater availability of 11256.7695 MCM and the stage of Groundwater development in the state is 139.52%. Allocation for domestic and industrial purposes is 2315.1773 MCM and that for irrigation is 903.1139 MCM. Out of 248 blocks, only 44 blocks are in Safe category, 28 blocks in Semi critical, 9 blocks in critical and 164 blocks fall in Over Exploited Category and remaining three blocks are saline which have been assessed separately.

As per the previous estimation on 31/03/2011, out of 243 blocks of 33 districts, 172 had been categorized as Over Exploited while 24 blocks were under critical category, 19 blocks under Semi critical category and only 26 blocks were safe. It was also informed that during the assessment as on 31/03/2009, the No. of Over-Exploited Blocks were 166 while 25 Blocks were falling under Critical Category and the stage of Ground water Development in the State had increased from 134.54 % in 2009 to 137.07% in 2011.

Members of the SLC desired that the methodology recommended earlier in 1997 by GEC should be reviewed at regular intervals. The Chairman desired that in view of the over exploitation of groundwater resources in the major parts of the state, management plan for augmenting the precious resource may also be suggested by CGWB and GWD.

After detailed deliberation, the report on Dynamic Ground Water Resources as on 31/03/2013 was approved by the committee.

The meeting concluded with the vote of thanks to the Chairman, the committee members and the other officers by the Regional Director, CGWB, WR, Jaipur.

12/4/16

(P.K.Parchure)

Regional Director

TS/19/GWRE/CGWB/WR/2014- 348 Dated 13 APR 2016

Distribution:

1. PS to Principal Secretary, PHED & GWD, Rajasthan State & Chairman SLC
2. PS to Secretary, PHED & GWD, Rajasthan State & Chairman SLC
3. PS to Secretary Energy, Rajasthan State Secretariat, Jaipur
4. Commissioner, Industries, Rajasthan, Udyog Bhawan, Tilak Marg, Jaipur
5. Commissioner, Agriculture, Rajesthan, Pant Krishi Bhawan , Jaipur
6. Chief Engineer (HQ), PHED, 2, Jal Bhawan, Civil Lines, Jaipur
7. Chief Engineer (Rural), PHED, 2, Jal Bhawan, Civil Lines, Jaipur
8. Chief Engineer, GWD, Jodhpur
9. General Manager, NABARD, 3, Nehru Palace, Tonk Road, Jaipur

12/4/16

(P.K.Parchure)

Regional Director

Tamil Nadu

Minutes of the Meeting of the "State Level Committee for Reestimation of Groundwater Resource Assessment for Tamil Nadu" As on March 2013.

The State Level Committee Meeting for approval of the report of Dynamic Groundwater Resources of Tamilnadu (as on March 2013) prepared by State Ground and Surface water Resources Data Centre(SG&SWRDC), Water Resources Department (WRD), Government of Tamilnadu and Central Ground Water Board (CGWB), South Eastern Coastal Region, Government of India, Chennai using the Groundwater Resource Estimation Committee (GEC – 97) Methodology was convened by the Principal Secretary, Public Works Department, Government of Tamil Nadu & the Chairman of the State Level Committee on 17.11.2016 at 11.00 A.M in the Public Works Department Conference Hall, Secretariat Chennai. The meeting was attended by the members of the Committee/ representatives and the list of members who had attended the meeting is enclosed.

At the outset, The Chief Engineer, State Ground and Surface Water Resources Data Centre & the Member Secretary of the committee proposed and requested the Principal Secretary to Government, Public Works Department, Chennai to preside and conduct the meeting.

The Chief Engineer, SG&SWRDC and the Member Secretary welcomed the gathering and informed that the groundwater resource assessment is being done by all the States but Tamil Nadu State is the unique as the assessment is carried out firka wise (i.e micro level) and this is jointly carried out by SG&SWRDC, Government of Tamil Nadu & CGWB, SECR, MoWR, RD&GR, GoI, Chennai for computing the dynamic groundwater resources for the State of Tamil Nadu (as on 31st March 2013). The computed Dynamic Ground Water Resources as on 31st March 2013 has been approved by the State Level Working Group meeting convened on 27.10.2016. The same is placed before the State Level Committee for approval.

In the welcome address, the Chief Engineer, State Ground and Surface Water Resource Data Centre, Chennai appreciated the efforts taken by both the departments on Groundwater Resources Estimation. He then highlighted that Groundwater Resource Assessment carried out on Firka wise (Micro level Basis) would be more beneficial to the State.

The Chief Engineer and Member Secretary, then invited the Regional Director, CGWB to brief the gathering on the Groundwater Resources Estimation Methodology. The Regional Director informed that the Dynamic Ground Water Resources Estimation is being carried out in the entire country. Earlier, the resources estimation was carried out once in five (5) years and presently it is carried out once in two (2) years. The Regional Director, CGWB, Chennai has presented briefly about the GEC – 97 Methodology and informed that this Methodology was formed by Ministry of Water Resources, River Development & Ganga Rejuvenation, Govt. of India and it is common to all the States and the aim is to calculate the Groundwater Resources of the Country. In this Resource Assessment, the data collected from various departments such as Statistics department, Tamil Nadu Water Supply and Drainage Board, Tamil Nadu pollution

Control Board, Industries department etc., were integrated and utilized for this Groundwater Resource Assessment. The Regional Director has also stated that for this Resource assessment 10 new Firkas were added and totally 1139 Firkas were assessed for the State.

The Member Secretary of the Committee requested the Assistant Director, SG&SWRDC to present the findings of the Groundwater Resources Assessment on Micro level basis as on March 2013.

The Assistant Director, SG&SWRDC presented the findings of the Groundwater Resources Assessment as on March 2013. The total firkas available as on March 2013 in Tamil Nadu as per statistics is 1139. As per the assessment the categorisation of the firkas are made and tabulated as follows.

Sl. No	Categorisation of Firkas	Total Nos.
1	Safe Firkas	429
2	Semi-critical firkas	212
3	Critical Firkas	105
4	Over Exploited Firkas	358
5	Saline / Poor quality Firkas	35
6	Total nos of firkas	1139

The Assistant Director informed the committee that this Micro level (firka wise) estimation has got greater advantage in identifying the favourable pockets in the over-exploited areas and in certain extent it prevents the ban on implementing the schemes effectively in the State when comparing with the earlier block wise resource assessment.

The following points were discussed by the Chairman and the members of the committee.

The Principal Secretary to the Government and the Chairman of the Committee enquired whether there is any difference encounted between the block and the firkawise resource assessment. The Regional Director, CGWB informed that there is no variation in the calculation part and it fairly matches with that of block.

The Chairman, Cauvery Technical Cell, Chennai enquired whether the difference between the block and firka were compared with the data analysis and in reply the Regional Director informed that the results were matching with that of Block. The typographical error was rectified in the total existing domestic and Industrial water supply values in reply to a query pointed out by the Chairman.

The Chairman, SIPCOT, Chennai expressed that the State departments and the allied Central departments should have coordinated effort in bringing out the data and in displaying maps in achieving the goals of the particular task instead of doing separately.

The Engineering Director, TWAD expressed that while considering the groundwater point of view, adequate priority has not been considered for domestic sectors especially for the water supply schemes. After the detailed deliberations, the Principal Secretary to the Government expressed that priority will be given to domestic sectors for the drawal of groundwater and it should be liberal in those factors especially in the water supply schemes. The Engineering Director, TWAD also expressed that in this resource assessment it is stated that 35 firkas are saline only on the coastal part of the State but in certain inland areas citing Tirunelveli and Virudhunagar Districts are showing deterioration in water quality parameters. The Joint Chief Environmental Engineer, TNPCB expressed that this study is meant mainly for quantitative aspects. For qualitative aspects separate study should be carried out. The Regional Director, Central Groundwater Board assured that in the next resource assessment due attention will be paid to the quality aspects also.

The Professor, Indian Institute of Technology (IIT), Chennai expressed that while carrying out this type of study, the quality and quantity factor should be simultaneously carried out and this study is mainly of covering shallow (unconfined) aquifer. Many industries are consuming groundwater from the deeper depths and is causing concern to the environment. The Chief Engineer, SG&SWRDC expressed that this factor has already been considered for regulation for groundwater development. The Regional Director, Central Ground Water Board informed that the Nation wise Aquifer Mapping Study is being carried out by the CGWB in order to identify the aquifer extent vertically as well as horizontally. He informed that under the aquifer mapping studies, the quantity and quality of the aquifers are assessed. In reply to the query raised by the Professor, IIT, Chennai about the study of groundwater models, the Senior Scientist from CGWB expressed that under the Pilot Project on Aquifer Mapping, the CGWB, Chennai has carried out Groundwater modeling studies in Lower Vellar basin areas covering the Cuddalore District both in the upper and deeper part of the aquifer and the report already been published by CHQ, CGWB and it is available in the website.

The Joint Chief Environmental Engineer, TNPCB expressed that in addition to industrial pollution, domestic pollution is also causing great concern to the quality aspects. The Chief Engineer, SG&SWRDC replied that we require more provision for quality studies and also suggested that recycling of waste water will be of prime importance in the forthcoming years.

The Principal Secretary to the Government, PWD, Chennai while complimenting the efforts taken by both the departments, invited more frequent interactions with the IIT and Central Ground Water Board.

The Chief Engineer, SG&SWRDC & the Member Secretary to the State Level Committee thanked the Principal Secretary to the Government & the Chairman of the Committee for conducting the meeting.

All the members of the committee appreciated the efforts taken by SG & SWRDC and CGWB in bring out the groundwater assessment (as on March 2013) firka wise.

All the members of the State Level Committee approved the Dynamic Groundwater Resources Estimation for Tamil Nadu as on March 2013.

Finally, the Chief Engineer, SG & SWRDC and the Regional Director, CGWB expressed their happiness to all the members of the committee for their valuable contribution during the deliberations. The meeting ended with thanks to the Chair and the members by the Regional Director, South Eastern Coastal Region, Central Groundwater Board, Chennai.

Sd/-Er. S. Thinakaran/2.12.2016.
Chief Engineer and Member secretary
of the Committee, SG &SWRDC, PWD,
Tharamani, Chennai.113

2/12/16

For Chief Engineer (SG&SWRDC),
PWD, Tharamani, Chennai-113.

2/12/16

Telangana

GOVERNMENT OF TELANGANA
GROUND WATER DEPARTMENT

MINUTES OF STATE LEVEL COMMITTEE MEETING ON RE-ESTIMATION OF DYNAMIC GROUND WATER RESOURCE OF TELANGANA AS ON MARCH 2013

The State Level Committee meeting on re-estimation of dynamic ground water resources of Telangana state (As on March 2013) was held on 31.05.2016 at 11.30 A.M. in the Conference Hall, Third Floor, "D" Block, Secretariat, Government of Telangana, Hyderabad. Dr. S.K. Joshi, I.A.S, Special Chief Secretary to Government of Telangana, I&CAD chaired the meeting.

The following Committee members attended the meeting:

1. Shri A.D.Rao, Regional Director, CGWB, SR, Hyderabad, Member Secretary
2. Shri G. Sambaiah, Director, Ground Water Department
3. Shri V. Subramanyan, Director, Director of Economics and Statistics
4. Prof. B. Venkateswar Rao, Professor, JNTU-H
5. Shri A. Anand Paul, Executive Director, RWS&S
6. Shri N.V. Venugopala Chary, Chief General Manager, TSNPDCL
7. Smt. J. Sridevi, VC&MD, TSIDC
8. Dr. Shakeel Ahmed, Chief Scientist, CSIR-NGRI
9. Prof.A.Narsing Rao, Head & Principal, Dept. of Geology, O.U., Hyderabad
10. Shri P. Venu Gopal Rao, Assistant Manager, NABARD, Telangana R.O.
11. Shri S. Narasimha Rao, CE, Inter State Water Resources
12. Shri E. Shyam Sundar, CE, Command Area Development Authority
13. Shri G. Shankar Naik, CE, Hydrology and Investigation
14. Shri P. Prakash, APM, Telangana State Remote Sensing Application Center
15. Shri R. Dhansingh, ENC,(PH)
16. Shri K. Suresh Kumar CE, Minor Irrigation
17. Shri K. Suresh Chander Reddy, EE, Panchayat Raj
18. Shri N. Mallikarjuna Swamy, O/o RD, SLNA, TS, Hyderabad
19. Shri A. Praveen Kumar, Divisional Engineer/Planning, TSTRANSCO
20. Shri K. Vijaya Kumar, AD, O/o. Director Agriculture

At the outset, Shri A.D. Rao, Regional Director, CGWB and Member-Secretary, GEC welcomed the Chairman and other members to the meeting. He requested all the members of the committee to introduce themselves to know each other. He informed that earlier the ground water estimation was carried out once in every 5 years, which is now done once in two years as per the directions of the Ministry of WR, RD and GR. The last estimation was done with the base year 2010-11 as on March 2011. He also thanked all the departments for providing the data.During the meeting Director SGWD briefed the importance of GEC.

Later on, a power point presentation on Ground water Resources Estimations 2012-13 was given by Sri Kumaraswamy, Dy. Director, Ground Water Department, Government of Telangana. He informed that most of the area is underlain by Granites i.e. hard rock with an average stage of development of 58%. He apprised the members of the methodologies followed, inputs taken from different departments , draft estimates of watershed and mandal wise. He also presented comparison of current estimates with previous estimations on groundwater resources.

Dr Shakeel Ahmed, Chief Scientist, NGRI, has opined that, latest technology and software be used in collection and computations and suggested for collecting data from the local people in the villages. He felt the need to revise the estimates more frequently.

Dr R. Rangarajan, NGRI suggested to make use of natural recharge values obtained by tritium method by NGRI for recharge estimation.

Action:- R D, CGWB, Director, GWD

Sri G.Sambaiah, Director, GWD replied that all efforts are on for year-wise assessment and informed that resources for the year 2014-15 are in final stage of compilation.

Prof A.Narsing Rao.Head, Geology Department, O U advised that O E Categorised areas have to be treated with suitable Artificial Recharge Structures on priority basis.

Action:- R D, CGWB, Director, GWD

Prof. Venkateswara Rao from JNTU-H while complimenting huge exercise of ground water estimations done by State ground water department and central ground water board felt that the best scientific methods be used in computation of resource estimations. He also opined that third party validation of the estimation by modelling is needed to check the accuracy of the estimation. Further he suggested to mention the percentage contribution by different sources for each parameter like contribution of rainfall, other sources to the total recharge be included in the report for planning purpose.

Action:- R D, CGWB

Sri G.Sambaiah, Director, GWD has clarified that estimate is being done in two methods i.e., water level fluctuation method with specific yield and rainfall infiltration method. Comparison is made between the two computations to select one of them based on a criteria as suggested in the methodology.

Shri A.D.Rao, RD, CGWB informed that data of artificial recharge structures and for tanks under Kakatiya mission the information like actual storage capacity of the tanks is not available for current estimates and may be collected and provided for more accurate resource estimation. Action:- CE-MI,DIRECTOR-SGWD,RD-CGWB

Dr. Giridhar of JNTU-H has suggested to go for local recharge of dried up bore wells by injection wells will be more effective rather than for large area recharge methods like percolation tanks and check dams. Localised recharge will be more effective.

Action:- COM- GHMC,MD,HMWS ,CRD,DWMA

Sri Kumaraswamy, Deputy Director , GWD has expressed his desire to dedicate the volume 1 of the GEC 2013 report which is the basin-wise resource estimation in the name of Late Dr. Pradeep Raj, Deputy Director, GWD who has contributed immensely for the development of the computer program in Excel which is being used by all in the states of Andhra Pradesh and Telangana in resource estimation computations. Everybody has welcomed the idea with applause and the Chairman of the committee agreed and said that his contribution should be suitably appreciated and recorded.

Action:- DIRECTOR-SGWD,R D- CGWB.

In his closing remarks, The Special Chief Secretary has raised a question on utility of calling meeting for approval of 2013 resources estimation now and also suggested estimation for the year 2016 and project for 2017 on that basis.The Regional Director, CGWB clarified that all states are involved in this national exercise of which some states do not have sufficient expertise and machinery for compilation of such huge voluminous data. The Director, Ground Water Department said that the draft estimates of 2015 are ready for reference for planning purposes. The Special CS then requested to seek approval of the Ministry of WR, RD and GR , Government of India for such states who complete the reports for current water year without linking with other states.

Action:- R D, CGWB, Director,GWD

Sri P Venugopala Rao, NABARD also felt the need for such approvals by Government of India for grounding of ground water schemes based on ground realities.

After thorough deliberations by the members, the state level committee has approved the report on re-estimation of dynamic ground water resources of Telangana state as on March 2013.

The meeting ended with vote of thanks by Shri G. Sambaiah, Director, Ground Water Department, Telangana.

4/6/16.		9/6/16
Director	Regional Director	Special Chief Secretary
Ground Water Department	Central Ground Water Board	I & CAD Dept
	Southern Region	Government of Telangana

भूजल संसाधन आकलन रिपोर्ट, 2013 के अनुमोदन हेतु प्रमुख सचिव, लघु सिचांई एवं भूगर्भ जल विभाग, उ0प्र0शासन की अध्यक्षता में राज्य स्तरीय भूजल आकलन समिति की दिनांक 13-06-2016 को सम्पन्न बैठक का कार्यवृत्त।

बैठक मे उपस्थित अधिकारियों का विवरण संलग्न है।

बैठक के प्रारम्भ में निदेशक, भूगर्भ जल विभाग द्वारा अवगत कराया गया कि भारत सरकार के दिशा-निर्देशों के अनुक्रम में 31-3-2013 के ऑकड़ों के आधार पर भूजल आकलन समिति का अनुमोदन अपेक्षित है। उक्तानुसार तैयार की गयी भूजल आकलन रिपोर्ट का प्रस्तुतीकरण करते हुए यह अवगत कराया गया कि इस नवीन आकलन के आधार पर प्रदेश के 820विकासखण्डों में से 113 विकास खण्ड अतिदोहित, 59 विकास खण्ड क्रिटिकल, 45 विकास खण्ड सेमीक्रिटिकल तथा 603 विकास खण्ड सुरक्षित श्रेणी में वर्गीकृत हुए हैं। इस आकलन के अनुसार प्रदेश में भूजल रिचार्ज 7.15 मिलियन हेक्टेयर मीटर तथा भूजल दोहन का स्तर 5.28 मिलियन हेक्टेयर मीटर पाया गया है। इस प्रकार भूजल दोहन की दर 74 प्रतिशत आंकी गयी है, जो वर्ष 2011 के आकलन में 73 प्रतिशत आंकी गयी थी। प्रस्तुतीकरण में वर्ष 2011 के आकलन के सापेक्ष वर्ष 2013 के भूजल संसाधन आकलन में विकासखण्डों के वर्गीकरण में श्रेणीवार आये परिवर्तन का क्षेत्रवार (पश्चिमी, केन्द्रीय, पूर्वी उ0प्र0 एवं बुन्देलखण्ड क्षेत्र) विश्लेषण करते हुए वर्तमान स्थिति रखी गयी। विगत वर्षो के आकलन के सापेक्ष जो परिवर्तन वर्ष 2013 के आकलन में परिलक्षित हुए हैं, उनके कारणों (जिसमें रिचार्ज व ड्राफ्ट प्रमुख हैं) को भी विस्तार से रखा गया।

बैठक में प्रस्तुतीकरण के उपरान्त निम्न निर्णय/निर्देश दिये गयेः-

(1)- 31मार्च, 2013 के ऑकड़ों पर आधारित भूजल संसाधन आकलन रिपोर्ट समिति द्वारा अनुमोदित की गयी। निर्देश दिये गये कि शीघ्र उक्त रिपोर्ट को भारत सरकार के अनुमोदनार्थ प्रेषित किया जाये।

(कार्यवाही-भूगर्भ जल विभाग एवं केन्द्रीय भूजल परिषद,उ0क्षे0 लखनऊ)

(2)- विकासखण्डों के वर्गीकरण की जनपदवार स्थिति से सभी जिलाधिकारियों को अवगत कराया जाये, जिससे कि जनपद स्तर पर तैयार की जा रही जनपदीय सिंचाई योजना (डी0आई0पी0) मे इस नये वर्गीकरण (31-3-2013) के निष्कर्षों को सम्मिलित किया जा सके। निर्देश दिये गये कि इस संबंध में सभी जिलाधिकारियों को प्रमुख सचिव, लघु सिंचाई एवं भूगर्भ जल विभाग, उ0प्र0 शासन के स्तर से पत्र भेजा जायेगा, जिसमें इस बात का स्पष्ट रूप से उल्लेख किया जायेगा कि इस नवीन वर्गीकरण के अनुसार विकासखण्डों की दर्शायी गयी स्थिति भारत सरकार से अनुमोदन प्राप्त होने तक संभावित मानी जाये और केवल जनपदीय सिंचाई योजना (डी0आई0पी0) तैयार करने में ही इस नये वर्गीकरण को सम्मिलित किया जाये।

(कार्यवाही-निदेशक, भूगर्भ जल विभाग, उ0प्र0)

(3)- भूगर्भ जल विभाग एवं केन्द्रीय भूजल बोर्ड (उ0क्षे0) को यह निर्देश दिये गये कि ऐसे विकासखण्ड, जहॉ वर्गीकृत श्रेणी में परिवर्तन बार्डर लाइन हो, उनको सूचीबद्ध कर विश्लेषणात्मक रिपोर्ट तैयार की जाय।

(कार्यवाही-निदेशक,भूगर्भ जल विभाग एवं क्षेत्रीय निदेशक, केन्द्रीय भूजल परिषद,उ0क्षे0 लखनऊ)

(4)- यह अध्ययन भी किया जाय कि जहॉ पर विकासखण्डों की स्थिति में सुधार हुआ है, वहॉ पर विगत वर्षो में क्रियान्वित किये गये वर्षा जल संचयन एवं भूजल रिचार्ज के कार्यो का क्या प्रभाव पड़ा?

(कार्यवाही-निदेशक, भूगर्भ जल विभाग, उ0प्र0)

(5)- भूजल के अतिदोहन की स्थिति को देखते हुए यह निर्देश दिये गये कि विशेष रूप से शहरी क्षेत्रों में भूजल दोहन के नियंत्रण एवं नियमन हेतु एक्ट के संबंध में की जा रही कार्यवाही को गति प्रदान की जाये। इस बात का भी अध्ययन कर लिया जाये कि भारत सरकार के पर्यावरण एक्ट-1996 के अधीन गठित केन्द्रीय भूजल प्राधिकरण के संदर्भ में राज्य स्तर पर एक पृथक राज्य भूजल प्राधिकरण के गठन की क्या संभावनायें हैं और उसे प्रदेश में किस प्रकार लागू किया जाये ?

(कार्यवाही-निदेशक, भूगर्भ जल विभाग, उ0प्र0)

(6)- आवास एवं शहरी नियोजन विभाग को यह निर्देश दिये गये कि वर्तमान में 300 वर्गमीटर अथवा उससे अधिक के भूखण्डों पर लागू रूफटॉप रेनवाटर हार्वेस्टिंग प्रणाली की व्यवस्था को परिवर्तित कर सभी प्रकार के भूखण्डों हेतु यह व्यवस्था अनिवार्य की जाये, जिससे इस योजना से शहरी क्षेत्रों के अधिक से आवासीय क्षेत्र आच्छादित हो सके।

(कार्यवाही-प्रमुख सचिव,आवास एवं शहरी
नियोजन विभाग, उ0प्र0)

(7)- सिंचाई एवं जल संसाधन विभाग को यह निर्देश दिये गये कि विकासखण्डवार कमाण्ड एवं नान-कमाण्ड क्षेत्रों से संबंधित सूचना शीघ्र भूगर्भ जल विभाग को उपलब्ध करायी जाये, जिससे कि भविष्य में भूजल संसाधन आकलन की कार्यवाही में इन ऑकड़ों का समावेश किया जा सके।

(कार्यवाही-प्रमुख सचिव, सिंचाई एवं जल संसाधन विभाग,

अन्त में धन्यवाद के साथ बैठक समाप्त हुई।

रेणुका कुमार
प्रमुख सचिव।

भूजल संसाधन आंकलन रिपोर्ट के अनुमोदन हेतु प्रमुख सचिव महोदय की अध्यक्षता में "राज्य स्तरीय भूजल आकलन समिति" की दिनांक 13-06-2016 को आयोजित बैठक में अधिकारियों की उपस्थिति।

क्र0 सं0	नाम/ पदनाम	विभाग का नाम	मो0नं0	हस्ताक्षर
1				
2	पी०सी० सिंह अपर कृषि निदेशक भू:सं0	कृषि विभाग	9235629307	[illegible]
3	वीरेन्द्र कुमार स्टाफ ऑफिसर	वन एवं वन्य जीव विभाग	9451053819	[illegible]
4	[illegible] पाण्डेय अनुसचिव,	कृषि विभाग,	[illegible]	[illegible]
5	डा० सीमा सिंह सहायक निदेशक	[illegible] विभाग	9991802336	[illegible]
6	Dr Ruhi Nisa	U.P. Pollution Control Board	9935383037	[illegible]
7	Sandeep K. Khare [illegible]	[illegible]	9415783973	[illegible]
8	Hari Om Gupta E.E.	सिंचाई विभाग	945286847	[illegible]
9	आर.बी. सिंह उपसचिव	नगर विकास विभाग	9454414096	[illegible]
10	मनोज कुमार सिंह अनुसचिव	वन विभाग	9454411823	[illegible]
11	अशोक कुमार अधिशासी अभियंता	आवास बन्धु उ० प्र०	7318000873	[illegible]
12	ओम प्रकाश पाण्डेय, अनुसचिव	आवास एवं शहरी नियोजन	9454411411	[illegible]

13	विकास रंजन वैज्ञानिक 'सी'	केन्द्रीय भूमि-जल परिषद, अलीगंज, लखनऊ	9450932398 vikasranjan[illegible]@gmail.com	[signature] 13/6/16
14	संजीव मेहरोत्रा वैज्ञानिक 'डी'	— DO —	9415785817	[signature] 13/6/16
15	रविकान्त सिंह सी० भू० भौतिकविद्	भूगर्भ जल विभाग उ०प्र० लखनऊ	8874953808	[signature]
16	जे० पी० गुप्ता निदेशक	मौसम विभाग लखनऊ	9453019406	[signature] 13/6/16
17	Dr. S. Sahai Sr. Geophysicist	UP Jal Nigam Lko	9532001462	[signature]
18	Dr. Surjeet Singh Scientist-D	NIH, Roorkee	9456134747	[signature]
19	R. S. Sinha	Sr. Hydrogeologist GWD	9415087818	[signature]
20	S. K. SAHNI	DIRECTOR	9335280003	[signature]
21	Y. B. KAUSHIK	Regional Director	08447557844	[signature]
22	P. R. Chaurasia	Chief Engineer Minor Irrigation U.P.	9415757819	[signature]
23				
24				
25				
26				
27				

Uttarakhand

Annexure-I

No. 4(17)/CGWB/UR/Tech – 16
Government of India
Ministry of Water Resources, River Development & Ganga Rejuvenation
Central Ground Water Board, Uttaranchal Region
419 – A, Kanwali Road, Balliwala, Dehradun – 248 001
Phone: 0135-2761675, Telefax: 0135-2769525
E-mail: rdur-cgwb@nic.in
Dated: 14th July, 2016

First Meeting of State Level Technical Co-ordination Committee (SLTCC) for Finalization of Dynamic Ground Water Resources of Uttarakhand State (as on March, 2013)

S. No	Member	Telephone	Signature
1.	Secretary (Irrigation & Minor Irrigation) and Chairman of SLTCC		**In Chair**
2.	**The Managing Director**, Uttarakhand Peyjal Nigam, Mohini Road, Dehradun. E-mail-upsvnn@gmail.com	0135-2678078 Fax : 2672337	14/7
3.	**The Chief General Manager**, Uttarakhand JalSansthan, Nehru Colony, JalBhawan, Dehradun. E-mail:guptask89@yahoo.in	0135-2676260 Fax : 0135-676177	Neelima Garg Secretary Appraisal
4.	**The Director**, Swajal, Project Unit, First Floor, The Institute of Engineers (India) Building Opposite ISBT, Dehradun E-mail: pmu_uttaranchal@rediffmail.com	0135-2644805 Fax : 2733381	
5.	**The Director**, Agriculture Department, Nanda Ki Chowki, Dehradun. E-mail: dir-agri-ua@nic.in	0135-2772677 Fax : 2771881	
6.	**The Chief Engineer & HOD**, Minor Irrigation, Indraprastha Colony, Nathanpur, Dehradun.	2672007,08 Fax : 2672006	
7.	**The Chief Engineer& HOD**, Irrigation Department, Yamuna Colony, Dehradun.	0135-2530170 Fax: 0135-2530916	
8.	**The Director**, Department of Industries, Patel Nagar, Dehradun	0135-2520604 Fax : 2728226	
9.	**The General Manager**, NABARD, Hotel Sunrise, Rajpur Road, Dehradun. E-mail:dehradun@nabard.org	0135-2748611 Fax : 2748610	Himanshu Khati AGM, NABARD
10.	**The Chief Development Officer**,VikasBhawan, Dehradun – 248 001 E-mail- cdodoon@gmail.com	0135-2712569 Fax : 0135-271256	Alok kumar Pandey
11. ✗	**The Chief Development Officer**, VikasBhawan, Rudrapur, district Udham Singh Nagar E-mail: cdo-usn-uk@nic.in	9412091200, 9412036366 Fax: 05944-250450	
12 ✗	**The Chief Development Officer**, VikasBhawan, Roshanabad, District Haridwar E-mail: cdohar@rediffmail.com	01334-239097	
13	**Member Secretary (SLTCC), Central Ground** Water Board, Uttaranchal region, Dehradun	0135-2769544	
14	Scientist – C, CGWB, UR, Dehradun	0135-2769544	RaviKalyan Butsa 14/7/16
15	Scientist, CGWB, UR, Dehradun	0135-2769544	14/7/16
16.	Unit Coordinator, Swajal Project Management Unit, Dehradun		
17.	J. P. Bhaskar Staff officer MID UK. Dehradun.	9412417777	
18.	S.K. Srivastava A.E. (HQ) MID U K.	9557184157	
19	A D Singh CE (Yantriki) PeyJal Nigam	7579002202	

20 - Arjun Singh A.S (Bijal)

21 - Dr. A.K. Verma JDA Agriculture 9997775257

22. Dr. V.K. Singh Yadav D.D. Agriculture

~~9412 997380~~
9412987380

23 Sh. P.K Singh —— 8859290407

Annexure – II

SUMMARY OF GROUND WATER RESOURCE ASSESSMENT (AS ON 31.03.2013)

District	Block	Annual Ground Water Availability (ham)	Existing Ground Water Draft for Irrigation (ham)	Existing Draft for Domestic & Industrial use (ham)	Ground Water Draft for all uses (ham)	Net Annual Ground Water Availability (ham)	Stage of Ground Water Development (%)	Category
1	2	3	4	5	6	8	9	10
Dehradun	Doiwala	14756.02	1028	383.4	1411.4	14698.89	9.60	Safe
	Sahaspur	15358.10	1407.89	162.39	1570.28	12448.99	10.27	Safe
	Vikasnagar	6500.10	1856.08	92.8	1948.88	6474.28	30.10	Safe
Total		**36614.22**	**4291.97**	**638.59**	**4930.56**	**33622.16**	**14.66**	**Safe**
Haridwar	Bahadrabad	16144.36	7295.58	2920.87	10216.45	15530.58	65.78	Safe
	Bhagwanpur	10519.95	8202.84	369.13	8571.97	10373.78	82.63	Safe
	Narsan	22581.43	7121.40	320.46	7441.86	21752.7	34.21	Safe
	Khanpur	7736.42	4611.20	207.50	4839.45	7654.44	63.22	Safe
	Laksar	12000.26	7066.40	317.99	7384.39	11875.59	62.18	Safe
	Roorkee	19501.43	6316.81	3856.50	10173.31	18943.51	53.70	Safe
Total		**88483.85**	**40614.23**	**7992.45**	**48627.43**	**86130.6**	**56.46**	**Safe**
U.S. Nagar	Jaspur	7252.43	3556.20	562.85	4172.40	7181.43	58.10	Safe
	Kashipur	7623.12	3867.80	3593.20	7519.01	7547.12	99.63	Critical
	Bazpur	8781.43	5337.58	520.26	5937.91	8678.32	68.42	Safe
	Gadarpur	6756.49	4249.08	159.84	4472.65	6674.33	67.01	Safe
	Rudrapur	8497.52	3340.78	120.82	3511.71	8427.68	41.67	Safe
	Sitarganj	11922.24	3126.01	88.28	3261.18	11856.06	27.51	Safe
	Khatima	13251.57	10434.65	421.05	11012.22	13056.43	84.34	Semi Critical
Total		**64084.8**	**33912.10**	**5466.30**	**39887.08**	**63421.37**	**62.89**	**Safe**
Nainital	Ramnagar	5473.57	2095.30	143.38	2238.68	5436.91	41.18	Safe
	Haldwani	5219.74	3199.90	406.10	3606.00	5163.75	69.83	Safe
Total		**10693.31**	**5295.2**	**549.48**	**5844.68**	**10600.66**	**55.14**	**Safe**
State Total		**199876.18**	**84113.5**	**14646.82**	**99289.75**	**193774.79**	**47.29**	**Safe**

Chandigarh

Minutes of the meeting of State Level Committee for Estimation of Ground Water Resources Potential held on 09.02.2016 under the chairmanship of Shri Sarvjit Singh, IAS, Finance Secretary–cum–Secretary Engineering, Engineering Department, UT, Chandigarh.

The list of participants is annexed as annexure I.

1. At the very outset, the Chairman welcomed all the participants and requested Regional Director, Central Ground Water Board, North Western Region, Chandigarh to initiate the discussions on the subject.
2. Regional Director, Central Ground Water Board dwelt upon the methodology adopted in estimation of current Ground Water Resource Potential in Chandigarh as on 31st March, 2013. The Ground Water Resources had been worked out on the basis of the Guidelines of the Groundwater Estimation Committee-1997 jointly by Engineering Department, Chandigarh Administration and CGWB, NWR, Chandigarh.
3. Dinesh Tewari, Scientist "D" made a brief presentation on the resource assessment methodology, norms used for various parameters and results of the assessment.
4. After detailed deliberations on the Draft Report on Dynamic Ground Water Resources as on 31st March, 2013 for Chandigarh. Few observations and suggestions were made as follows:.

   a) The Chairman suggested that since there is no draft from the shallow aquifer and there is rising trend of ground water level in the southern sectors, the artificial recharge to ground water should be discouraged in Chandigarh UT.

   b) The ground water utilization of the shallow aquifer should be used. It was suggested that permission for the shallow tubewells should be granted for the utilization of ground water for other purposes than drinking.

   c) Chief Engineer, Municipal Corporation, Chandigarh will prepare the proposal for opinion of CGWB in this regard.
5. After detailed deliberations, the House approved the Draft Report on Dynamic Ground Water Resources as on 31st March, 2013 for Chandigarh UT.

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

Annexure I

List of Participants for meeting of State Level Committee for Estimation of Ground Water Resources Potential As on March 2013, held on 09.02.2016 under the chairmanship of Shri Sarvjit Singh, IAS, Finance Secretary –cum –Secretary Engineering, Engineering Department, Chandigarh Administration at 3.00 P. M. in the committee room (4th Floor) U.T. Secretariat Building, Sector 9-D, Chandigarh.

S. No.	Name	Designation	Department	Phone No.
1.	Sh Mukesh Anand	Chief Engineer,	Municipal Corporation, Chandigarh	9872511125
2.	Sh. Rajinder Singh	SE (PH)	Chandigarh Administration	9872511227
3.	Sh. Vikas Mittal	AGM	NABARD	9433249380
4.	Sh. B K Dh [illegible]an	XEN	Municipal Corporation	9872511246
5.	Sh. Naval Verma	XEN	PH Div No 3, Public Health	7508185445
6.	Smt. Sudha Bhatia	Superintendent	Industries Department	9914141083
7.	Dr. S.K Jain	Regional Director	CGWB, NWR, Chandigarh	9873640962
8.	Sh. Dinesh Tewari	Scientist 'D'	CGWB, NWR, Chandigarh	9878698350
9.	Dr. Shailendra Singh	AHG	CGWB, NWR, Chandigarh	9569350950

MINUTES OF THE 2nd MEETING OF STATE LEVEL COMMITTEE FOR GROUND WATER RESOURCE ASSESSMENT OF UT OF DADRA & NAGAR HAVELI AS ON MARCH 2013

The Second Meeting of the State Level Committee (SLC) for Ground Water Resource Estimation as on March 2013 was held under the Chairmanship of Shri Gaurav Singh Rajawat, IAS, District Collector, D&NH and Secretary, Panchayat Raj & Rural Development on 11th August 2016 at 04.30 pm at Collectorate Office, Silvassa with following agenda:

1. Presentation on Ground Water Resources Assessment (2013) of UT of DNH.
2. Discussion followed by approval of GWRA (2013).
3. Any other item: With the permission of Chair.

The SLC have been constituted vide Order No. PWD-III/ASW/GWRA-2013/SLC/DNH/2014/416/353 dated 26/06/14 for the UT of DNH. The list of members attending the 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 (2013).

- At the outset, Dr. P.K. Jain, Head of Office, Central Groundwater Board, Central Region, Nagpur and Member Secretary welcomed Chairman and all the members of SGWCC.
- Shri Rahul R. Shende made a presentation on "Ground Water Resource Assessment of UT of D&NH - 2013". During the presentation, he informed that the GWRA-2013 has been completed by CGWB, Nagpur based on the data available with CGWB and data provided by various Departments of D&NH viz., PWD (Civil, Irrigation & Road), District Panchayat, Planning & Statistics etc.
- He informed that the stage of ground water development in UT of D&NH has increased from 21.79% in 2011 to 32.22% in 2013, due to increase in domestic draft. He also informed that the situation in UT of D&NH is different from other parts as the domestic draft is more than the irrigation draft as per the data made available. He further stressed that due to non availability of ground water draft for industrial purpose, true ground water draft could not be estimated. Hence in future ground water assessments, the data on industrial draft may be provided.
- The dynamic ground water resources - 2013 for the UT of D&NH were discussed in detail.
- Dr. P.K. Jain, Head of Office, CGWB, Nagpur and Member Secretary, SLC said that many industries exist in UT and exact consumption of water, its source, is precisely required for future assessments. He also informed that due to the prevailing drought situation in the country during previous years, it is necessary to have exact assessment of available ground water resources. He informed that the detailed report will be submitted shortly after approval of the SLC.
- Shri Gaurav Singh Rajawat, IAS, District Collector, D&NH appreciated the efforts put in by CGWB in estimation of GWRA-2013 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-2013 will provide an insight into the dynamic nature of ground water resources.
- The Ground Water Resource Assessment of UT of D&NH was 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.

(Gaurav Singh Rajawat)
District Collector, D&NH
and Chairman of SGWCC

(Dr. P.K. Jain)
Head of Office, CGWB, CR, Nagpur
and Member Secretary of SGWCC

Date – 11-08-2016

Place- Silvassa, UT of D&NH

Daman & Diu

Minutes of the UT Level meeting on Dynamic Ground Water Resources as on March 2013, held on 18th August 2016 at 13.30 Hrs in the Conference Hall of Secretariat Building, Moti Daman, UT of Daman & Diu.

The UT level meeting for the approval of Dynamic Ground Water Resources Estimation of UT of Daman and Diu as on March 2013 was held under the Chairmanship of the Chief Engineer, PWD, Daman on 18/08/2016 at 13.30 hours in the conference Hall, Secretariat, Moti Daman.

1. Shri Anoop Nagar, Member Secretary & Regional Director, West Central Region, Ahmadabad welcomed all members and briefed them about the groundwater scenario of the area, previous assessment of the ground water resources carried out during the year 2011 and present assessment of ground water resources as on 31st March 2013 for UT of Daman and Diu.

2. The minutes of the last meeting of the UT level Committee on "Dynamic Ground Water Resources of UT of Daman & Diu as on March 2013" held on 13.10.2014 was confirmed.

3. The presentation on Dynamic Ground Water Resources was made by Shri B. Mohapatra, Scientist-C, CGWB, WCR, Ahmedabad. During the course of presentation the Chairman opined that data required for resources estimation may be compiled properly and timely keeping in view timely completion of the resource estimation likely to be done in coming years.

4. After discussion on hydrogeological disposition of limited thickness of fresh quality aquifers of UT of Diu and stage of high development of groundwater resources leading to Critical categorization, the Chairman emphasized to take necessary actions on artificial recharge and groundwater conservation measures and rainwater harvesting. Shri Ashok Patel, JE, PWD, Daman intimated that Rainwater Harvesting measures are being adopted in the Govt. buildings and residential complexes in the UT of Diu.

5. Shri K S Gaikwad, Directorate of Agriculture, Daman informed that 50% subsidy is being given at present to farmers using micro irrigation system like drip and sprinkler irrigation as a measure to save water.

6. The Chief Engineer, PWD informed that the domestic water supply in UT of Diu is going to be entirely by piped surface water supply by the end of year 2016, thus reducing the dependability on groundwater for domestic uses. He also informed that in a likewise manner the domestic water requirement of UT of Daman will be catered completely by piped surface water supply by the end of Year 2019.

7. After above deliberation the Chairman conveyed the approval for the report on "Dynamic Groundwater Resources of UT of Daman and Diu as on 31st March 2013.

8. The meeting ended with Vote of thanks by Shri H N Tiwari, Scientist-D, CGWB, WCR, Ahmedabad.

Lakshdweep

Minutes of the first meeting of the UT level Standing Committee for Re-estimation of Ground Water Resources of UT of Lakshadweep, held on 13.01.2016.

The first meeting of the UT level standing committee for re-estimation of ground water resources of U.T.of Lakshadweep was held at 12.00 hrs in the chamber of Secretary (Works)/Collector cum Dev. Commissioner, U.T.of Lakshadweep on 13.01.2016. The meeting was chaired by ShriJ.Ashok Kumar.IAS.Secretray (Works) the following members attended the meeting.

1.Shri.ArunJadhav, Superintending Engineer. LPWD - Member

2.Shri A.Hamza, Director(Planning and Statistics) - Member

3.Shri Punit Kumar Patel, Director (Agriculture and Director Industries) - Member

4.Shri K.Balakrishnan, Scientist D, CGWB Trivandrum. - Member (Secy)

5.Shri C.Hidyathulla, Chemist, LPWD - Invitee.

The Chairman of the committee welcomed the members at the outset. Shri.K.Balakrishnan, Scientist D appraised the committee of the completion of the draft report on dynamic ground water resources of U.T. of Lakshadweep as on 31.03.2013 and placed the same for the approval of the committee. The Chairman opened the discussion on the report as per the agenda.

Agenda Item: Estimation of dynamic ground water resources of U.T.of Lakshadweep (as in March 2013).

ShriK.Balakrishnan, Scientist D Member Secretary informed the committee that the Dynamic Ground Water Resources of U.T. of Lakshadweep as in March2013 have been assessed following the procedures of GEC 1997 methodology by CGWB with the data collected from the different govt. departments of U.T.of Lakshadweep and data collected by officers of CGWB. He had explained various steps involved in the methodology adopted for the estimation of resources and the final result of the computation were deliberated in detail by the committee.

- The Committee was informed that the assessments carried out for all the inhabited islands of Lakshadweep except Bitra.

- Ground water draft for domestic uses in the islands have been updated based on projected population keeping 2011 census as base.

- As per the assessment carried out, the annual surplus ground water availability, available resources and gross ground water draft for all uses in U.T of Lakshadweep are of the order of 1054.6 ha.m, 350 ha.m and 237.4 ha.m respectively.

- Stage of development of U.T.of Laksahdweep is 67.7 percent. Three islands are categorised as semi critical viz.Kavaratti, Agatti and Amini islands and rest of the islands as safe.

The members enquired about the bacteriological contamination of ground water in all the islands. The Member Secretary had informed that bacteriological contamination was not included in the assessment.

The assessment of Dynamic Ground Water Resources of U.T. of Lakshadweep as on 31.03.2013 was unanimously approved by the committee.

The meeting ended with thanks to the Chair.

(J. Ashok Kumar IAS)
-sd-
Chairman

APPENDIX-C

Minutes of the 1st Meeting of Central Level Expert Group for over all re-assessment of Ground Water Resources of India (as on 31st March, 2013) held on 15th July, 2016 at CGWB, Jamnagar House, New Delhi.

At the outset Shri GC Pati, Member, (TT & WQ), CGWB, CHQ, Faridabad welcomed all the members of Central Level Expert Group (CLEG). Chairman of the Committee, Shri K.B. Biswas addressed the gathering and emphasized the need for critical review of the resource estimates wherever there is a noticeable change in status of resources and categories of assessment units. The list of participant who attended the meeting is enclosed as Annexure-I. A comparison of the abstracts of Ground Water Resource Assessments (as on 31st March, 2013) approved by the respective State Level Committee with previous assessment (as on 31st March, 2011) was presented by Ms Parveen Kaur Scientist 'B' during the meeting.

1. Shri GC Pati, Member, (TT & WQ), CGWB, CHQ, Faridabad intimated that approved ground water resources from the states of Tamil Naidu, West Bengal, Bihar, Andaman & Nicobar, Manipur, Dadra & Nagar Haveli, Puducherry, Uttarakhand, Andhra Pradesh and Sikkim have not been received so far.

2. Dr. A.R. Khan, Dy. General Manager, (NABARD) raised the issue of delay in convening the first meeting of CLEG and whether there is any time line for submission of final report and whether the next assessment will be based on the new methodology i.e. GEC-2015.

3. Shri GC Pati, Member, (TT & WQ) explained that the ground water resource assessment is approved by State Level Committees headed by Principal Secretary/Secretary of the states which are used for compilation of national report at central level. Without having the substantial number of approved Ground water resources assessment reports from states, convening a meeting of CLEG would not have been possible. Shri GC Pati further added that the time line for submission of final report has been extended upto 31st August, 2016. GEC-2015 Methodology has been submitted to Ministry for approval. The Secretary MoWR, RD & GR has desired that a pilot study need to be taken up in selective assessment units to check the validity of the revised norms as suggested in GEC-2015 Methodology.

4. During the meeting Dr. N.C. Ghosh, Scientist 'G', NIH has pointed out that there is a huge difference in the estimated values of various parameters like Annual Replenishable GW Resources, Net GW availability, Annual GW Draft, Draft for irrigation and Industrial and domestic uses for the states of Maharashtra and Punjab. In this regard it was decided that ground water resource estimates (2013) of one block each from Maharashtra and Punjab will be reviewed by the CLEG.

5. In Jammu & Kashmir the number of assessment units have been changed and there is huge difference in total Annual Replenishable GW Resources, Net GW availability, Annual GW Draft, Draft for Industrial and domestic uses. The committee agreed with the ground water resource assessment. However, proper justifications for this difference need to be provided by the state.

6. Dr. N.C. Ghosh, Scientist 'G', NIH pointed out that in the state of Haryana, no blocks have been categorised as saline inspite of occurrences of salinity in some pockets of Mewat district. On this Sh. G.C. Pati explained that unless the whole assessment unit is affected by salinity it is not categorised as saline. The committee approved the ground water resource of the state of Haryana.

7. In Rajasthan, there is decrease in the number of over exploited blocks from 172 in 2011 to 164 in 2013 assessment. Sh. R.S. Vyas, Suptdg. Hydrogeologist, GWD, Rajasthan explained that there is an increase in rainfall during last 10 years and implementation of watershed development practices in the state has lead to improvement in categorization of some blocks. The committee approved the ground water resource of the state of Rajasthan.

8. In Gujarat, there is an increase in the total Annual Replenishable GW Resources, Net GW availability, Annual GW Draft and draft for irrigation and overall improvement in 5 assessment units. Sh. K.B. Rabadia, MD, GWRDC, Gujarat informed that the difference is attributed to increase in rainfall during last few years and use of surface water irrigation from Narmada canal distribution system and other ground water management practices. The committee approved the ground water resource of the state of Gujarat.

9. In Jharkhand state there is substantial change in number of assessment units and category of assessment units. There is noticeable change in total Annual Replenishable GW Resources, Net GW availability, Annual GW Draft and draft for irrigation and Industrial and domestic uses. Need of re-assessment of resources has been advised by the committee.

10. The Ground water resources Assessment of Chandigarh, Delhi, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Assam, Meghalaya, Tripura, Goa, Kerala and Lakshadweep have been approved by the CLEG.

11. Proper justification is needed in case of Nagaland where there is a substantial change in ground water resources and category of assessment units and Telangana where the number of assessment units has decreased.

The meeting ended with vote of thanks.

Annexure –I

List of Participant in 1st Meeting of Central Level Expert Group for over all re-assessment of Ground Water Resources of India (as on 31st March, 2013) held on 15th July, 2016 at CGWB, Jamnagar House, New Delhi.

1. Shri K.B. Biswas, Chairman, Central Ground Water Board.
2. Sh. K.C. Naik, Member (RGI), Central Ground Water Board, Faridabad.
3. Dr. D. Saha, Member (SAM), Central Ground Water Board, Faridabad.
4. Sh. G.C. Pati, Member (TT&WQ), Central Ground Water Board B, Faridabad.
5. Dr. A.R. Khan, Dy. General Manager, NABARD, Mumbai.
6. Dr. N.C. Ghosh, Scientist 'G', NIH, Roorkee.
7. Prof. B.R. Chachar, Department of Civil Engineering, IIT Delhi.
8. Shri Avinash Mishra, Joint Adviser, NITI Aayog, New Delhi.
9. Dr. J.S. Mehta, Director, Geological Survey of India, New Delhi.
10. Sh. S. B. Tyagi, India Meteorological Department (IMD), New Delhi.
11. Dr. M.K. Srivastava, National Rainfed Area Authority (NRAA)
12. Sh. K.B. Rabadia, MD, Gujarat Water Resources Development Corporation, Gujarat.
13. Sh. R.S. Vyas, Suptdg. Hydrogeologist, Ground Water Department, Jodhpur, Rajasthan.
14. Sh. R.K. Jain, Chief Engineer, National Water Development Agency (NWDA), New Delhi.
15. Sh. V.K. Upadhyay, Joint Director, Ground Water Department, Uttar Pradesh.
16. Sh. Ravi Kant Singh, Sr. Hydrogeologist, Ground Water Department, Uttar Pradesh.
17. Smt. Rose Anita Kujur, Scientist D, Central Ground Water Board, Eastern Region, Kolkata.
18. Sh. A.K. Madhukar, Suptdg. Geophysicist, Central Ground Water Board, CHQ, Faridabad.
19. Dr. B.C. Joshi, Scientist 'D', Central Ground Water Board, CHQ, Faridabad.
20. Mrs. Rumi Mukherjee, Scientist 'C', Central Ground Water Board, CHQ, Faridabad.
21. Ms. Parveen Kaur, Scientist 'B' Central Ground Water Board, CHQ, Faridabad.
22. Dr. Anil Kumar, Central Ground Water Board, CHQ, Faridabad.

APPENDIX-D

Minutes of the 2nd Meeting of Central Level Expert Group for over all re-assessment of Ground Water Resources of India (as on 31st March, 2013) held on 23rd August, 2016 at CGWB, Jamnagar House, New Delhi.

At the outset Shri G.C. Pati, Member, (TT & WQ), CGWB & Member Secretary of CLEG welcomed all the Members of Central Level Expert Group (CLEG). Chairman of the Committee, Shri K.B. Biswas addressed the gathering and reiterated the importance of ground water resource estimation at regular intervals and the need for creation of void through ground water extraction particularly for states which have a very low stage of development. The list of participants who attended the meeting is enclosed as Annexure-I. A presentation on the gist of the Ground Water Resource Assessments (as on 31st March, 2013) of the states approved by the respective State Level Committee was made by Ms Parveen Kaur Scientist 'B' during the meeting. The major decisions taken during the meeting are:

1. The Ground Water Resource Assessment of seven states and three Union Territories namely Andhra Pradesh, Arunachal Pradesh, Himachal Pradesh, Karnataka, Mizoram, Odisha, Uttarakhand, Daman & Diu Puducherry and Dadra & Nagar Haveli were approved by CLEG.

2. The ground water resource assessment of Bihar, Manipur, Tamil Nadu, West Bengal & Andaman & Nicobar Islands are yet to be approved by their State Level Committees (SLC). It was decided that a month's time would be given to the respective SLCs to approve the reports. After this deadline, the draft reports would be taken into consideration for compilation of the national report.

3. Proper justification for substantial change in ground water resources and/or category of assessment units for the states of Jharkhand ,Nagaland, and Telangana were sought during the first meeting of CLEG. The justification has been received from the states and the reports have been approved by CLEG.

4. During the first meeting, it was decided that ground water resource estimates (2013) of one block each from Maharashtra and Punjab will be reviewed by the CLEG. The detailed resource estimation for 1 block each of Maharashtra and Punjab were sent to select members of CLEG. The resource estimation of Morshi block of Amravati district was discussed. The reports of Maharashtra and Punjab were approved by CLEG.

5. The meeting ended with vote of thanks.

Annexure –I

List of Participants in 2nd Meeting of Central Level Expert Group for over all re-assessment of Ground Water Resources of India (as on 31st March, 2013) held on 23rd August, 2016 at CGWB, Jamnagar House, New Delhi.

1. Shri K.B. Biswas, Chairman, Central Ground Water Board.
2. Shri. K.C. Naik, Member (RGI), Central Ground Water Board, Faridabad.
3. Dr. D. Saha, Member (SAM), Central Ground Water Board, Faridabad.
4. Shri. G.C. Pati, Member (TT&WQ), Central Ground Water Board , Faridabad.
5. Dr. N.C. Ghosh, Scientist 'G', NIH, Roorkee
6. Prof. A K Gosain, Department of Civil Engineering, IIT Delhi.
7. Shri. Avinash Mishra, Joint Adviser, NITI Aayog, New Delhi.
8. Shri. Vimal Chaurasia, Water Resource Department, Madhya Pradesh.
9. Shri. Awdhesh Kumar, Ground water Department, Uttar Pradesh
10. Shri. M.S. Mohan Kumar, IISC, Bangalore
11. Shri. Gautam Sahe, Geological Survey of India, New Delhi.
12. Shri. S. B. Tyagi, India Meteorological Department (IMD), New Delhi.
13. Dr. M.K. Srivastava, National Rainfed Area Authority (NRAA)
14. Mrs Jancy Vijayan, National Water Development Agency (NWDA), New Delhi.
15. Shri. A.K. Madhukar, Suptdg. Geophysicist, Central Ground Water Board, CHQ, Faridabad.
16. Dr. B.C. Joshi, Scientist 'D', Central Ground Water Board, CHQ, Faridabad.
17. Mrs. Rumi Mukherjee, Scientist 'C', Central Ground Water Board, CHQ, Faridabad.
18. Ms. Parveen Kaur, Scientist 'B' Central Ground Water Board, CHQ, Faridabad.

APPENDIX-E

REASONS FOR SIGNIFICANT CHANGE IN PARAMETERS OF ASSESSMENT UNITS (FROM 2011 TO 2013 ASSESSMENT)

Sl.No	States	Reasons
1	**Andhra Pradesh**	There is a decrease in the Total annual replenishable ground water resources from 20.78 bcm to 20.39 bcm. This is because rainfall is more in the year 2010-11 (1346 mm) when compared to the present assessment year, 2012-13 (1057 mm). Annual ground water draft has also increased from 7.01 to 8.10 bcm due to increase in the ground water irrigation area from 15.61 lakh ha. (37% of the total irrigated area) to 16.31 lakh ha. (44% of the total irrigated area).
2	**Assam**	Total annual replenishable ground water resources have increased from 28.42 to 32.11 bcm due to increase in recharge components from both surface and ground water irrigation. Ground water draft for irrigation has increased from 2.86 to 4.06 bcm The actual figure of shallow tubewells has been taken in 2013 whereas in 2011 projected figures were used, (an increase in 45,000 nos of shallow tubewells in 2013 over 2011).
3	**Delhi**	Total annual replenishable ground water resources have increased from 0.31 to 0.34 bcm because data pertaining to canals/drains have been updated. The annual ground water draft (bcm) has decreased from 0.392 to 0.388 bcm because improvement in surface water supply in areas by the DJB has led to the less dependency on Ground Water after commissioning of Sonia Vihar treatment plant in 2007. Increase in ground water salinity in many areas of NCT, Delhi has led to less withdrawal of ground water.
4	**Gujarat**	Total annual replenishable ground water resources has increased from 18.57 to 20.85 bcm due to increase in average decadal rainfall from 893 (2001 to 2010) mm to 914 mm (2003 to 2012). Ground water draft for irrigation has increased from 10.75 to 12.30 bcm due to increase in ground water extraction structures from 804054 (2011) to 1014173 (2013).
5	**Haryana**	Recharge from other sources has increased from 6.12 bcm in 2011 to 6.70 bcm during 2013.This is mainly due to the contribution from return flow component by surface and ground water irrigation. In 2011, only three values were taken for return flow factor based on water level, <10

		m, 10-25 m & more than 25 m. However, in 2013, a linear factor is applied, instead of three ranges, which has resulted in increase in estimated ground water recharge. The annual Ground water draft has increased from 13.05 to 13.92 bcm due to increase in Total number of tube wells from 741062 during 2011 to 785894 in 2013.
6	**Himachal Pradesh**	There is a decrease in the annual ground water draft from 0.38 to 0.27 bcm and decrease in ground water draft due to irrigation from 0.25 to 0.16 bcm. This is because during the 2011 assessment, non-commissioned tube wells of state govt. were included resulting into more ground water draft, which was rectified for 2013 assessment.
7	**Jammu & Kashmir**	The total annual replenishable ground water resource of the state has increased from 4.25 bcm in 2011 assessment to 5.25 bcm. This is attributed to Increase in recharge from other sources during monsoon and non-monsoon due to increase in net irrigated area from 2008 - 09 to 2011-12. The annual ground water draft has increased from 0.81 to 1.18 bcm due to Increase in ground water structures for domestic and industrial purposes. Change in total no. of assessment units from 14 to 22 is because of formation of 8 new districts.
8	**Jharkhand**	During the 2011 estimation projected 3rd MI Census data was used and in 2013 4th MI Census data was used. However, in comparison with 3rd Minor Irrigation Census, 4th MI Census depicted significant change in number of groundwater abstraction structures. As 4th MI Census was carried out in 2006-07, hence, its' consequent projection up to 2013 have been utilized. Even after projection there is a 54% decline in number of irrigation wells in present estimation compared to earlier estimation of 2011. This has been reflected in the decrease in ground water draft figures for the state. The number of blocks has increased from 210 to 260 due to change in administrative setup.
9	**Karnataka**	In 2011 estimates, the taluks were divided into Command and Non-command units. Hence, there were 270 assessment units. During 2013 exercise, it was decided by the State Level Committee to sum up the Command and Non-Command part and make it as one assessment unit, ie. Taluk (176 assessment units).
10	**Kerala**	As compared to 2011 assessment, the annual replenishable ground water resource of the state has decreased from 6.69 bcm to 6.27 bcm due to variation in

		rainfall. The unit draft for ground water abstraction structures were calculated area-wise during 2013 assessment instead of the whole state. This has resulted in the decrease in the annual ground water draft from 2.84 bcm to 2.63 bcm.
10	**Madhya Pradesh**	There is an increase of 3% in annual ground water draft from 18.83 bcm to 19.36 bcm. This is due to increased Ground water draft for irrigation and increase in population
11	**Maharashtra**	The total annual replenishable Ground water resources have decreased from 32.15 to 31.78 bcm due to Rainfall deficit for consecutive last 3 years in Marathwada region of Maharashtra.
12	**Meghalaya**	The annual replenishable ground water resources and net ground water availability have increased from 1.78 bcm to 3.31 bcm and 1.60 bcm to 2.98 bcm respectively. This is due to re-calculation of ground water recharge worthy area using digitized slope maps (area having slope less than 20% given by North East Space Application Centre, Umiam, RiBhoi District) for 2013 assessment. Moreover, recharge from water spread area of various reservoirs has been taken into consideration for 2013 estimation, which was not taken earlier.
13	**Nagaland**	As compared to 2011 estimate there is an increase in annual ground water recharge by about 1.32 bcm in the 2013 estimate, which can be attributed to the change in recharge worthy areas as area of slope has been recalculated based on Govt. of Nagaland Dept. of Land Resources.
14	**Odisha**	There is an increase in the annual ground water draft for all uses from 4.73 bcm to 5.02 bcm due to increase in irrigation & domestic consumption.
15	**Punjab**	The annual replenishable ground water resources has increased from 22.53 bcm to 25.91 bcm (recharge from other sources increased from 15.38 bcm in 2011 to 18.85 bcm in 2013) and similarly, net ground water availability increased from 20.32 bcm to 23.39 bcm. This is mainly due to the contribution from return flow component by surface and ground water irrigation. In 2011, only three values were taken for return flow factor based on water level <10 m, 10-25 m & more than 25 meter. However in 2013, a linear factor is applied, instead of three ranges, which has resulted in increase of ground water recharge.This is also reflected in the decreased stage of ground water development from 172% in (2011)

		to 149% (2013). Annual ground water draft for irrigation has marginally decreased from 34.17 bcm in 2011 to 34.05 bcm in 2013. This mainly due to the implementation of Punjab Preservation of Subsoil Water Act 2009 which restricts sowing of Paddy before 10th of May of the agricultural year in the entire State. The ground water draft for industrial and domestic uses has also increased from 0.71 bcm to 0.77 bcm due to increase in population and demand of water for industrial use.
15	**Telangana**	The total annual replenishable ground water resources has decreased from 15.1 to 14.74 bcm because in 2010-11, rainfall was 22% excess and in 2012-13 it was only 2% normal and approximately 3486 sq.km, of the state areas was shifted to Andhra Pradesh state due to bi-furcation. The annual ground water draft has increased from 7.50 bcm to 7.77 bcm due to increase in number of irrigation wells and domestic and industrial consumption. The total no. of assessment units have decreased from 448 to 443 because after bifurcation of the state, 7 mandals have been shifted to Andhra Pradesh state, out of which 5 are full and 2 partial.
16	**Uttarakhand**	There is a decrease in the ground water draft for irrigation from 1.10 bcm to 0.84 bcm, which can be attributed to reduction in number of ground water abstraction structures. There is an increase in the ground water draft for industrial and domestic uses from 0.03 to 0.15 bcm due to establishment of new industries.
17	**UT of Dadra & Nagar Haveli**	The annual ground water draft has increased from 0.013 to 0.020 for D&NH and stage of ground water development has also increased from 22% to 32% due to increase in domestic draft.
18	**UT of Daman & Diu**	The annual replenishable ground water resource has decreased from 0.018 bcm to 0.015 bcm. This is attributed to lesser recharge from rainfall due to urbanization. The annual ground water draft and the stage of ground water development has decreased from 0.016 bcm to 0.010 bcm and 97% to 70% respectively. This variation is due to reduction in irrigated area due to urbanization and adoption of micro irrigation schemes such as drip and sprinkler irrigation.

APPENDIX F

CHANGE IN CATEGORIZATION OF ASSESSMENT UNITS FROM 2011 TO 2013 ASSESSMENT

APPENDIX F (i)

STATE-WISE SUMMARY OF ASSESSMENT UNITS IMPROVED & DETERIORATED FROM 2011 TO 2013 ASSESSMENT

Sl.No	State/UT	Improved	Deteriorated	No Change
1	**Andhra Pradesh**	9	70	576
2	**Arunachal Pradesh**	0	0	11
3	**Assam**	0	0	27
4	**Bihar**	3	5	525
5	**Chattisgarh**	0	0	146
6	**Delhi**	9	4	14
7	**Goa**	0	0	12
8	**Gujarat**	5	0	218
9	**Haryana**	27	11	77
10	**Himachal Pradesh**	1	0	7
11	**Jammu & Kashmir**	0	0	14
12	**Jharkhand**	5	6	196
13	**Karnataka***	-	-	-
14	**Kerala**	11	6	135
15	**Madhya Pradesh**	13	2	298
16	**Maharashtra**	5	5	343
17	**Manipur**	0	0	8
18	**Meghalaya**	0	0	7
19	**Mizoram**	0	0	22
20	**Nagaland**	0	0	8
21	**Odisha**	0	0	309
22	**Punjab**	11	3	124
23	**Rajasthan**	39	9	193
24	**Sikkim**	-	-	-
25	**Tamil Nadu**	82	108	935
26	**Telangana**	27	63	353
27	**Tripura**	0	0	39
28	**Uttar Pradesh**	87	31	704
29	**Uttarakhand**	6	1	11
30	**West Bengal**	1	24	243
	State Total	**341**	**348**	**5555**
	Union Territories			
1	**Andaman & Nicobar**	0	0	34
2	**Chandigarh**	0	0	1
3	**Dadra & Nagar Haveli**	0	0	1
4	**Daman & Diu**	2	0	0
5	**Lakshdweep**	0	1	8
6	**Puducherry**	0	0	4
	UTs Total	**2**	**1**	**48**
	Grand Total	**343**	**349**	**5603**

*Karnataka: In 2011, the Ground water Resources assesment was carried out with Command and Non Command areas as Assessment Units. However, during 2013 assessment the same has been done Taluk wise. Therefore, comparison of categorization of Assessment units could not be made.

APPENDIX F (ii)

COMPARISON OF CATEGORIZATION OF ASSESSMENT UNITS (2011 TO 2013)

1. Andhra Pradesh

Improved Assessment Units

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Anantapur	Beluguppa	Semi Critical	Anantapur	Beluguppa	Safe	Improved
2.	Anantapur	Dharmavaram	Semi Critical	Anantapur	Dharmavaram	Safe	Improved
3.	Anantapur	Garladinne	Semi Critical	Anantapur	Garladinne	Safe	Improved
4.	Anantapur	Kalyandurg	Over exploited	Anantapur	Kalyandurg	Critical	Improved
5.	Chittoor	Chowdepalli	Semi Critical	Chittoor	Chowdepalli	Safe	Improved
6.	Chittoor	Karvetinagaram	Critical	Chittoor	Karvetinagaram	Semi critical	Improved
7.	Chittoor	Nimmanapalli	Semi Critical	Chittoor	Nimmanapalli	Safe	Improved
8.	Chittoor	Punganur	Critical	Chittoor	Punganur	Semi critical	Improved
9.	Chittoor	Vijayapuram	Semi Critical	Chittoor	Vijayapuram	Safe	Improved

Deteriorated Assessment Units

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Anantapur	Anantapur	Safe	Anantapur	Anantapur	Critical	Deteriorated
2.	Anantapur	Atmakur	Safe	Anantapur	Atmakur	Semi critical	Deteriorated
3.	Anantapur	B.k.samudram	Safe	Anantapur	B.k.samudram	Semi critical	Deteriorated
4.	Anantapur	Bommanahal	Safe	Anantapur	Bommanahal	Semi critical	Deteriorated
5.	Anantapur	Bukkapatnam	Semi critical	Anantapur	Bukkapatnam	Over exploited	Deteriorated
6.	Anantapur	Chilamathur	Safe	Anantapur	Chilamathur	Semi critical	Deteriorated
7.	Anantapur	C.K.Palli	Safe	Anantapur	C.K.Palli	Over exploited	Deteriorated
8.	Anantapur	D.Hirehal	Safe	Anantapur	D.Hirehal	Critical	Deteriorated
9.	Anantapur	Gooty	Safe	Anantapur	Gooty	Semi critical	Deteriorated
10.	Anantapur	Gorantla	Safe	Anantapur	Gorantla	Over exploited	Deteriorated
11.	Anantapur	Gudibanda	Semi critical	Anantapur	Gudibanda	Over exploited	Deteriorated
12.	Anantapur	Kanaganapalli	Semi critical	Anantapur	Kanaganapalli	Critical	Deteriorated
13.	Anantapur	Nallacheruvu	Safe	Anantapur	Nallacheruvu	Over exploited	Deteriorated

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
14.	Anantapur	Narpala	Semi critical	Anantapur	Narpala	Over exploited	Deteriorated
15.	Anantapur	O.D.cheruvu	Semi critical	Anantapur	O.D.cheruvu	Over exploited	Deteriorated
16.	Anantapur	Puttaparthi	Semi critical	Anantapur	Puttaparthi	Over exploited	Deteriorated
17.	Anantapur	Ramagiri	Safe	Anantapur	Ramagiri	Semi critical	Deteriorated
18.	Anantapur	Raptadu	Semi critical	Anantapur	Raptadu	Critical	Deteriorated
19.	Anantapur	Rayadurg	Semi critical	Anantapur	Rayadurg	Critical	Deteriorated
20.	Anantapur	Settur	Safe	Anantapur	Settur	Over exploited	Deteriorated
21.	Anantapur	Talupula	Critical	Anantapur	Talupula	Over exploited	Deteriorated
22.	Anantapur	Tanakallu	Semi critical	Anantapur	Tanakallu	Over exploited	Deteriorated
23.	Chittoor	B.kothakota	Safe	Chittoor	B.kothakota	Semi critical	Deteriorated
24.	Chittoor	Baireddypalli	Semi critical	Chittoor	Baireddypalli	Critical	Deteriorated
25.	Chittoor	Cggallu	Semi critical	Chittoor	Cggallu	Critical	Deteriorated
26.	Chittoor	Gurramkonda	Safe	Chittoor	Gurramkonda	Semi critical	Deteriorated
27.	Chittoor	Kalikiri	Safe	Chittoor	Kalikiri	Semi critical	Deteriorated
28.	Chittoor	Kurabalakota	Safe	Chittoor	Kurabalakota	Semi critical	Deteriorated
29.	Chittoor	Kv palli	Safe	Chittoor	Kv palli	Semi critical	Deteriorated
30.	Chittoor	Molakalacheruvu	Safe	Chittoor	Molakalacheruvu	Semi critical	Deteriorated
31.	Chittoor	Peddapanjani	Semi critical	Chittoor	Peddapanjani	Critical	Deteriorated
32.	Chittoor	Piler	Semi critical	Chittoor	Piler	Critical	Deteriorated
33.	Chittoor	Pulicherla	Critical	Chittoor	Pulicherla	Over exploited	Deteriorated
34.	Chittoor	Sodam	Safe	Chittoor	Sodam	Semi critical	Deteriorated
35.	Chittoor	V.Kota	Semi critical	Chittoor	V.Kota	Critical	Deteriorated
36.	Chittoor	Y.V.palem	Safe	Chittoor	Y.V.palem	Semi critical	Deteriorated
37.	Guntur	Bollapalle	Safe	Guntur	Bollapalle	Over exploited	Deteriorated
38.	Guntur	Kakumanu	Safe	Guntur	Kakumanu	Saline	Deteriorated
39.	Guntur	Nagaram	Safe	Guntur	Nagaram	Semi critical	Deteriorated
40.	Guntur	Veldurthi	Safe	Guntur	Veldurthi	Over exploited	Deteriorated
41.	Kadapa	Atloor	Safe	Kadapa	Atloor	Semi critical	Deteriorated
42.	Kadapa	Chinnamandem	Safe	Kadapa	Chinnamandem	Over exploited	Deteriorated
43.	Kadapa	Kondapuram	Safe	Kadapa	Kondapuram	Semi critical	Deteriorated
44.	Kadapa	Lakkireddi palli	Safe	Kadapa	L.R.palle	Semi critical	Deteriorated
45.	Kadapa	Lingala	Safe	Kadapa	Lingala	Semi critical	Deteriorated
46.	Kadapa	Muddanur	Safe	Kadapa	Muddanur	Critical	Deteriorated

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
47.	Kadapa	Obulavaripalli	Safe	Kadapa	Obulavaripalle	Over exploited	Deteriorated
48.	Kadapa	Pendlimarri	Semi critical	Kadapa	Pendlimarri	Critical	Deteriorated
49.	Kadapa	Porumamilla	Safe	Kadapa	Porumamilla	Semi critical	Deteriorated
50.	Kadapa	Proddatur	Safe	Kadapa	Proddatur	Semi critical	Deteriorated
51.	Kadapa	Pullampeta	Semi critical	Kadapa	Pullampet	Over exploited	Deteriorated
52.	Kadapa	Rajampeta	Safe	Kadapa	Rajampet	Semi critical	Deteriorated
53.	Kadapa	Ramapuram	Safe	Kadapa	Ramapuram	Semi critical	Deteriorated
54.	Kadapa	Rayachoty	Safe	Kadapa	Rayachoty	Semi critical	Deteriorated
55.	Kadapa	Thondur	Safe	Kadapa	Thondur	Semi critical	Deteriorated
56.	Kadapa	Vallur	Semi critical	Kadapa	Vallur	Over exploited	Deteriorated
57.	Kadapa	Veeraballi	Safe	Kadapa	Veeraballi	Semi critical	Deteriorated
58.	Kadapa	Vempalli	Safe	Kadapa	Vempalle	Semi critical	Deteriorated
59.	Kurnool	C.Belagal	Safe	Kurnool	C.Belagal	Semi critical	Deteriorated
60.	Kurnool	Gonegondla	Safe	Kurnool	Gonegandla	Semi critical	Deteriorated
61.	Kurnool	Krishnagiri	Safe	Kurnool	Krishnagiri	Semi critical	Deteriorated
62.	Kurnool	Orvakal	Safe	Kurnool	Orvakal	Semi critical	Deteriorated
63.	Kurnool	Peddakadabur	Safe	Kurnool	Peddakadabur	Semi critical	Deteriorated
64.	Prakasam	Bestavaripeta	Safe	Prakasam	Bestavaripeta	Over exploited	Deteriorated
65.	Prakasam	Cumbum	Semi critical	Prakasam	Cumbum	Critical	Deteriorated
66.	Prakasam	Tarlupadu	Safe	Prakasam	Tarlupadu	Semi critical	Deteriorated
67.	Srikakulam	Kotabommali	Safe	Srikakulam	Kotabommali	Semi critical	Deteriorated
68.	Srikakulam	Laveru	Safe	Srikakulam	Laveru	Over exploited	Deteriorated
69.	Srikakulam	Ranasthalam	Safe	Srikakulam	Ranasthalam	Over exploited	Deteriorated
70.	West Godavari	T.Narsapuram	Safe	West Godavari	T.Narsapuram	Semi critical	Deteriorated

2. Bihar:

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Arwal	Kurtha	Semi critical	Arwal	Kurtha	Safe	Improved
2.	Begusarai	Birpur	Semi critical	Begusarai	Birpur	Safe	Improved
3.	Patna	Masuarhi	Semi critical	Patna	Masuarhi	Safe	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Begusarai	Bhagwanpur	Safe	Begusarai	Bhagwanpur	Semi-Critical	Deteriorated
2.	Gaya	Imamgang	Safe	Gaya	Imamgang	Semi-Critical	Deteriorated
3.	Jehanabad	Kako	Safe	Jehanabad	Kako	Semi-Critical	Deteriorated
4.	Patna	Patna Sadar	Safe	Patna	Patna Sadar	Semi-Critical	Deteriorated
5.	Vaishali	Hazipur	Safe	Vaishali	Hazipur	Semi-Critical	Deteriorated

3. Delhi

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Central	Pahar Ganj	Over Exploited	Central	Pahar Ganj	Semi Critical	Improved
2.	East	Gandhi Nagar	Semi-Critical	East	Gandhi Nagar	Safe	Improved
3.	New Delhi	Parliament Street	Critical	New Delhi	Parliament Street	Safe	Improved
4.	North	Kotwali	Over Exploited	North	Kotwali	Semi Critical	Improved
5.	North	Sadar Bazar	Over Exploited	North	Sadar Bazar	Safe	Improved
6.	North West	Saraswati Vihar	Over Exploited	North West	Saraswati Vihar	Semi Critical	Improved
7.	South	Defence Colony	Over Exploited	south	Defence Colony	Semi Critical	Improved
8.	South West	Najafgarh	Over Exploited	South West	Najafgarh	Semi Critical	Improved
9.	West	Punjabi Bagh	Semi-Critical	West	Panjabi Bagh	Safe	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Central	Darya Ganj	Safe	Central	Darya Ganj	Semi Critical	Deteriorated
2.	New Delhi	Chanakya Puri	Critical	New Delhi	Chanakay Puri	Over Exploited	Deteriorated
3.	New Delhi	Connaught Place	Semi Critical	New Delhi	Connaught Place	Over Exploited	Deteriorated
4.	North East	Seelam Pur	Semi-Critical	North East	Seelam Pur	Over Exploited	Deteriorated

4. Gujarat:

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Ahmedabad	City - Daskroi	Over Exploited	Ahmedabad	City-Daskroi	Critical	Improved
2.	Amreli	Khambha	Semi critical	Amreli	Khambha	Safe	Improved
3.	Kheda	Kapadwanj	Semi critical	Kheda	Kapadwanj	Safe	Improved
4.	Kheda	Kathlal	Semi critical	Kheda	Kathlal	Safe	Improved
5.	Kheda	Mahemdavad	Semi critical	Kheda	Mahemdavad	Safe	Improved

5. Haryana:

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Ambala	Shazadpur	Critical	Ambala	Shazadpur	Semi Critical	Improved
2.	Panchkula	Barwala	Critical	Panchkula	Barwala	Safe	Improved
3.	Panchkula	Pinjore	Critical	Panchkula	Pinjore	Safe	Improved
4.	Fatehabad	Bhuna	Over Exploited	Fatehabad	Bhuna	Semi Critical	Improved
5.	Bhiwani	Dadri-I	Over Exploited	Bhiwani	Dadri-I	Critical	Improved
6.	Bhiwani	Siwani	Over Exploited	Bhiwani	Siwani	Safe	Improved
7.	Hissar	Hansi-II (Bass)	Over Exploited	Hissar	Hansi-II (Bass)	Critical	Improved
8.	Gurgaon	Gurgaon	Over Exploited	Gurgaon	Gurgaon	Critical	Improved
9.	Mewat	Ferozepur Zhirka	Critical	Mewat	Ferozepur Zhirka	Safe	Improved
10.	Mewat	Nuh	Critical	Mewat	Nuh	Safe	Improved
11.	Palwal	Hassanpur	Over Exploited	Palwal	Hassanpur	Critical	Improved
12.	Palwal	Hathin	Critical	Palwal	Hathin	Semi Critical	Improved
13.	Palwal	Hodel	Critical	Palwal	Hodel	Semi Critical	Improved
14.	Jhajjar	Bhadurgarh	Semi Critical	Jhajjar	Bhadurgarh	Safe	Improved
15.	Jind	Pilukhera	Semi Critical	Jind	Pilukhera	Safe	Improved
16.	Karnal	Indri	Over Exploited	Karnal	Indri	Safe	Improved
17.	Mahendragarh	Ateli	Over Exploited	Mahendragarh	Ateli	Semi Critical	Improved
18.	Mahendragarh	Mahendragarh	Over Exploited	Mahendragarh	Mahendragarh	Safe	Improved
19.	Mahendragarh	Nangal Chaudary	Over Exploited	Mahendragarh	Nangal Chaudary	Semi Critical	Improved
20.	Mahendragarh	Narnaul	Over Exploited	Mahendragarh	Narnaul	Safe	Improved
21.	Rewari	Bawal	Over Exploited	Rewari	Bawal	Safe	Improved
22.	Rewari	Jatusana	Critical	Rewari	Jatusana	Safe	Improved
23.	Rewari	Nahar	Over Exploited	Rewari	Nahar	Safe	Improved
24.	Rohtak	Lakhan Majra	Semi Critical	Rohtak	Lakhan Majra	Safe	Improved
25.	Sonepat	Gohana	Critical	Sonepat	Gohana	Semi Critical	Improved
26.	Yamunanagar	Bilaspur	Over Exploited	Yamunanagar	Bilaspur	Critical	Improved
27.	Yamunanagar	Chachrauli	Over Exploited	Yamunanagar	Chachrauli	Critical	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Ambala	Ambala II	Safe	Ambala	Ambala II	Semi Critical	Deteriorated
2.	Fatehabad	Bhattu Kalan	Critical	Fatehabad	Bhattu Kalan	Over Exploited	Deteriorated
3.	Bhiwani	Bhawani Khera	Safe	Bhiwani	Bhawani Khera	Critical	Deteriorated
4.	Bhiwani	Bhiwani	Safe	Bhiwani	Bhiwani	Critical	Deteriorated
5.	Bhiwani	Dadri-II	Semi Critical	Bhiwani	Dadri-II	Critical	Deteriorated
6.	Bhiwani	Tosham	Safe	Bhiwani	Tosham	Over Exploited	Deteriorated
7.	Hissar	Adampur	Safe	Hissar	Adampur	Over Exploited	Deteriorated
8.	Hissar	Hansi-I	Safe	Hissar	Hansi-I	Critical	Deteriorated
9.	Mewat	Punhana	Semi Critical	Mewat	Punhana	Critical	Deteriorated
10.	Faridabad	Ballabhgarh	Critical	Faridabad	Ballabhgarh	Over Exploited	Deteriorated
11.	Jind	Julana	Safe	Jind	Julana	Semi Critical	Deteriorated

6. Himachal Pradesh

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1	Una	Una Valley	Critical	Una	Una Valley	Safe	Improved

7. Jharkhand

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Godda	Godda	Over Exploited	Godda	Godda	Safe	Improved
2.	Lohardaga	Lohardaga	Over Exploited	Lohardaga	Lohardaga	Safe	Improved
3.	Ramgarh	Ramgarh	Over Exploited	Ramgarh	Ramgarh	Semi-Critical	Improved
4.	Ranchi	Kanke	Over Exploited	Ranchi	Kanke	Semi-Critical	Improved
5.	Saraikela - Kharsawan	Gamharia	Semi-Critical	Saraikela - Kharsawan	Adityapur (Gamharia)	Safe	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Bokaro	Bermo	Safe	Bokaro	Bermo	Over Exploited	Deteriorated
2.	Dhanbad	Baghmara	Safe	Dhanbad	Baghmara	Critical	Deteriorated
3.	Dhanbad	Baliapur	Safe	Dhanbad	Baliapur	Semi-Critical	Deteriorated
4.	Dhanbad	Topchachi	Safe	Dhanbad	Topchanchi	Critical	Deteriorated
5.	Ramgarh	Mandu	Safe	Ramgarh	Mandu	Semi-Critical	Deteriorated
6.	Ramgarh	Patratu	Safe	Ramgarh	Patratu	Semi-Critical	Deteriorated

8. Kerala

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Ernakulam	Parakkadavu	Semi Critical	Ernakulam	Parakkadavu	Safe	Improved
2.	Ernakulam	Paravur	Semi Critical	Ernakulam	Paravoor	Safe	Improved
3.	Ernakulam	Vypeen	Semi Critical	Ernakulam	Vypeen	Safe	Improved
4.	Kannur	Kallyasseri	Semi Critical	Kannur	Kallyasseri	Safe	Improved
5.	Kasargod	Kanhangad	Semi Critical	Kasargod	Kanhangad	Safe	Improved
6.	Kasargod	Karadka	Semi Critical	Kasargod	Karadka	Safe	Improved
7.	Kollam	Chittumala	Semi Critical	Kollam	Chittumala	Safe	Improved
8.	Malappuram	Kodotty	Semi Critical	Malappuram	Kondotty	Safe	Improved
9.	Palakkad	Thirthala	Semi Critical	Palakkad	Thrithala	Safe	Improved
10.	Thiruvananthapuram	Nedumangad	Semi Critical	Thiruvananthapuram	Nedumangad	Safe	Improved
11.	Thrissur	Thalikkulam	Semi Critical	Thrissur	Thalikkulam	Safe	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Kannur	Kannur	Safe	Kannur	Kannur	Semi Critical	Deteriorated
2.	Kannur	Thalassery	Safe	Kannur	Thalassery	Semi Critical	Deteriorated
3.	Kollam	Mukhathala	Safe	Kollam	Mukhathala	Semi Critical	Deteriorated
4.	Malappuram	Tanur	Safe	Malappuram	Tanur	Semi Critical	Deteriorated
5.	Thiruvananthapuram	Chirayinkil	Safe	Thiruvananthapuram	Chirayinkil	Semi Critical	Deteriorated
6.	Thrissur	Chowannur	Safe	Thrissur	Chowannur	Semi Critical	Deteriorated

9. Madhya Pradesh

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Bhopal	Barasia	Semi Critical	Bhopal	Barasia	Safe	Improved
2.	Datia	Datia	Semi Critical	Datia	Datia	Safe	Improved
3.	Guna	Guna	Semi Critical	Guna	Guna	Safe	Improved
4.	Jabalpur	Shahpura	Semi Critical	Jabalpur	Shahpura	Safe	Improved
5.	Morena	Kailaras	Semi Critical	Morena	Kailaras	Safe	Improved
6.	Morena	Sabalgarh	Semi Critical	Morena	Sabalgarh	Safe	Improved
7.	Narsinghpur	Chanwarpatha	Semi Critical	Narsinghpur	Chanwarpatha	Safe	Improved
8.	Narsinghpur	Kareli	Semi Critical	Narsinghpur	Kareli	Safe	Improved
9.	Narsinghpur	Narsinghpur	Critical	Narsinghpur	Narsinghpur	Semi Critical	Improved
10.	Rewa	Gangao	Semi Critical	Rewa	Gangao	Safe	Improved
11.	Satna	Amarpatan	Critical	Satna	Amarpatan	Semi Critical	Improved
12.	Sagar	Sagar	Semi Critical	Sagar	Sagar	Safe	Improved
13.	Shajapur	Agar	Critical	Agar	Agar	Semi Critical	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Barwani	Rajpur	Semi Critical	Barwani	Rajpur	Over Exploited	Deteriorated
2.	Neemuch	Neemuch	Semi Critical	Neemuch	Neemuch	Critical	Deteriorated

10. Maharashtra

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Ahmednagar	Shrirampur	Semi Critical	Ahmednagar	Shrirampur	Safe	Improved
2.	Amravati	Morshi	Over Exploited	Amravati	Morshi	Semi Critical	Improved
3.	Jalgaon	Chopda	Semi Critical	Jalgaon	Chopda	Safe	Improved
4.	Nashik	Deola	Over Exploited	Nashik	Deola	Semi Critical	Improved
5.	Sangli	Miraj	Over Exploited	Sangli	Miraj	Semi Critical	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Ahmednagar	Sangamner	Semi Critical	Ahmednagar	Sangamner	Over Exploited	Deteriorated
2.	Ahmednagar	Shrigonda	Safe	Ahmednagar	Shrigonda	Semi Critical	Deteriorated
3.	Amravati	Chandur Bazar	Critical	Amravati	Chandur Bazar	Over Exploited	Deteriorated
4.	Osmanabad	Osmanabad	Safe	Osmanabad	Osmanabad	Semi Critical	Deteriorated
5.	Satara	Khatav	Safe	Satara	Khatav	Semi Critical	Deteriorated

11. Punjab:

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Amritsar	Majitha	Over Exploited	Amritsar	Majitha	Critical	Improved
2.	Bathinda	Nathana	Critical	Bathinda	Nathana	Safe	Improved
3.	Bathinda	Rampura	Critical	Bathinda	Rampura	Safe	Improved
4.	Ferozepur	Guru Har Sahai	Over Exploited	Ferozepur	Guru Har Sahai	Critical	Improved
5.	Gurdaspur	Gurdaspur	Critical	Gurdaspur	Gurdaspur	Semi Critical	Improved
6.	Hoshiarpur	Hazipur	Over Exploited	Hoshiarpur	Hazipur	Safe	Improved
7.	Hoshiarpur	Talwara	Semi Critical	Hoshiarpur	Talwara	Safe	Improved
8.	Mansa	Jhunir	Over Exploited	Mansa	Jhunir	Critical	Improved
9.	Nawan Shahr	Nawan Shahr	Over Exploited	Nawan Shahr	Nawan Shahr	Critical	Improved
10.	Pathankot	Narot Jaimal Singh	Semi Critical	Pathankot	Narot Jaimal Singh	Safe	Improved
11.	Ropar	Chamkaur Sahib	Over Exploited	Ropar	Chamkaur Sahib	Safe	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Hoshiarpur	Hoshiarpur-1	Critical	Hoshiarpur	Hoshiarpur-1	Over-Exploited	Deteriorated
2.	Hoshiarpur	Mukerian	Safe	Hoshiarpur	Mukerian	Semi-Critical	Deteriorated
3.	Ropar	Anandpur Sahib	Safe	Ropar	Anandpur Sahib	Semi-Critical	Deteriorated

12. Rajasthan

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Banswara	Kushalgarh	Semi Critical	Banswara	Kushalgarh	Safe	Improved
2.	Baran	Anta	Over Exploited	Baran	Anta	Semi Critical	Improved
3.	Bikaner	Kolayat	Semi Critical	Bikaner	Kolayat	Safe	Improved
4.	Bundi	K.Patan	Semi Critical	Bundi	Keshorai Patan	Safe	Improved
5.	Bundi	Talera	Over Exploited	Bundi	Talera	Safe	Improved
6.	Churu	Churu	Semi Critical	Churu	Churu	Safe	Improved
7.	Churu	Ratangarh	Semi Critical	Churu	Ratangarh	Safe	Improved
8.	Dholpur	Bari	Critical	Dholpur	Bari	Semi Critical	Improved
9.	Dholpur	Dholpur	Over Exploited	Dholpur	Baseri	Semi Critical	Improved
10.	Dungarpur	Bichhiwara	Semi Critical	Dungarpur	Bichhiwara	Safe	Improved
11.	Dungarpur	Dungarpur	Semi Critical	Dungarpur	Dungarpur	Safe	Improved
12.	Dungarpur	Sagwara	Semi Critical	Dungarpur	Sagwara	Safe	Improved
13.	Jalore	Chitalwana	Over Exploited	Jalore	Chitalwana	Critical	Improved
14.	Jhalawar	Manohar Thana	Over Exploited	Jhalawar	Manohar Thana	Semi Critical	Improved
15.	Jhalawar	Pirawa	Over Exploited	Jhalawar	Pirawa	Semi Critical	Improved
16.	Jhalawar	Bakani	Over Exploited	Jhalawar	Bakani	Semi Critical	Improved
17.	Jhalawar	Dag	Over Exploited	Jhalawar	Dag	Safe	Improved
18.	Jhalawar	Jhalrapatan	Over Exploited	Jhalawar	Jhalrapatan	Semi Critical	Improved
19.	Jodhpur	Luni	Semi Critical	Jodhpur	Luni	Safe	Improved
20.	Karauli	Nadauti	Critical	Karauli	Nadoti	Safe	Improved
21.	Pali	Pali	Semi Critical	Pali	Pali	Safe	Improved
22.	Pali	Rohat	Critical	Pali	Rohat	Semi Critical	Improved
23.	Pali	Sumerpur	Critical	Pali	Sumerpur	Semi Critical	Improved
24.	Rajsamand	Deogarh	Over Exploited	Rajsamand	Deogarh	Semi Critical	Improved
25.	Rajsamand	Khamnor	Over Exploited	Rajsamand	Khamnor	Semi Critical	Improved
26.	Rajsamand	Kumbhalgarh	Over Exploited	Rajsamand	Kumbhalgarh	Semi Critical	Improved
27.	Sirohi	Abu Road	Critical	Sirohi	Abu Road	Semi Critical	Improved
28.	Sirohi	Pindwara	Critical	Sirohi	Pindwara	Semi Critical	Improved
29.	Tonk	Todaraisingh	Semi Critical	Tonk	Todaraisingh	Safe	Improved
30.	Tonk	Tonk	Semi Critical	Tonk	Tonk	Safe	Improved
31.	Tonk	Deoli	Critical	Tonk	Deoli	Safe	Improved
32.	Udaipur	Kotra	Semi Critical	Udaipur	Kotra	Safe	Improved
33.	Udaipur	Lasadiya	Critical	Udaipur	Lasadiya	Semi Critical	Improved

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
34.	Udaipur	Jhadol	Critical	Udaipur	Jhadol	Semi Critical	Improved
35.	Udaipur	Kherwara	Critical	Udaipur	Kherwara	Semi Critical	Improved
36.	Udaipur	Salumber	Critical	Udaipur	Salumbar	Semi Critical	Improved
37.	Udaipur	Sarada	Critical	Udaipur	Sarada	Semi Critical	Improved
38.	Udaipur	Girwa	Over Exploited	Udaipur	Girwa	Semi Critical	Improved
39.	Udaipur	Gogunda	Over Exploited	Udaipur	Gogunda	Semi Critical	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Baran	Shahbad	Safe	Baran	Shahbad	Semi Critical	Deteriorated
2.	Barmer	Sindhri	Critical	Barmer	Sindhari	Over Exploited	Deteriorated
3.	Bharatpur	Bayana	Critical	Bharatpur	Bayana	Over Exploited	Deteriorated
4.	Bharatpur	Kama	Critical	Bharatpur	Kaman	Over Exploited	Deteriorated
5.	Jaipur	Phagi	Semi Critical	Jaipur	Phagi	Critical	Deteriorated
6.	Jaisalmer	Sam	Critical	Jaisalmer	Sam	Over Exploited	Deteriorated
7.	Jhalawar	Khanpur	Critical	Jhalawar	Khanpur	Over Exploited	Deteriorated
8.	Karauli	Karauli	Critical	Karauli	Karauli	Over Exploited	Deteriorated
9.	Kota	Itawa	Semi Critical	Kota	Itawa	Critical	Deteriorated

13. Tamil Nadu

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Ariyalur	Suthamalli	Over Exploited	Ariyalur	Suthamalli	Semi Critical	Improved
2.	Coimbatore	Perur	Over Exploited	Coimbatore	Perur	Semi Critical	Improved
3.	Cuddalore	Manjakkuppam	Critical	Cuddalore	Manjakkuppam	Semi Critical	Improved
4.	Cuddalore	Pennadam	Over Exploited	Cuddalore	Pennadam	Critical	Improved
5.	Cuddalore	Sirupakkam	Critical	Cuddalore	Sirupakkam	Semi Critical	Improved
6.	Cuddalore	Thozhudur	Semi Critical	Cuddalore	Thozhudur	Safe	Improved
7.	Cuddalore	Veppur	Semi Critical	Cuddalore	Veppur	Safe	Improved
8.	Cuddalore	Virudhachalam (N)	Semi Critical	Cuddalore	Virudhachalam (N)	Safe	Improved
9.	Dindigul	Thoppampatti	Over Exploited	Dindigul	Thoppampatti	Critical	Improved
10.	Erode	Poondurai	Semi Critical	Erode	Poondurai	Safe	Improved
11.	Erode	Sivagiri	Semi Critical	Erode	Sivagiri	Safe	Improved
12.	Kancheepuram	Chittiambakkam	Critical	Kancheepuram	Chittiambakkam	Safe	Improved
13.	Kancheepuram	Jameenendathur	Critical	Kancheepuram	Jameenendathur	Semi Critical	Improved
14.	Kancheepuram	Orathi	Over Exploited	Kancheepuram	Orathi	Critical	Improved
15.	Kancheepuram	Pallur	Critical	Kancheepuram	Pallur	Safe	Improved
16.	Kancheepuram	Thiruppu Kuzhi	Over Exploited	Kancheepuram	Thiruppu Kuzhi	Critical	Improved
17.	Karur	Chinthalavadi	Semi Critical	Karur	Chinthalavadi	Safe	Improved
18.	Karur	Pugalur	Over Exploited	Karur	Pugalur	Critical	Improved
19.	Krishnagiri	Bagalur	Semi Critical	Krishnagiri	Bagalur	Safe	Improved
20.	Krishnagiri	Kaveripattinam	Semi Critical	Krishnagiri	Kaveripattinam	Safe	Improved
21.	Krishnagiri	Kelamangalam	Semi Critical	Krishnagiri	Kelamangalam	Safe	Improved
22.	Madurai	Sivarakkottai	Semi Critical	Madurai	Sivarakkottai	Safe	Improved
23.	Nagapattinam	Thirukannapuram	Semi Critical	Nagapattinam	Thirukannapuram	Safe	Improved
24.	Pudukottai	Keeramangalam	Critical	Pudukottai	Keeramangalam	Semi Critical	Improved
25.	Ramanathapuram	Aappanur	Saline	Ramanathapuram	Aappanur	Safe	Improved
26.	Ramanathapuram	Keelakkarai	Saline	Ramanathapuram	Keelakkarai	Safe	Improved
27.	Salem	Patchamalai	Semi Critical	Salem	Patchamalai	Safe	Improved
28.	Salem	Poolampatti	Over Exploited	Salem	Poolampatti	Critical	Improved
29.	Salem	Suramangalam	Over Exploited	Salem	Suramangalam	Critical	Improved
30.	Thanjavur	Adirampattinam	Over Exploited	Thanjavur	Adirampattinam	Semi Critical	Improved
31.	Thanjavur	Andikkadu	Saline	Thanjavur	Andikkadu	Semi Critical	Improved
32.	Thanjavur	Kabisthalam	Over Exploited	Thanjavur	Kabisthalam	Critical	Improved
33.	Thanjavur	Kuruchi	Over Exploited	Thanjavur	Kuruchi	Semi Critical	Improved

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
34.	Thanjavur	Nambivayal	Over Exploited	Thanjavur	Nambivayal	Semi Critical	Improved
35.	Thanjavur	Pattukkottai	Over Exploited	Thanjavur	Pattukkottai	Critical	Improved
36.	Thanjavur	Peravurani	Semi Critical	Thanjavur	Peravurani	Safe	Improved
37.	Thanjavur	Thanjavur	Over Exploited	Thanjavur	Thanjavur	Critical	Improved
38.	Thanjavur	Thirumangalakottai	Over Exploited	Thanjavur	Thirumangalakottai	Critical	Improved
39.	Thanjavur	Vallam	Saline	Thanjavur	Vallam	Over Exploited	Improved
40.	Theni	Cumbam	Semi Critical	Theni	Cumbam	Safe	Improved
41.	Theni	Kodangipatti	Semi Critical	Theni	Kodangipatti	Safe	Improved
42.	Theni	Mayladumparai	Semi Critical	Theni	Mayladumparai	Safe	Improved
43.	Theni	Rajathani	Over Exploited	Theni	Rajathani	Critical	Improved
44.	Theni	Rasingapuram	Semi Critical	Theni	Rasingapuram	Safe	Improved
45.	Thirunelveli	Panagudi	Semi Critical	Thirunelveli	Panagudi	Safe	Improved
46.	Thirunelveli	Radhapuram	Over Exploited	Thirunelveli	Radhapuram	Critical	Improved
47.	Thirunelveli	Tisayanvilai	Over Exploited	Thirunelveli	Tisayanvilai	Semi Critical	Improved
48.	Thirunelveli	Valliyoor	Semi Critical	Thirunelveli	Valliyoor	Safe	Improved
49.	Thiruvallur	Ammanambakkam	Critical	Thiruvallur	Ammanambakkam	Semi Critical	Improved
50.	Thiruvallur	Arani	Semi Critical	Thiruvallur	Arani	Safe	Improved
51.	Thiruvallur	Avadi	Over Exploited	Thiruvallur	Avadi	Semi Critical	Improved
52.	Thiruvallur	Balapuram	Over Exploited	Thiruvallur	Balapuram	Critical	Improved
53.	Thiruvallur	Erumbi	Over Exploited	Thiruvallur	Erumbi	Critical	Improved
54.	Thiruvallur	Kadambathur	Over Exploited	Thiruvallur	Kadambathur	Critical	Improved
55.	Thiruvallur	Kannigaipair	Over Exploited	Thiruvallur	Kannigaipair	Critical	Improved
56.	Thiruvallur	Mappedu	Over Exploited	Thiruvallur	Mappedu	Critical	Improved
57.	Thiruvallur	Pallipattu	Over Exploited	Thiruvallur	Pallipattu	Semi Critical	Improved
58.	Thiruvallur	Redhills	Semi Critical	Thiruvallur	Redhills	Safe	Improved
59.	Thiruvallur	Thiruninravur	Over Exploited	Thiruvallur	Thiruninravur	Critical	Improved
60.	Thiruvarur	Nannilam	Critical	Thiruvarur	Nannilam	Semi Critical	Improved
61.	Thoothukudi	Kovilpatti	Semi Critical	Thoothukudi	Kovilpatti	Safe	Improved
62.	Thoothukudi	Ottapidaram	Over Exploited	Thoothukudi	Ottapidaram	Semi Critical	Improved
63.	Thoothukudi	Sattankulam	Over Exploited	Thoothukudi	Sattankulam	Semi Critical	Improved
64.	Tiruchy	Manapparai	Over Exploited	Tiruchy	Manapparai	Critical	Improved
65.	Tiruchy	Pannappatti	Over Exploited	Tiruchy	Pannappatti	Critical	Improved
66.	Tiruchy	Sengattuppatti	Over Exploited	Tiruchy	Sengattuppatti	Critical	Improved
67.	Tiruchy	V.Periyapatti	Over Exploited	Tiruchy	V.Periyapatti	Critical	Improved
68.	Tiruppur	Cheyur	Over Exploited	Tiruppur	Cheyur	Critical	Improved
69.	Tiruppur	Madathukulam	Semi Critical	Tiruppur	Madathukulam	Safe	Improved
70.	Tiruppur	Tiruppur (N)	Over Exploited	Tiruppur	Tiruppur (N)	Critical	Improved

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
71.	Vellore	Melasannankuppam	Over Exploited	Vellore	Melasannankuppam	Critical	Improved
72.	Vellore	Melpatti	Over Exploited	Vellore	Melpatti	Critical	Improved
73.	Vellore	Walajah	Critical	Vellore	Walajah	Semi Critical	Improved
74.	Villupuram	Kanjanur	Over Exploited	Villupuram	Kanjanur	Critical	Improved
75.	Villupuram	Mailam	Critical	Villupuram	Mailam	Semi Critical	Improved
76.	Villupuram	Rishivandhiyam	Semi Critical	Villupuram	Rishivandhiyam	Safe	Improved
77.	Villupuram	Vanur	Over Exploited	Villupuram	Vanur	Critical	Improved
78.	Virudhunagar	Elayiram- Pannai	Critical	Virudhunagar	Elayiram- Pannai	Semi Critical	Improved
79.	Virudhunagar	Mandapasalai	Semi Critical	Virudhunagar	Mandapasalai	Safe	Improved
80.	Virudhunagar	Rajapalayam	Over Exploited	Virudhunagar	Rajapalayam	Semi Critical	Improved
81.	Virudhunagar	Sivakasi	Critical	Virudhunagar	Sivakasi	Semi Critical	Improved
82.	Virudhunagar	Vatchakara-Patti	Over Exploited	Virudhunagar	Vatchakara-Patti	Critical	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Coimbatore	Annur(S)	Semi Critical	Coimbatore	Annur(S)	Critical	Deteriorated
2.	Coimbatore	Ottakkal Mandabam	Critical	Coimbatore	Ottakkal Mandabam	Over Exploited	Deteriorated
3.	Coimbatore	Sarkar Samakulam	Semi Critical	Coimbatore	Sarkar Samakulam	Critical	Deteriorated
4.	Dharmapuri	Morappur	Semi Critical	Dharmapuri	Morappur	Critical	Deteriorated
5.	Dharmapuri	Nallampalli	Semi Critical	Dharmapuri	Nallampalli	Critical	Deteriorated
6.	Dharmapuri	Pappireddipatty	Semi Critical	Dharmapuri	Pappireddipatty	Critical	Deteriorated
7.	Dindigul	Ayyalur	Semi Critical	Dindigul	Ayyalur	Over Exploited	Deteriorated
8.	Dindigul	Dharmathupatti	Semi Critical	Dindigul	Dharmathupatti	Critical	Deteriorated
9.	Dindigul	Dindigul South	Semi Critical	Dindigul	Dindigul South	Critical	Deteriorated
10.	Erode	Ammapettai	Semi Critical	Erode	Ammapettai	Critical	Deteriorated
11.	Erode	Anthiyur	Semi Critical	Erode	Anthiyur	Over Exploited	Deteriorated
12.	Erode	Arachalur	Semi Critical	Erode	Arachalur	Critical	Deteriorated
13.	Erode	Arasur	Semi Critical	Erode	Arasur	Critical	Deteriorated
14.	Erode	Erode West	Semi Critical	Erode	Erode West	Critical	Deteriorated
15.	Kancheepuram	Arumpuliyur	Semi Critical	Kancheepuram	Arumpuliyur	Critical	Deteriorated
16.	Kancheepuram	Mangadu	Semi Critical	Kancheepuram	Mangadu	Critical	Deteriorated
17.	Kancheepuram	Nerumbur	Semi Critical	Kancheepuram	Nerumbur	Critical	Deteriorated
18.	Kancheepuram	Perumpakkam	Safe	Kancheepuram	Perumpakkam	Semi Critical	Deteriorated

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
19.	Kanniyakumari	Rajakkamangalam	Safe	Kanniyakumari	Rajakkamangalam	Semi Critical	Deteriorated
20.	Karur	Panjapatti	Semi Critical	Karur	Panjapatti	Over Exploited	Deteriorated
21.	Karur	Thalapatti	Semi Critical	Karur	Thalapatti	Critical	Deteriorated
22.	Karur	Thogaimalai	Semi Critical	Karur	Thogaimalai	Over Exploited	Deteriorated
23.	Krishnagiri	Hosur	Semi Critical	Krishnagiri	Hosur	Critical	Deteriorated
24.	Krishnagiri	Mathigiri	Safe	Krishnagiri	Mathigiri	Semi Critical	Deteriorated
25.	Madurai	A.Vellalapatti	Safe	Madurai	A.Vellalapatti	Over Exploited	Deteriorated
26.	Madurai	Kalligudi	Safe	Madurai	Kalligudi	Semi Critical	Deteriorated
27.	Madurai	Kokkulam	Semi Critical	Madurai	Kokkulam	Critical	Deteriorated
28.	Madurai	Kottampatti	Semi Critical	Madurai	Kottampatti	Critical	Deteriorated
29.	Madurai	Madurai West	Semi Critical	Madurai	Madurai West	Critical	Deteriorated
30.	Madurai	Neerathan	Safe	Madurai	Neerathan	Semi Critical	Deteriorated
31.	Madurai	Pannikkundu	Safe	Madurai	Pannikkundu	Semi Critical	Deteriorated
32.	Madurai	**Sindhupatti**	Semi Critical	Madurai	Sindhupatti	Critical	Deteriorated
33.	Madurai	Thenkarai	Safe	Madurai	Thenkarai	Semi Critical	Deteriorated
34.	Madurai	Valanthur	Safe	Madurai	Valanthur	Semi Critical	Deteriorated
35.	Nagapattinam	Sirkali	Critical	Nagapattinam	Sirkali	Over Exploited	Deteriorated
36.	Namakkal	Alanganatham	Semi Critical	Namakkal	Alanganatham	Over Exploited	Deteriorated
37.	Namakkal	Elachipalayam	Safe	Namakkal	Elachipalayam	Critical	Deteriorated
38.	Namakkal	Pallapatti	Semi Critical	Namakkal	Pallapatti	Critical	Deteriorated
39.	Namakkal	Pandamangalam	Semi Critical	Namakkal	Pandamangalam	Over Exploited	Deteriorated
40.	Perambalur	Keelapuliyur	Semi Critical	Perambalur	Keelapuliyur	Over Exploited	Deteriorated
41.	Perambalur	Vengalam	Semi Critical	Perambalur	Vengalam	Over Exploited	Deteriorated
42.	Pudukottai	Karaiyur	Safe	Pudukottai	Karaiyur	Semi Critical	Deteriorated
43.	Pudukottai	Viralimalai	Safe	Pudukottai	Viralimalai	Semi Critical	Deteriorated
44.	Ramanathapuram	Mangalakudi	Safe	Ramanathapuram	Mangalakudi	Saline	Deteriorated
45.	Ramanathapuram	Perunkulam	Safe	Ramanathapuram	Perunkulam	Semi Critical	Deteriorated
46.	Ramanathapuram	Thondi	Safe	Ramanathapuram	Thondi	Saline	Deteriorated
47.	Salem	Belur	Safe	Salem	Belur	Semi Critical	Deteriorated
48.	Salem	Mettur	Safe	Salem	Mettur	Semi Critical	Deteriorated
49.	Thanjavur	Perambur	Safe	Thanjavur	Perambur	Semi Critical	Deteriorated
50.	Thanjavur	Thambikkottai	Safe	Thanjavur	Thambikkottai	Semi Critical	Deteriorated
51.	Thanjavur	Thirukkattupalli	Semi Critical	Thanjavur	Thirukkattupalli	Critical	Deteriorated
52.	Thanjavur	Thuvarankurichi	Semi Critical	Thanjavur	Thuvarankurichi	Over Exploited	Deteriorated
53.	Thirunelveli	Alankulam	Safe	Thirunelveli	Alankulam	Semi Critical	Deteriorated
54.	Thirunelveli	Kadayanallur	Safe	Thirunelveli	Kadayanallur	Semi Critical	Deteriorated
55.	Thirunelveli	Keezhapavoor	Semi Critical	Thirunelveli	Keezhapavoor	Over Exploited	Deteriorated

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
56.	Thirunelveli	Manur	Safe	Thirunelveli	Manur	Semi Critical	Deteriorated
57.	Thirunelveli	Nettur	Critical	Thirunelveli	Nettur	Over Exploited	Deteriorated
58.	Thirunelveli	Puliyankudi	Semi Critical	Thirunelveli	Puliyankudi	Critical	Deteriorated
59.	Thirunelveli	Sivanthipatti	Safe	Thirunelveli	Sivanthipatti	Semi Critical	Deteriorated
60.	Thirunelveli	Thalaiyuthu	Safe	Thirunelveli	Thalaiyuthu	Semi Critical	Deteriorated
61.	Thirunelveli	Thiruvengadem	Semi Critical	Thirunelveli	Thiruvengadem	Critical	Deteriorated
62.	Thirunelveli	Venkadampatti	Semi Critical	Thirunelveli	Venkadampatti	Critical	Deteriorated
63.	Thiruvallur	Gummidipoondi	Safe	Thiruvallur	Gummidipoondi	Critical	Deteriorated
64.	Thiruvallur	Morai	Safe	Thiruvallur	Morai	Semi Critical	Deteriorated
65.	Thiruvallur	Velakapuram	Safe	Thiruvallur	Velakapuram	Semi Critical	Deteriorated
66.	Thiruvannamalai	Agrapalayam	Safe	Thiruvannamalai	Agrapalayam	Semi Critical	Deteriorated
67.	Thiruvannamalai	Chennavaram	Semi Critical	Thiruvannamalai	Chennavaram	Critical	Deteriorated
68.	Thiruvannamalai	Desur	Semi Critical	Thiruvannamalai	Desur	Critical	Deteriorated
69.	Thiruvannamalai	Eraiyur	Semi Critical	Thiruvannamalai	Eraiyur	Critical	Deteriorated
70.	Thiruvannamalai	Kannamangalam	Safe	Thiruvannamalai	Kannamangalam	Semi Critical	Deteriorated
71.	Thiruvannamalai	Kelur	Semi Critical	Thiruvannamalai	Kelur	Critical	Deteriorated
72.	Thiruvannamalai	Kilkodungalur	Semi Critical	Thiruvannamalai	Kilkodungalur	Critical	Deteriorated
73.	Thiruvannamalai	Kolappalur	Semi Critical	Thiruvannamalai	Kolappalur	Critical	Deteriorated
74.	Thiruvannamalai	Malaiyur	Critical	Thiruvannamalai	Malaiyur	Over Exploited	Deteriorated
75.	Thiruvannamalai	Mangalam	Safe	Thiruvannamalai	Mangalam	Semi Critical	Deteriorated
76.	Thiruvannamalai	Mullipattu	Safe	Thiruvannamalai	Mullipattu	Semi Critical	Deteriorated
77.	Thiruvannamalai	Nateri	Safe	Thiruvannamalai	Nateri	Semi Critical	Deteriorated
78.	Thiruvannamalai	Nedungunam	Semi Critical	Thiruvannamalai	Nedungunam	Critical	Deteriorated
79.	Thiruvannamalai	Osur	Critical	Thiruvannamalai	Osur	Over Exploited	Deteriorated
80.	Thiruvannamalai	Pachal	Critical	Thiruvannamalai	Pachal	Over Exploited	Deteriorated
81.	Thiruvannamalai	Peranamallur	Semi Critical	Thiruvannamalai	Peranamallur	Critical	Deteriorated
82.	Thiruvannamalai	Pudupalayam	Semi Critical	Thiruvannamalai	Pudupalayam	Over Exploited	Deteriorated
83.	Thiruvannamalai	Santhavasal	Semi Critical	Thiruvannamalai	Santhavasal	Critical	Deteriorated
84.	Thiruvannamalai	Thachambadi	Semi Critical	Thiruvannamalai	Thachambadi	Critical	Deteriorated
85.	Thiruvannamalai	Thellar	Safe	Thiruvannamalai	Thellar	Semi Critical	Deteriorated
86.	Thiruvannamalai	Thethurai	Safe	Thiruvannamalai	Thethurai	Semi Critical	Deteriorated
87.	Thiruvannamalai	Vanapuram	Semi Critical	Thiruvannamalai	Vanapuram	Critical	Deteriorated
88.	Thiruvannamalai	Vandavasi	Semi Critical	Thiruvannamalai	Vandavasi	Over Exploited	Deteriorated
89.	Thiruvannamalai	Vinnamangalam	Safe	Thiruvannamalai	Vinnamangalam	Semi Critical	Deteriorated
90.	Tiruchy	Eragudi	Semi Critical	Tiruchy	Eragudi	Critical	Deteriorated
91.	Tiruchy	Kattuputhur	Semi Critical	Tiruchy	Kattuputhur	Over Exploited	Deteriorated
92.	Tiruchy	Sirugambur	Safe	Tiruchy	Sirugambur	Semi Critical	Deteriorated

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
93.	Tiruchy	Thottiyam	Semi Critical	Tiruchy	Thottiyam	Critical	Deteriorated
94.	Tiruchy	Thuvarangurichi	Semi Critical	Tiruchy	Thuvarangurichi	Over Exploited	Deteriorated
95.	Tiruppur	Kurichikottai	Safe	Tiruppur	Kurichikottai	Semi Critical	Deteriorated
96.	Tiruppur	Nathakadaiyur	Semi Critical	Tiruppur	Nathakadaiyur	Critical	Deteriorated
97.	Vellore	Agaram	Semi Critical	Vellore	Agaram	Critical	Deteriorated
98.	Vellore	Alangayam	Semi Critical	Vellore	Alangayam	Critical	Deteriorated
99.	Vellore	Kandhili	Semi Critical	Vellore	Kandhili	Critical	Deteriorated
100.	Vellore	Kaniyambadi	Semi Critical	Vellore	Kaniyambadi	Critical	Deteriorated
101.	Vellore	Mambakkam	Safe	Vellore	Mambakkam	Semi Critical	Deteriorated
102.	Vellore	Odugathur	Semi Critical	Vellore	Odugathur	Critical	Deteriorated
103.	Vellore	Pennathur	Critical	Vellore	Pennathur	Over Exploited	Deteriorated
104.	Villupuram	Kalvarayan Malai	Safe	Villupuram	Kalvarayan Malai	Semi Critical	Deteriorated
105.	Villupuram	Mugaiyur	Safe	Villupuram	Mugaiyur	Semi Critical	Deteriorated
106.	Villupuram	Villupuram	Semi Critical	Villupuram	Villupuram	Critical	Deteriorated
107.	Virudhunagar	Ethirkottai	Critical	Virudhunagar	Ethirkottai	Over Exploited	Deteriorated
108.	Virudhunagar	Pillaiyarkulam	Critical	Virudhunagar	Pillaiyarkulam	Over Exploited	Deteriorated

14. Telangana

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Adilabad	Dandepalli	Semi Critical	Adilabad	Dandepalli	Safe	Improved
2.	Adilabad	Luxettipet	Semi Critical	Adilabad	Luxettipet	Safe	Improved
3.	Medak	Chegunta	Critical	Medak	Chegunta	Semi Critical	Improved
4.	Medak	Kalher	Over Exploited	Medak	Kalher	Semi Critical	Improved
5.	Medak	Kowdipally	Semi Critical	Medak	Kowdipally	Safe	Improved
6.	Medak	Kulcharam	Semi Critical	Medak	Kulcharam	Safe	Improved
7.	Medak	Mulugu	Over Exploited	Medak	Mulugu	Critical	Improved
8.	Medak	Narsapur	Over Exploited	Medak	Narsapur	Critical	Improved
9.	Medak	Shivampet	Semi Critical	Medak	Shivampet	Safe	Improved
10.	Medak	Tekmal	Semi Critical	Medak	Tekmal	Safe	Improved
11.	Nalgonda	Alair	Semi Critical	Nalgonda	Alair	Safe	Improved
12.	Nalgonda	Jajireddi gudem	Semi Critical	Nalgonda	Jajireddi gudem	Safe	Improved
13.	Nalgonda	Kethepalle	Semi Critical	Nalgonda	Kethepalle	Safe	Improved
14.	Nalgonda	Rajapet	Semi Critical	Nalgonda	Rajapet	Safe	Improved
15.	Nalgonda	Suryapet	Semi Critical	Nalgonda	Suryapet	Safe	Improved
16.	Nalgonda	Valigonda	Semi Critical	Nalgonda	Valigonda	Safe	Improved
17.	Nizamabad	Armoor	Semi Critical	Nizamabad	Armoor	Safe	Improved
18.	Nizamabad	Balkonda	Semi Critical	Nizamabad	Balkonda	Safe	Improved
19.	Nizamabad	Bheemgal	Semi Critical	Nizamabad	Bheemgal	Safe	Improved
20.	Nizamabad	Jakranpally	Critical	Nizamabad	Jakranpally	Safe	Improved
21.	Nizamabad	Makloor	Semi Critical	Nizamabad	Makloor	Safe	Improved
22.	Nizamabad	Nandipet	Semi Critical	Nizamabad	Nandipet	Safe	Improved
23.	Nizamabad	Sadashivanagar	Over Exploited	Nizamabad	Sadashivanagar	Critical	Improved
24.	Ranga Reddy	Pargi	Semi Critical	Ranga Reddy	Pargi	Safe	Improved
25.	Ranga Reddy	Yacharam	Semi Critical	Ranga Reddy	Yacharam	Safe	Improved
26.	Warangal	Mogullapally	Critical	Warangal	Mogullapally	Semi Critical	Improved
27.	Warangal	Rayaparthy	Over Exploited	Warangal	Rayaparthy	Critical	Improved

Deteriorated Assessment Units

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Adilabad	Chennur	Semi Critical	Adilabad	Chennur	Critical	Deteriorated
2.	Adilabad	Laxmanchanda	Semi Critical	Adilabad	Laxmanchanda	Over Exploited	Deteriorated
3.	Karimnagar	Bejjanki	Safe	Karimnagar	Bejjanki	Critical	Deteriorated
4.	Karimnagar	Eligadu	Safe	Karimnagar	Eligadu	Semi Critical	Deteriorated
5.	Karimnagar	Ellanthakunta	Safe	Karimnagar	Ellanthakunta	Critical	Deteriorated
6.	Karimnagar	Gollapalle	Safe	Karimnagar	Gollapalle	Critical	Deteriorated
7.	Karimnagar	Korutla	Safe	Karimnagar	Korutla	Semi Critical	Deteriorated
8.	Karimnagar	Malhar Rao_Tadicharla	Safe	Karimnagar	Malhar Rao_Tadicharla	Semi Critical	Deteriorated
9.	Karimnagar	Mallapur	Safe	Karimnagar	Mallapur	Critical	Deteriorated
10.	Karimnagar	Manakondur	Safe	Karimnagar	Manakondur	Semi Critical	Deteriorated
11.	Karimnagar	Saidapur	Safe	Karimnagar	Saidapur	Semi Critical	Deteriorated
12.	Karimnagar	Timmapur_Lmd Colony	Safe	Karimnagar	Timmapur_Lmd Colony	Semi Critical	Deteriorated
13.	Karimnagar	Veenavanka	Safe	Karimnagar	Veenavanka	Semi Critical	Deteriorated
14.	Karimnagar	Vemulawada	Safe	Karimnagar	Vemulawada	Semi Critical	Deteriorated
15.	Mehboobnagar	Addakal	Safe	Mehboobnagar	Addakal	Critical	Deteriorated
16.	Mehboobnagar	Amangal	Safe	Mehboobnagar	Amangal	Semi Critical	Deteriorated
17.	Mehboobnagar	Balanagar	Safe	Mehboobnagar	Balanagar	Semi Critical	Deteriorated
18.	Mehboobnagar	Bijinapalle	Safe	Mehboobnagar	Bijinapalle	Semi Critical	Deteriorated
19.	Mehboobnagar	Bomraspeta	Safe	Mehboobnagar	Bomraspeta	Semi Critical	Deteriorated
20.	Mehboobnagar	Dhanwada	Safe	Mehboobnagar	Dhanwada	Semi Critical	Deteriorated
21.	Mehboobnagar	Doulatabad	Safe	Mehboobnagar	Doulatabad	Semi Critical	Deteriorated
22.	Mehboobnagar	Jadcherla	Safe	Mehboobnagar	Jadcherla	Semi Critical	Deteriorated
23.	Mehboobnagar	Keshampeta	Semi Critical	Mehboobnagar	Keshampeta	Critical	Deteriorated
24.	Mehboobnagar	Koilkonda	Safe	Mehboobnagar	Koilkonda	Semi Critical	Deteriorated
25.	Mehboobnagar	Kondurg	Safe	Mehboobnagar	Kondurg	Semi Critical	Deteriorated
26.	Mehboobnagar	Kothur	Safe	Mehboobnagar	Kothur	Semi Critical	Deteriorated
27.	Mehboobnagar	Maddur	Safe	Mehboobnagar	Maddur	Semi Critical	Deteriorated
28.	Mehboobnagar	Midjil	Critical	Mehboobnagar	Midjil	Over Exploited	Deteriorated
29.	Mehboobnagar	Nawabpet	Safe	Mehboobnagar	Nawabpet	Semi Critical	Deteriorated
30.	Mehboobnagar	Shadnagar	Safe	Mehboobnagar	Shadnagar	Semi Critical	Deteriorated
31.	Mehboobnagar	Tadoor	Safe	Mehboobnagar	Tadoor	Semi Critical	Deteriorated
32.	Mehboobnagar	Talakondapalle	Safe	Mehboobnagar	Talakondapalle	Semi Critical	Deteriorated
33.	Mehboobnagar	Thimmajipeta	Safe	Mehboobnagar	Thimmajipeta	Semi Critical	Deteriorated
34.	Mehboobnagar	Uppununthala	Safe	Mehboobnagar	Uppununthala	Semi Critical	Deteriorated
35.	Mehboobnagar	Wanaparthy	Safe	Mehboobnagar	Wanaparthy	Semi Critical	Deteriorated

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
36.	Medak	RC Puram	Safe	Medak	RC Puram	Semi Critical	Deteriorated
37.	Medak	Zaheerabad	Safe	Medak	Zaheerabad	Semi Critical	Deteriorated
38.	Nalgonda	Atmakur (s)	Safe	Nalgonda	Atmakur (s)	Critical	Deteriorated
39.	Nalgonda	Bhongir	Safe	Nalgonda	Bhongir	Semi Critical	Deteriorated
40.	Nalgonda	Bibinagar	Safe	Nalgonda	Bibinagar	Semi Critical	Deteriorated
41.	Nalgonda	Chandur	Critical	Nalgonda	Chandur	Over Exploited	Deteriorated
42.	Nalgonda	Chintha palle	Safe	Nalgonda	Chintha palle	Semi Critical	Deteriorated
43.	Nalgonda	Chityala	Safe	Nalgonda	Chityala	Critical	Deteriorated
44.	Nalgonda	Gundala	Safe	Nalgonda	Gundala	Over Exploited	Deteriorated
45.	Nalgonda	Gurram pode	Safe	Nalgonda	Gurram pode	Semi Critical	Deteriorated
46.	Nalgonda	Mothey	Semi Critical	Nalgonda	Mothey	Over Exploited	Deteriorated
47.	Nalgonda	Nakrekal	Semi Critical	Nalgonda	Nakrekal	Over Exploited	Deteriorated
48.	Nalgonda	Nampalle	Safe	Nalgonda	Nampalle	Semi Critical	Deteriorated
49.	Nalgonda	Narayanapur	Safe	Nalgonda	Narayanapur	Semi Critical	Deteriorated
50.	Nalgonda	Nuthankal	Safe	Nalgonda	Nuthankal	Semi Critical	Deteriorated
51.	Nalgonda	Sali gouraram	Safe	Nalgonda	Sali gouraram	Semi Critical	Deteriorated
52.	Nalgonda	Thungathurthi	Safe	Nalgonda	Thungathurthi	Semi Critical	Deteriorated
53.	Nizamabad	Biknoor	Safe	Nizamabad	Biknoor	Semi Critical	Deteriorated
54.	Warangal	Atmakur	Safe	Warangal	Atmakur	Semi critical	Deteriorated
55.	Warangal	Dornakal	Safe	Warangal	Dornakal	Semi critical	Deteriorated
56.	Warangal	Hasanparthy	Safe	Warangal	Hasanparthy	Semi critical	Deteriorated
57.	Warangal	Mahabubabad	Safe	Warangal	Mahabubabad	Semi critical	Deteriorated
58.	Warangal	Maripeda	Safe	Warangal	Maripeda	Semi critical	Deteriorated
59.	Warangal	Narsampet	Safe	Warangal	Narsampet	Semi critical	Deteriorated
60.	Warangal	Palakurthy	Safe	Warangal	Palakurthy	Semi critical	Deteriorated
61.	Warangal	Raghunathpally	Critical	Warangal	Raghunathpally	Over Exploited	Deteriorated
62.	Warangal	Sangem	Safe	Warangal	Sangem	Semi critical	Deteriorated
63.	Warangal	Shayampet	Safe	Warangal	Shayampet	Semi critical	Deteriorated

15. Uttar Pradesh

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Agra	Jagner	Critical	Agra	Jagner	Semi Critical	Improved
2.	Aligarh	Khair	Over Exploited	Aligarh	Khair	Safe	Improved
3.	Allahabad	Bahadurpur	Over Exploited	Allahabad	Bahadurpur	Critical	Improved
4.	Allahabad	Holagarh	Over Exploited	Allahabad	Holagarh	Critical	Improved
5.	Allahabad	Urwa	Semi Critical	Allahabad	Urwa	Safe	Improved
6.	Ambedkar Nagar	Bhiti	Semi Critical	Ambedkar Nagar	Bhiti	Safe	Improved
7.	Amethi	Amethi	Semi Critical	Amethi	Amethi	Safe	Improved
8.	Amethi	Bahadurpur	Semi Critical	Amethi	Bahadurpur	Safe	Improved
9.	Amethi	Gauriganj	Semi Critical	Amethi	Gauriganj	Safe	Improved
10.	Amethi	Jagdishpur	Semi Critical	Amethi	Jagdishpur	Safe	Improved
11.	Amethi	Shahgarh	Semi Critical	Amethi	Shahgarh	Safe	Improved
12.	Azamgarh	Azmatgarh	Semi Critical	Azamgarh	Azmatgarh	Safe	Improved
13.	Azamgarh	Mirzapur	Semi Critical	Azamgarh	Mirzapur	Safe	Improved
14.	Azamgarh	Rani Ki Sarai	Semi Critical	Azamgarh	Rani Ki Sarai	Safe	Improved
15.	Azamgarh	Tahabarpur	Semi Critical	Azamgarh	Tahabarpur	Safe	Improved
16.	Baghpat	Baraut	Critical	Baghpat	Baraut	Semi Critical	Improved
17.	Ballia	Rasara	Critical	Ballia	Rasara	Semi Critical	Improved
18.	Banda	Jaspura	Semi Critical	Banda	Jaspura	Safe	Improved
19.	Banda	Tindwari	Critical	Banda	Tindwari	Semi Critical	Improved
20.	Bijnor	Aaku (Nehtaur)	Over Exploited	Bijnor	Aaku (Nehtaur)	Critical	Improved
21.	Budaun	Asafpur	Critical	Budaun	Asafpur	Semi Critical	Improved
22.	Budaun	Islamnagar	Over Exploited	Budaun	Islamnagar	Critical	Improved
23.	Bulandshahar	Agauta	Semi Critical	Bulandshahar	Agauta	Safe	Improved
24.	Bulandshahar	Lakhaoti	Semi Critical	Bulandshahar	Lakhaoti	Safe	Improved
25.	Chitrakoot	Mau	Semi Critical	Chitrakoot	Mau	Safe	Improved
26.	Chitrakoot	Ram Nagar	Semi Critical	Chitrakoot	Ram Nagar	Safe	Improved
27.	Etah	Awagarh	Critical	Etah	Awagarh	Semi Critical	Improved
28.	Etah	Sakeet	Semi Critical	Etah	Sakeet	Safe	Improved
29.	Faizabad	Bikapur	Semi Critical	Faizabad	Bikapur	Safe	Improved
30.	Faizabad	Tarun	Semi Critical	Faizabad	Tarun	Safe	Improved
31.	Fatehpur	Deomai	Semi Critical	Fatehpur	Deomai	Safe	Improved
32.	Fatehpur	Hathgaon	Critical	Fatehpur	Hathgaon	Semi Critical	Improved
33.	Fatehpur	Khajuha	Semi Critical	Fatehpur	Khajuha	Safe	Improved

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
34.	Fatehpur	Malawan	Over Exploited	Fatehpur	Malawan	Critical	Improved
35.	Fatehpur	Teliyani	Over Exploited	Fatehpur	Teliyani	Critical	Improved
36.	Fatehpur	Vijayeepur	Semi Critical	Fatehpur	Vijayeepur	Safe	Improved
37.	Ghazipur	Bhawarkol	Semi Critical	Ghazipur	Bhawarkol	Safe	Improved
38.	Ghazipur	Karanda	Semi Critical	Ghazipur	Karanda	Safe	Improved
39.	Ghazipur	Kasimabad	Semi Critical	Ghazipur	Kasimabad	Safe	Improved
40.	Hamirpur	Sareela	Semi Critical	Hamirpur	Sareela	Safe	Improved
41.	Hamirpur	Sumerpur	Critical	Hamirpur	Sumerpur	Semi Critical	Improved
42.	Hardoi	Ahrauri	Semi Critical	Hardoi	Ahrauri	Safe	Improved
43.	Hardoi	Harpalpur	Semi Critical	Hardoi	Harpalpur	Safe	Improved
44.	Hathras	Sadabad	Critical	Hathras	Sadabad	Semi Critical	Improved
45.	Jaunpur	Barsathi	Critical	Jaunpur	Barsathi	Semi Critical	Improved
46.	Jaunpur	Dharmapur	Critical	Jaunpur	Dharmapur	Semi Critical	Improved
47.	Jaunpur	Jalalpur	Semi Critical	Jaunpur	Jalalpur	Safe	Improved
48.	Jaunpur	Khutahan	Semi Critical	Jaunpur	Khutahan	Safe	Improved
49.	Jhansi	Babina	Semi Critical	Jhansi	Babina	Safe	Improved
50.	Jhansi	Mauranipur	Semi Critical	Jhansi	Mauranipur	Safe	Improved
51.	Kannauj	Gugrapur	Semi Critical	Kannauj	Gugrapur	Safe	Improved
52.	Kannauj	Kannauj	Semi Critical	Kannauj	Kannauj	Safe	Improved
53.	Kanpur Nagar	Chaubeypur	Semi Critical	Kanpur Nagar	Chaubeypur	Safe	Improved
54.	Kasganj	Soron	Critical	Kasganj	Soron	Semi Critical	Improved
55.	Kaushambi	Kara	Over Exploited	Kaushambi	Kara	Critical	Improved
56.	Kaushambi	Sarsawan	Semi Critical	Kaushambi	Sarsawan	Safe	Improved
57.	Lucknow	Malihabad	Semi Critical	Lucknow	Malihabad	Safe	Improved
58.	Maunath Bhanjan	Badraon	Semi Critical	Maunath Bhanjan	Badraon	Safe	Improved
59.	Maunath Bhanjan	Ranipur	Semi Critical	Maunath Bhanjan	Ranipur	Safe	Improved
60.	Meerut	Daurala	Semi Critical	Meerut	Daurala	Safe	Improved
61.	Meerut	Hastinapur	Semi Critical	Meerut	Hastinapur	Safe	Improved
62.	Mirzapur	Marihan	Semi Critical	Mirzapur	Marihan	Safe	Improved
63.	Mirzapur	Pahari	Semi Critical	Mirzapur	Pahari	Safe	Improved
64.	Mirzapur	Sikhar	Critical	Mirzapur	Sikhar	Semi Critical	Improved
65.	Moradabad	Chhijlet	Over Exploited	Moradabad	Chhijlet	Critical	Improved
66.	Moradabad	Deengarpur	Semi Critical	Moradabad	Deengarpur	Safe	Improved
67.	Muzaffarnagar	Shahpur	Over Exploited	Muzaffarnagar	Shahpur	Critical	Improved
68.	Pratapgarh	Baba Bekhernath	Over Exploited	Pratapgarh	Baba Bekhernath	Critical	Improved
69.	Pratapgarh	Kalanker	Semi Critical	Pratapgarh	Kalanker	Safe	Improved
70.	Pratapgarh	Sangaipur	Semi Critical	Pratapgarh	Sangaipur	Safe	Improved

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
71.	Raibareli	Kheron	Semi Critical	Raibareli	Kheron	Safe	Improved
72.	Raibareli	Rahi	Semi Critical	Raibareli	Rahi	Safe	Improved
73.	Sambhal	Gunnaur	Over Exploited	Sambhal	Gunnaur	Critical	Improved
74.	Sant Ravidas Nagar	Abholi	Critical	Sant Ravidas Nagar	Abholi	Semi Critical	Improved
75.	Sant Ravidas Nagar	Aurai	Critical	Sant Ravidas Nagar	Aurai	Semi Critical	Improved
76.	Sant Ravidas Nagar	Deegh	Critical	Sant Ravidas Nagar	Deegh	Semi Critical	Improved
77.	Sant Ravidas Nagar	Suriyawan	Critical	Sant Ravidas Nagar	Suriyawan	Semi Critical	Improved
78.	Shamli	Shamli	Over Exploited	Shamli	Shamli	Critical	Improved
79.	Sitapur	Machharehta	Semi Critical	Sitapur	Machharehta	Safe	Improved
80.	Sonbhadra	Babhani	Semi Critical	Sonbhadra	Babhani	Safe	Improved
81.	Sonbhadra	Chatara	Semi Critical	Sonbhadra	Chatara	Safe	Improved
82.	Sonbhadra	Duddhi	Semi Critical	Sonbhadra	Duddhi	Safe	Improved
83.	Sonbhadra	Ghorawal	Critical	Sonbhadra	Ghorawal	Semi Critical	Improved
84.	Sonbhadra	Robertsganj	Semi Critical	Sonbhadra	Robertsganj	Safe	Improved
85.	Sultanpur	Bhadaiyan	Semi Critical	Sultanpur	Bhadaiyan	Safe	Improved
86.	Sultanpur	Dubeypur	Semi Critical	Sultanpur	Dubeypur	Safe	Improved
87.	Unnao	Bigha Pur	Semi Critical	Unnao	Bigha Pur	Safe	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Aligarh	Chandaus	Critical	Aligarh	Chandaus	Over Exploited	Deteriorated
2.	Allahabad	Baheria	Critical	Allahabad	Baheria	Over Exploited	Deteriorated
3.	Ambedkar Nagar	Jahangirganj	Safe	Ambedkar Nagar	Jahangirganj	Semi Critical	Deteriorated
4.	Amethi	Bhadar	Safe	Amethi	Bhadar	Semi Critical	Deteriorated
5.	Amroha (J P Nagar)	Gajraula	Semi Critical	Amroha (J P Nagar)	Gajraula	Over Exploited	Deteriorated
6.	Amroha (J P Nagar)	Hasanpur	Safe	Amroha (J P Nagar)	Hasanpur	Over Exploited	Deteriorated
7.	Amroha (J P Nagar)	Joya	Critical	Amroha (J P Nagar)	Joya	Over Exploited	Deteriorated
8.	Azamgarh	Sathiaon	Critical	Azamgarh	Sathiaon	Over Exploited	Deteriorated

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
9.	Budaun	Quadar Chowk	Safe	Budaun	Quadar Chowk	Critical	Deteriorated
10.	Budaun	Ujhani	Semi Critical	Budaun	Ujhani	Critical	Deteriorated
11.	Bulandshahar	Bulandshahar	Safe	Bulandshahar	Bulandshahar	Over Exploited	Deteriorated
12.	Bulandshahar	Debai	Safe	Bulandshahar	Debai	Semi Critical	Deteriorated
13.	Bulandshahar	Jahangirabad	Safe	Bulandshahar	Jahangirabad	Semi Critical	Deteriorated
14.	Bulandshahar	Pahasu	Semi Critical	Bulandshahar	Pahasu	Critical	Deteriorated
15.	Bulandshahar	Siyana	Safe	Bulandshahar	Siyana	Semi Critical	Deteriorated
16.	Firozabad	Aron	Semi Critical	Firozabad	Aron	Critical	Deteriorated
17.	G B Nagar	Dadri	Safe	G B Nagar	Dadri	Semi Critical	Deteriorated
18.	G B Nagar	Dankaur	Safe	G B Nagar	Dankaur	Semi Critical	Deteriorated
19.	Ghazipur	Deokali	Safe	Ghazipur	Deokali	Semi Critical	Deteriorated
20.	Ghazipur	Manihari	Semi Critical	Ghazipur	Manihari	Critical	Deteriorated
21.	Hathras	Sahpau	Semi Critical	Hathras	Sahpau	Over Exploited	Deteriorated
22.	Jaunpur	Muftiganj	Critical	Jaunpur	Muftiganj	Over Exploited	Deteriorated
23.	Jaunpur	Sikrara	Critical	Jaunpur	Sikrara	Over Exploited	Deteriorated
24.	Kasganj	Ganj Dundwara	Safe	Kasganj	Ganj Dundwara	Semi Critical	Deteriorated
25.	Lucknow	Sarojini Nagar	Safe	Lucknow	Sarojini Nagar	Over Exploited	Deteriorated
26.	Meerut	Kharkhoda	Critical	Meerut	Kharkhoda	Over Exploited	Deteriorated
27.	Mirzapur	Chanbey	Semi Critical	Mirzapur	Chanbey	Critical	Deteriorated
28.	Moradabad	Bhagatpur Tanda	Semi Critical	Moradabad	Bhagatpur Tanda	Critical	Deteriorated
29.	Pratapgarh	Aspur-Deosara	Critical	Pratapgarh	Aspur-Deosara	Over Exploited	Deteriorated
30.	Shamli	Kairana	Critical	Shamli	Kairana	Over Exploited	Deteriorated
31.	Varanasi	Harhuwa	Critical	Varanasi	Harhuwa	Over Exploited	Deteriorated

16. Uttarakhand

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Haridwar	Bhagwanpur	Semi Critical	Haridwar	Bhagwanpur	Safe	Improved
2.	Haridwar	Khanpur	Semi Critical	Haridwar	Khanpur	Safe	Improved
3.	Haridwar	Laksar	Semi Critical	Haridwar	Laksar	Safe	Improved
4.	Udham Singh Nagar	Jaspur	Critical	Udham Singh Nagar	Jaspur	Safe	Improved
5.	Udham Singh Nagar	Gadarpur	Semi Critical	Udham Singh Nagar	Gadarpur	Safe	Improved
6.	Udham Singh Nagar	Rudrapur	Semi Critical	Udham Singh Nagar	Rudrapur	Safe	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Udham Singh Nagar	Khatima	Safe	Udham Singh Nagar	Khatima	Semi Critical	Deteriorated

17. West Bengal

Improved Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Hooghly	Chinsurah-Mogra	Semi-critical	Hooghly	Chinsurah-Mogra	Safe	Improved

Deteriorated Assessment Units:

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
1.	Birbhum	Labhpur	Safe	Birbhum	Labhpur	Semi-Critical	Deteriorated
2.	Birbhum	Sainthia	Safe	Birbhum	Sainthia	Semi-Critical	Deteriorated
3.	Burdwan	Katwa-I	Safe	Burdwan	Katwa-I	Semi-Critical	Deteriorated
4.	Burdwan	Ketugram-II	Safe	Burdwan	Ketugram-II	Semi-Critical	Deteriorated
5.	Hooghly	Chanditala-I	Safe	Hooghly	Chanditala-I	Semi-Critical	Deteriorated
6.	Hooghly	Chanditala-II	Safe	Hooghly	Chanditala-II	Semi-Critical	Deteriorated
7.	Hooghly	Dhaniakhali	Safe	Hooghly	Dhaniakhali	Semi-Critical	Deteriorated
8.	Hooghly	Jangipara	Safe	Hooghly	Jangipara	Semi-Critical	Deteriorated
9.	Hooghly	Khanakul-I	Safe	Hooghly	Khanakul-I	Semi-Critical	Deteriorated
10.	Hooghly	Purshura	Safe	Hooghly	Purshura	Semi-Critical	Deteriorated
11.	Hooghly	Tarakeswar	Safe	Hooghly	Tarakeswar	Semi-Critical	Deteriorated
12.	Malda	Habibpur	Safe	Malda	Habibpur	Semi-Critical	Deteriorated
13.	Murshidabad	Jalangi	Safe	Murshidabad	Jalangi	Semi-Critical	Deteriorated
14.	Murshidabad	Nowda	Safe	Murshidabad	Nowda	Semi-Critical	Deteriorated
15.	Murshidabad	Suti-Ii	Safe	Murshidabad	Suti-Ii	Semi-Critical	Deteriorated
16.	Nadia	Krishnaganj	Safe	Nadia	Krishnaganj	Semi-Critical	Deteriorated
17.	Nadia	Krishnagar-I	Safe	Nadia	Krishnagar-I	Semi-Critical	Deteriorated
18.	Nadia	Ranaghat-II	Safe	Nadia	Ranaghat-II	Semi-Critical	Deteriorated
19.	Paschim Medinipore	Chandrakona-II	Safe	Paschim Medinipore	Chandrakona-II	Semi-Critical	Deteriorated
20.	Paschim Medinipore	Dantan-Ii	Safe	Paschim Medinipore	Dantan-II	Semi-Critical	Deteriorated
21.	Paschim Medinipore	Daspur-II	Safe	Paschim Medinipore	Daspur-II	Semi-Critical	Deteriorated
22.	Paschim	Debra	Safe	Paschim	Debra	Semi-Critical	Deteriorated

S.No	District	Name of the Assessment Unit	Category in 2011	District	Name of the Assessment Unit	Category in 2013	Remarks
	Medinipore			Medinipore			
23.	Purba Medinipore	Egra-II	Safe	Purba Medinipore	Egra-II	Semi-Critical	Deteriorated
24.	Purba Medinipore	Kolaghat (Panskura-II)	Safe	Purba Medinipore	Kolaghat (Panskura-II)	Semi-Critical	Deteriorated

18. Daman & Diu

Improved Assessment Units:

S.No	UT	Name of the Assessment Unit	Category in 2011	Name of the Assessment Unit	Category in 2013	Remarks
1.	Daman & Diu	Daman	Semi Critical	Daman	Safe	Improved
2.	Daman & Diu	Diu	Over Exploited	Diu	Critical	Improved

19. Lakshadweep

Deteriorated Assessment Units:

S.No	UT	Name of the Assessment Unit	Category in 2011	Name of the Assessment Unit	Category in 2013	Remarks
1.	Lakshadweep	Androth	Safe	Androth	Semi Critical	Deteriorated

Appendix G

SAMPLE ESTIMATION REPORT

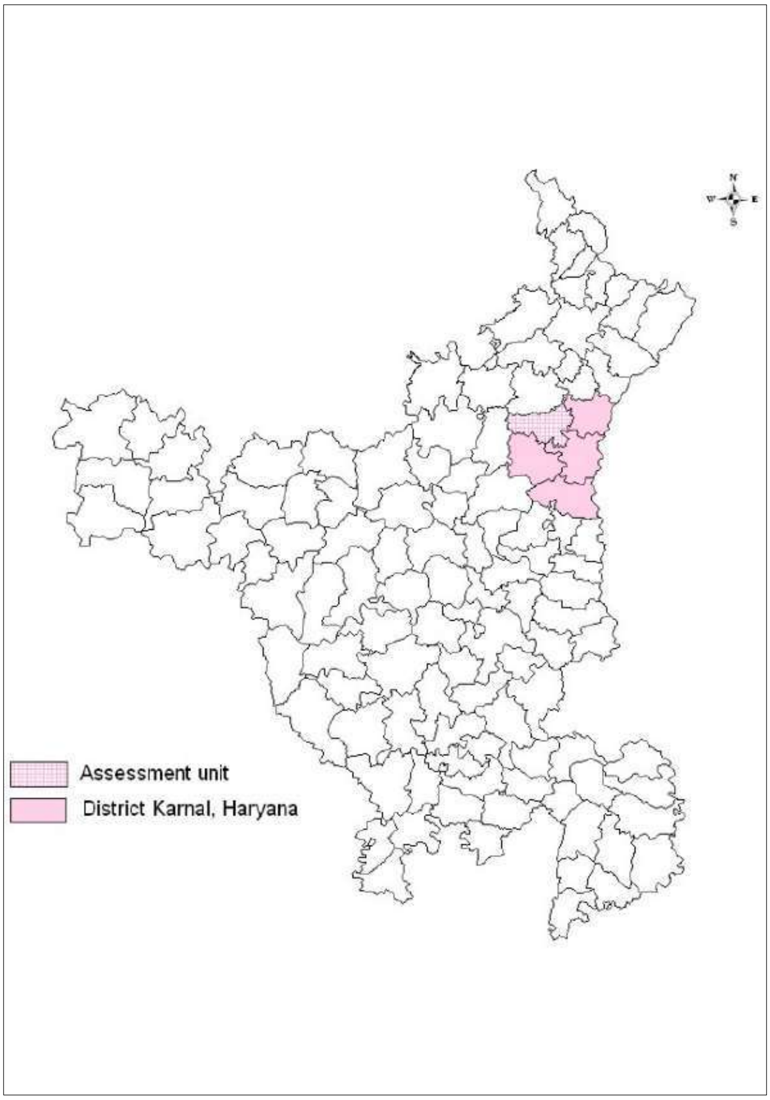
ASSESSMENT OF DYNAMIC GROUND WATER RESOURCES (AS ON 31ST MARCH 2013) OF NILOKHERI BLOCK, KARNAL DISTRICT, HARYANA.

Name of the Assessment unit: Nilokheri
Type (Watershed/Mandal): Block

Salient Features:

Total Geographical Area (ha)	39491
Hilly Area (>20%slope)(ha)	0
Command Area (ha)	39491
Non-command Area (ha)	
Poor Ground Water Quality Area (ha)	0

Location of the Assessment Unit:



Parameter	Normal	Assessment year
Annual Rainfall mm)	674	500.63
Monsoon Rainfall (mm)	577	458.23
Non Monsoon Rainfall (mm)	97	42.4

Soil Type : Sandy Loam
Aquifer : A lluvium

Assessment of Dynamic Ground Water Resources of Nilokheri Block, Karnal District, Haryana.

Ground water draft:

Irrigation Draft

Type of structure	MonsoonSeason			Non-MonsoonSeason			Data
	Number of structures	Unit Draft	Total Draft	Number of structures	Unit draft	Total Draft	Source
			(2*3)			(5*6)	
1	2	3	4	5	6	7	8
STW with PS	6379	0.543	3463.797	6379	1.267	8082.193	Agriculture
Command Area Total	6379		3463.797	6379		8082.193	

Annual Irrigation Draft (monsoon+non-monsoon) **=** 3463.797 + 8082.193**=11545.99 ham**

Domestic and Industrial Draft

Type of structure	MonsoonSeason			Non-MonsoonSeason			Data
	Number of structures	Unit Draft	Total Draft	Number of structures	Unit Draft	Total Draft	Source
1	2	3	4	5	6	7	8
STW+PS	91	0.5973	54.3573	91	1.2127	110.3557	Public Health and Industry
DTW+PS	107	0.5973	63.9111	107	1.2127	129.7589	
Command Area Total	198		118.2684	198		240.1146	

Annual Domestic & Industrial Draft (monsoon+non-monsoon) = 118.2684+240.1146
= 358.383 ham

Annual Ground Water Draft=Annual Irrigation Draft+Annual Domestic & Industrial Draft

=11545.99+358.383
=11904.373 ham

Recharge from Other Sources:

Recharge from Canals / Drains:

Name of Canal Segment	Length	Wetted Perimeter	Wetted Area	Canal Seepage Factor	No of Running Days		Recharge (ham)		
	(m)	(m)	(miilionsq.m)		Monsoon	Non-Monsoon	Monsoon	Non-Monsoon	Annual
Chautang fd.	10594	12.95	0.137192	20	66	1	181.0938	2.743846	183.8376
Rakshi Dy.	8765	7.68	0.067315	20	66	1	88.85606	1.346304	90.20236
Taraori Mr.	3064	6.4	0.01961	20	66	1	25.88467	0.392192	26.27686
Kurak Mr.	2743	4.23	0.011603	20	66	1	15.31581	0.232058	15.54787
Bhaini Mr.	3677	3.79	0.013936	20	66	1	18.3953	0.278717	18.67402
Sambhi Mr.	2957	3.45	0.010202	20	66	1	13.46618	0.204033	13.67021
Sadiq Pur Mr.	229	1.62	0.000371	20	66	1	0.489694	0.00742	0.497114
Padana Dy.	4237	8.67	0.036735	20	75	91	55.10219	66.85732	121.9595
Sagga Mr.	229	1.62	0.000371	20	66	1	0.489694	0.00742	0.497114
Shadi Pur Mr.	329	4.44	0.001461	20	66	1	1.928203	0.029215	1.957418
Gital Pur Mr.	1829	3.57	0.00653	20	66	1	8.61898	0.130591	8.749571
Barthal Dy.	12805	9.92	0.127026	20	66	1	167.6738	2.540512	170.2143
Gholpura Mr.	10674	5.24	0.055932	20	66	1	73.82992	1.118635	74.94856
Sambhli Mr.	8451	6.96	0.058819	20	66	1	77.64103	1.176379	78.81741
Karsa Mr.	6158	3.19	0.019644	20	66	1	25.93011	0.39288	26.32299
I.R. Mr.	8704	3.7	0.032205	4	66	1	8.502067	0.128819	8.630886
I.R. Mr.	10331	3.15	0.032543	4	66	1	8.59126	0.130171	8.721431
Bala Mr.	2021	4.9	0.009903	4	75	91	2.97087	3.604656	6.575526
N.B.K.Link	20152	42.38	0.854042	4	91	274	310.8712	936.0298	1246.901
Nardak Dy.	11250	15.85	0.178313	4	75	91	53.49375	64.90575	118.3995
Kheri Dy.	2113	3.62	0.007649	4	55	1	1.682793	0.030596	1.713389
Total Recharge from Due to Canals/Drains							1140.827	1082.287	2223.115

Annual Recharge Due to Canals/Drains=Monsoon Recharge+Non-monsoon Recharge
= 1140.827+1082.287 =2223.115 ham

Recharge from Surface water Irrigation: Monsoon

IrrigationWater Applied (ham)	Return FlowFactor						Recharge from Surface Water Irrigation (ham)
	Average Depth to Water Level (mbgl)	Irrigated Area (Paddy) (ha)	Return flow factor	Irrigated Area (non-Paddy) (ha)	Return flow factor	Weighted Return flow factor (3*4+5*6)	
1	2	3	4	5	6	7	8
119.5	18.475	30303	0.44	3510	0.24	0.42	50.1
Recharge from Surface water (Monsoon Season)							50.10

Non-Monsoon

Irrigation Water Applied (ham)	Return Flow Factor						Recharge from Surface Water Irrigation (ham)
	Average Depth to Water Level (mbgl)	Irrigated Area (Paddy) (ha)	Return flow factor	Irrigated Area (non-Paddy) (ha)	Return flow factor	Weighted Return flow factor (3*4+5*6) /(3+5)	
1	2	3	4	5	6	7	**8**
203.78	18.474	0	0.44	30139	0.24	0.24	48.91
Recharge from Surface water (Non-Monsoon Season)							48.91

Annual Recharge Due to Surface Water Irrigation =Monsoon Recharge +Non-monsoon Recharge = 50.1+48.91 = 99.01 ham

Recharge from Ground water Irrigation: Monsoon

Irrigation Water Applied(GW Draft) (ham)	Return FlowFactor						Recharge from Ground Water Irrigation (ham)
	Average Depthto Water Level (mbg)	Irrigated Area (Paddy) (ha)	Return flow factor	Irrigated Area (non-Paddy) (ha)	Return flow factor	Weighted Return flow factor (3*4+5*6) /(3+5)	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
3464	18.474	27279	0.39	1789	0.19	0.38	1308.24
Total Recharge from Ground Water Irrigation (Monsoon season)							1308.24

Non-Monsoon

Irrigation Water Applied (GW Draft) (ham)	Return Flow Factor						Recharge from Ground Water Irrigation (ham)
	Average Depth to Water Level (mbgl)	Irrigated Area (Paddy) (ha)	Return flow factor	Irrigated Area (non-Paddy) (ha)	Return flow factor	Weighted Return flow factor (3*4+5*6) /(3+5)	
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
8082	18.474	0	0.39	30363	0.19	0.19	1535.62
Total Recharge from Ground Water Irrigation (Non-Monsoon season)							1535.62

Annual Recharge Due to Ground Water Irrigation =Monsoon Recharge +Non-monsoon Recharge =1308.24+1535.62

= 2843.86 ham

Recharge fromTanks and Ponds:

Monsoon

Nameof Tanks/ Ponds	Average Water Spread Area (ham)	No.of days Water is available	Recharge from Tanks and Ponds (ham) (0.00144*(2)*(3))
1	2	3	4
132	149	135	28.965
Total Recharge from Tanks & Ponds (Monsoon season)			28.97

Non-Monsoon

Nameof Tanks/ Ponds	Average WaterSpread Area (ham)	No.of days Water is available	Recharge from Tanks and Ponds (ham) (0.00144*(2)*(3)
1	2	3	4
132	149	165	35.40
Total Recharge from Tanks & Ponds (Non-Monsoon season)			35

Annual Recharge Due to Tanks & Ponds=Monsoon Recharge +Non-monsoon Recharge = 28.97 + 35 = 63.97 ham

Recharge from Water Conservation Structures:

S.No	Name of theStructure	No. of structures	Gross Storage [ham]	Recharge(ham)		
				Monsoon	Non-Monsoon	Total
1	**2**	**3**	**4**	**5**	**6**	**7**
1	PercolationTanks	0				
2	Mini-PercolationTanks	0				
3	Check Dams	0				
4	Dugout Ponds/Farm Ponds	0				
5	Other Structures	0				
	Total	0				

Recharge from Other Sources (Monsoon)=

[Recharge (Canal Seepage) + Return flow (SW) +Return flow (GW) + Recharge (Tanks / Ponds) + Recharge (Water Conservation Structure)]
=1140.83+50.1+1308.24+28.97+0.0
= 2528.14 ham

Recharge from Other Sources (Non-Monsoon)
[Recharge (Canal Seepage) + Return flow (SW) + Return flow (GW) + Recharge (Tanks/Ponds)+ Recharge (Water Conservation Structure)]
=1082.29+48.91+1535.62+35+0.0
= 2701.82 ham

Annual Recharge from Other Sources=
[Monsoon Other Sources Recharge +Non-monsoon Other Sources Recharge]
=2528.14 + 2701.82
=5229.96 ham

Rainfall Recharge

Method: Rainfall Recharge (using Rainfall Infiltration Factor method):

Monsoon

Normal Rainfall (m)	Rainfall Infiltration Factor For Paved Alluvium	Rainfall Infiltration Factor For Un Paved Alluvium	Paved Alluvial Area in the Assessment Unit (ha)	Un Paved Alluvial Area in the Assessment Unit (ha)	Weighted Average Infiltration Factor ((2)*(4)+(3)*(5))/((4)+(5))	Rainfall Recharge (ham)
1	**2**	**3**	**4**	**5**	**6**	**7**
0.577	0.08	0.22	0	39491	0.22	5012.98
Recharge from Rainfall (Monsoon season)						5012.98

Non-Monsoon

Normal Rainfall (m)	Rainfall Infiltration Factor For Paved Alluvium	Rainfall Infiltration Factor For Un Paved Alluvium	Paved Alluvial Area in the Assessment Unit (ha)	Un Paved Alluvial Area in the Assessment Unit (ha)	Weighted Average Infiltration Factor ((2)*(4)+(3)*(5))/((4)+(5))	Rainfall Recharge (ham)
1	**2**	**3**	**4**	**5**	**6**	**7**
0.097	0.08	0.22	0	39491	0.22	842.74
Recharge from Rainfall (Non Monsoon season)						842.74

Method: Rainfall Recharge during Monsoon (using Water Level Fluctuation method):

Water Level Fluctuation

Averagepre- monsoon Depthto Waterlevel (mbgl)	Averagepost- monsoonDepth to Waterlevel (mbgl)	WaterLevel Fluctuation (m) ((1)-(2))
1	2	3
18.474	19.196	-0.722

Rainfall Recharge during Monsoon Season

Assessment Area (ha)	Rock Type	Specific Yield	Average Water Level Fluctuation (m)	Change in Storage (ham)	Ground Water Draft (ham)	Ground Water Recharge (ham) (5+6)	Recharge from Other Sources (ham)	Rainfall Recharge (ham) (8-7)
1	2	3	4	5	6	7	8	9
39491	Alluviu	0.12	**-0.722**	-3421.5	3582	160.5	2528.14	2367.64
Total Rainfall Recharge (Monsoon season)								2367.64

Normalization of Rainfall Recharge during monsoon season (WLF Method)

AssessmentYear	Rainfall Recharge (ham)	Normal Monsoon Rainfall (mm)	Monsoon Rainfall forthe CorrespondingYear (mm)	Recharge Correspondingto NormalRainfall (ham) ([3]*[2]/[4])
1	2	3	4	5
2013	2367.64	577	458.23	2981.3
Normal Rainfall Recharge during Monsoon Season (AverageofCol.5)				2981.3

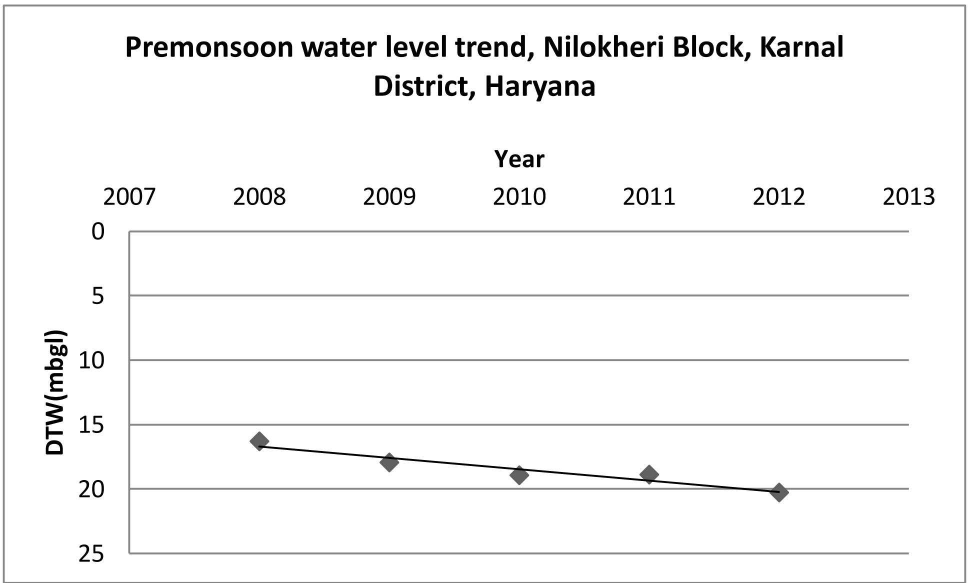
NormalRainfallRecharge

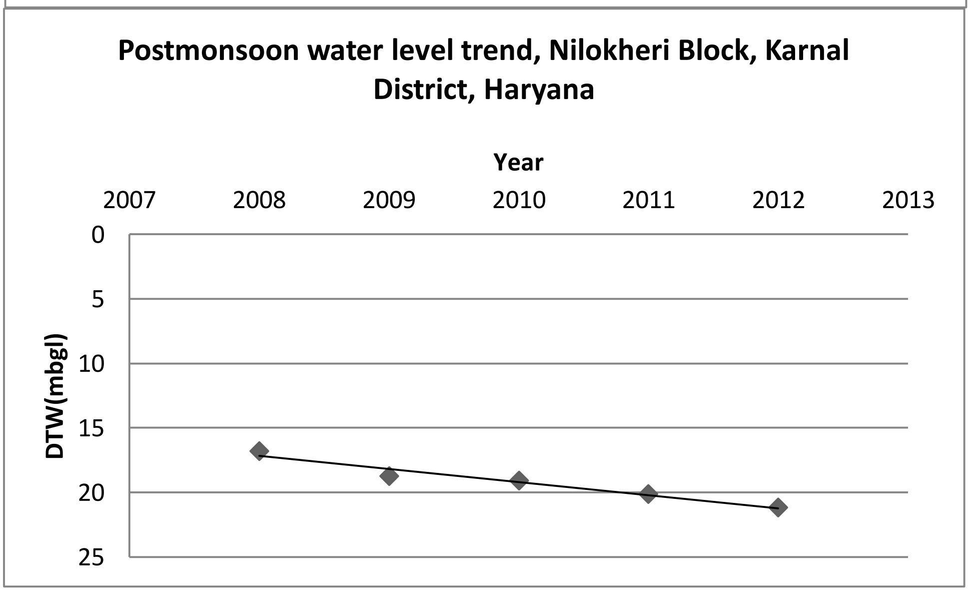
Normal Rainfall Recharge (RIFmethod) (ham)	NormalRainfall Recharge (WLFmethod) (ham)	Percentage Difference (%) [(2)-(1)/(1)]*100	Normal Rainfall Recharge (ham)
1	2	3	4
5012.98	2981.3	100* (-3743.88/5012.98) = -40.53	4010.39

SUMMARY OF RECHARGE ESTIMATION

MonsoonRecharge		Non-monsoon Recharge		Annual Replenishable GroundWater Resources (ham) ([1]+[2]+[3]+[4])	Natural discharges (provision) (ham)	Net Annual Ground Water Availability (ham) [[1]-[2]]	Gross Annual Ground Water Draft ForAll Uses (ham)	Stage of Ground Water Development (%) [[8]/[7]]*100
Rainfall Recharge (ham)	Recharge from Other Sources (ham)	Rainfall Recharge (ham)	Recharge from Other Sources (ham)					
1	2	3	4	5	6	7	8	9
4010.39	2528.14	842.74	2701.82	10083.09	1008	9075	11904	131

Long Term Water Level Trend





Stage of ground Water Development= 131%

Average long Term Water level Trend (Pre-monsoon):106.4 cm/year falling
Average long Term Water level Trend (Post-monsoon): 114 cm/year falling
Category: Over Exploited

Allocation of ground water resources for utilization

Projected Population density per sq.km 2025	Per capita per day require ment as on 2025 (lpcd)	Depen dency Factor	Ground Water Require ment in Ham as on 2025	Current Ground Water Draft For Domestic Purposes (ham)	Current Draft For Industrial Needs (ham)	Current Irrigation Draft (ham)	Net GW Availability (ham)	Gwav -Dgi (8)-(7)	(Gwav-Dgi) or Dgd	Allocation (ham) (Illustration is given below)
1	2	3	4	5	6	7	8	9	10	12
600	60	0.75	389	194	165	11546	9075	-2471	358	358

Illustration: During present assessment provision for future allocation for domestic and industrial requirement supply to 2025 has been computed as per growth rate of population and industries. The provision has been kept as under: -

Case-I→ when GWav ≥ Dgi + Alld
In such cases allocation for future domestic requirement = Alld.

Case-II→when GWav < Dgi + Alld
In such cases allocation for future domestic requirement = (GWav – Dgi) or Dgd, which- ever is more.

Where,
GWav = Net annual ground water availability
Dgi = Existing ground water draft for irrigation
Dgd = Existing ground water draft for domestic use
Dg = Existing ground water draft for all uses
Alld = Computed value of allocation for domestic use
(Based on projected population, fractional load and per capita requirement)

Net Ground Water Availability For future Irrigation:

Net Annual Ground Water Availability (ham)	Annual Ground Water Draft for Irrigation use (ham)	Annual Allocation of Ground water resources for domestic and Industrial water requirement upto2025 (ham)	Net Ground Water Availability for future Irrigation (ham) [(1)-(2)-(3)
1	**2**	**3**	**4**
9075	11546	358	-2829

SUMMARY REPORT OF DYNAMIC GROUND WATER RESOURCES ESTIMATION
(AS ON 31st MARCH 2013)
OF NILOKHERIBLOCK,
DISTRICT KARNAL, HARYANA

(in ham)

Annual Replenishable Ground Water Resources					Natural Discharge during monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft		
Monsoon Recharge		Non-monsoon Recharge		Total			Irrigation use	Domestic & Industrial Water Use	Total
Rainfall recharge	Recharge from other sources	Rainfall recharge	Recharge from other sources						
1	2	3	4	5	6	7	8	9	10
4010	2528	843	2702	10083	1008	9075	11546	358	11904

Annual Allocation of ground water resources for domestic and industrial water requirement upto 2025 (ham)	Net Ground Water Availability for future Irrigation (ham)	Stage of Ground Water Development (%)
11	12	13
358	-2829	131

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ABBREVIATIONS

bcm	Billion cubic metre
CGWB	Central Ground Water Board
CLEG	Central Level Expert Group for overall reassessment of ground water resource of the country
GEC-1984	Ground Water Estimation Committee, 1984
GEC-1997	Ground Water Resources Estimation Committee, 1997
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
SGWD	State Ground Water Departments
UT	Union Territory

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