ANNUAL REPORT 2015-16

CENTRAL GROUND WATER BOARD

MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION

GOVERNMENT OF INDIA

FARIDABAD

2017

Govt. of India

CENTRAL GROUND WATER BOARD

Ministry of Water Resources, River Development and Ganga Rejuvenation

ANNUAL REPORT
2015-16

FARIDABAD

Contents

EXECUTIVE SUMMARY

Central Ground Water Board (CGWB), in the Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India, is the National Apex Agency entrusted with the responsibilities of providing scientific inputs for management, exploration, monitoring, assessment, augmentation and regulation of ground water resources of the country. Board carries out its activities through 18 Regional Offices, 17 Divisional offices and 11 state unit offices located in States/UTs.

National Aquifer Mapping and Management Programme (NAQUIM)

It is one of the most important Programme of Ministry of Water Resources, River Development and Ganga Rejuvenation being implemented by Central Ground Water Board. Under NAQUIM, an area of 8.89 lakh sq.km has been identified for aquifer mapping during XII plan. The various activities of NAQUIM including additional data generation, Aquifer Mapping and Management Plans are being taken up in phased manner. The areas have been prioritiesed considering over-exploitation, ground water contamination and other issues. Major thrust has been given to an area of 5.26 lakh km^2 covering parts of eight priority States (Haryana, Punjab, Rajasthan, Gujarat, Andhra Pradesh, Telangana, Karnataka, Tamil Nadu) and Bundelkhand areas of Uttar Pradesh and Madhya Pradesh.By the end of March 2016, aquifer maps were prepared and management plans were developed for an area of 2.28 lakh km^2 covering parts of 17 States including 1.87 lakh km^2 in parts of eight priority states and Bundelkhand areas.

Ground Water Exploration

Ground Water Exploration is being carried out to study the sub-surface hydrogeological setup and to evaluate various aquifer parameters of different aquifer systems. During the year 2015-16, Central Ground Water Board under their Ground Water Exploration programme, constructed 840 wells consisting Exploratory Wells (EW) -544, Observation Wells (OW) -219, Piezometers (PZ) -77, Slim Hole (SH)-01 including 64 high yielding wells to assess the ground water potential in different hydrogeological set up. Priority was accorded to Over Exploited /Critical/Semi-Critical/Drought Prone and areas affected with ground water pollution etc. Out of 840 exploratory wells constructed, 669 wells were constructed in hard rock, 161 wells in alluvium and 10 wells in bouldary formation. Out of 840 wells, 74 wells were constructed in the tribal and 86 wells in drought prone areas.

Monitoring of Ground Water Observation Wells

The Board is monitoring the ground water levels in the country four times in a year (Jan/May/Aug/Nov) through a network of around 23196 Ground Water Observation Wells. The ground water samples collected during the pre- monsoon monitoring were analysed for the purpose of ascertaining the changes in chemical quality of ground water. Monitoring of Ground Water Observation Wells for May, August, November 2015 & January 2016 have been completed and reports describing fluctuation of water levels during each measurement compared to monitoring of previous year, decadal average and pre-monsoon period have been compiled to depict detailed information regarding short term and long term changes in the ground water regime.

Geophysical Studies

During 2015-16, 3303 Vertical Electrical Soundings (VES), 18.88 line kilometre 1-D resistivity profiling, 3.2 line kilometre 2-D resistivity profiling and 168 nos of borehole logging have been conducted in various parts of the country.

Water Quality Analysis

During 2015-16, a total number of 34155 water samples have been analyzed, out of which 17372 water samples have been analyzed for determination of basic constituents, 4576 water samples was carried out under specific studies while analysis of 12207 No. of water samples has been done for the Trace elements like As, Cd, Co, Cr, Cu Fe, Mn, Ni, Pb and Zn etc.

Reports and Information Booklets

Results of investigations carried out by Central Ground Water Board are suitably documented in the form of reports and maps which are categorized as Ground Water Year Books, State Reports(Hydrogelogical/Exploration/Geophysical/Chemical), District Ground Water Brochures and Basic Data Reports. During 2015-16, 6 State Reports and 23 Ground Water Year Books were submitted & issued.

Water Supply Investigations

The Board carries out short-term water supply investigations for Government departments and helps them in augmenting their water supply. The Board has carried out a total of 221 investigations during this year.

Dissemination and Sharing of Technical Know-how

Central Ground Water Board has organized 23 workshops under IEC program. The officers of CGWB participated in various Seminars/ symposia/ workshop/ conference with a view to share the expertise in the field of Ground Water and also for getting exposure to new ideas / technological developments in the field Ground Water science with others. The officers of the Board also participated in various meetings /committees etc. to render advice on ground water development in specific areas.

Re-assessment of Dynamic Ground Water Resources

The total Annual Replenishable Ground Water Resources as on March 2011 of the Country have been reassessed as 433 Billion Cubic Metres (bcm) and the Net Annual Ground Water Availability has been estimated as 398 bcm. Annual Ground Water Draft as on March, 2011 for all uses is 245 bcm. The Stage of Ground Water Development has been worked out as 62%. Re-assessment of Dynamic Ground Water Resources base year 2013 is under progress.

Artificial Recharge Studies

During 2015-16, total of 43 artificial recharge structures have been constructed. No spill over balance funds was released for on-going projects.

Technical Examination of Major / Medium Irrigation project proposals

During 2015-16, 12 major and minor irrigation project proposals of Central Water Commission were examined.

Human Resources Development

It has been the earnest endeavour of the Board to keep its technical personnel abreast with the latest developments in all aspects related to ground water development & management. Besides the officers of the Board, trainees from State Departments and candidates from abroad are included in the training programme being organized by the Board. During the year 2015-16, 105 training programmes (34- Tier I, 25-Tier II and 46- Tier-III) were conducted by RGI and a total of 8952 trainees (690- Tier I, 825-Tier II and 7437- Tier-III) were trained including 2498 female participants.

Hydrology Project II

During 2015-16, under the Hydrology Project-II, the implementation of Pilot Project on Aquifer Mapping has been completed in six different Hydrogeological terrains of the country covering states of Bihar, Rajasthan, Tamil Nadu, Karnataka and Maharashtra. Various ground geophysical survey viz. VES, Ground TEM and ERT and Heliborne Survey by CSIR-NGRI have been completed in all six pilot areas. Reports have been submitted by CSIR-NGRI. Aquifer maps and aquifer management plan have been prepared and reports have been finalized and released by the Hon'ble Minister of Water Resources, RD &GR on the occasion of Jalmanthan-2 during February 22-23, 2016 at Vigyan Bhawan, New Delhi.

Publicity and Public Awareness

With a view to generate awareness among the masses, "Water Resources Day" and "India Water Week 2016" were celebrated with CWC and other State Govt. Organizations. On these occasions, emphasis was laid on educating the rural population on various aspects of water resources in the country. Important technical achievements of the Board were brought to the knowledge of the public through radio talks, television interviews, and telecast of a short film on ground water pollution, newspaper reports, and release of District Reports and Atlases at various public functions.

Central Ground Water Authority

The Beta Version of "Web Based Application of Receipt and Issue of NOC for Abstraction of Ground Water (www.cgwa-noc.gov.in)" has been launched by Hon'ble Minister of Water Resources, River Development & Ganga Rejuvenation on 28th January, 2015. During 2015-16, 62 NOCs have been issued online using the above application.In addition 194 NOCs have been issued offline and 79 renewals of NOCs have also been issued.

IEC Activities

Central Ground Water Board organized 6th National Level Painting Competition on 29th March, 2016 at Chhat Puja Ghat, Near ITO, New Delhi under IEC Scheme of the Ministry. The theme of the National Painting Competition was **"Care for Water – Secure the Future".** A total of 30 students, who won the 1st prizes in the State Level Painting Competitions from various States / UT's participated in the National Level Painting Competition.

More than 17000 schools and over 14 lakh students in all over the country have participated at School Level. Out of these, 50 students selected by the Jury in each State, were invited to participate in the State Level Painting Competition.

National Level Painting Competition carries a First prize of Rs. 50,000/-, Two Second prizes of Rs. 25,000/- each, Three Third prizes of Rs 10,000/- each and Twenty Four (24) Consolation prizes of Rs. 5000/- each. The first prize was bagged by Kumari Ayesha Patnaik and the winner of second prizes were Master Suraj Choudhary and Master Hemchandran V. The three third prize winners were Kumari Bidipta Deb, Kumari Emora Mercy G, and Kumari Neha Sharma. North Central Chhattisgarh Region (NCCR), Raipur, Southern Region (SR), Hyderabad and West Central Region (WCR), Ahmedabad was awarded as First, Second and Third best-performing Region of CGWB respectively.

Apart from this, 1st National Essay Competition was organized under Jal Kranti Abhiyan 2015-16 in all the States and Union Territories of the country. The Essay Competition was held for two categories i.e. Essay Competition for the age group of 15-25 Years (Category-1) and Technical Papers (Category-II). The themes were: Phase–I Role of Youth in Water Management, Phase–II Role of Youth for Prevention of Water Pollution. 23 workshops were also organized by Regional offices of CGWB on various issues.

Budget & Expenditure

During 2015-16, Expenditure of Rs. 15436.23 lakhs under Plan and Rs.14713.42 lakhs under non-plan was incurred by the Board to carry out various activities.The Scheme wise expenditure is as below:

Sr. No.	Item of Work	Budget (Rs. In Lakhs)	Expenditure (Rs. In Lakhs)
1.	PLAN	18800.00	15436.23
2.,	Non-Plan	15206.00	14713.42
3.	RGNGWT RI for ground Water	700.00	586.84
4.	HP-II (PLAN)	nil	nil
5.	Building for Offices	900.00	56.81
6.	Deduct Recoveries	2500.00	1351.84

1. INTRODUCTION

1.1 CENTRAL GROUND WATER BOARD

The Central Ground Water Board, the National apex organization dealing with Ground Water under the Ministry of Water Resources, River Development and Ganga Rejuvenation, Govt. of India is vested with the responsibilities to carry out ground water management studies, exploration, monitoring of development, management and regulation of country's vast ground water resources.

1.2 MANDATE AND OBJECTIVES

The mandate of the Central Ground Water Board is : "Develop and disseminate technologies, monitor and implement national policies for the scientific and sustainable development and management of India's ground water resources including their exploration, assessment, conservation, augmentation, protection from pollution and distribution based on principles of economic and ecological efficiency and equity". Commensurate with the above mandate, the objectives laid down for the Central Ground Water Board are:-

- Aquifer mapping for delineation & disposition of Aquifer Systems to develop aquifer management plan
- Periodic long term monitoring of ground water regime for creation of time series database through existing and enhanced ground water observation wells.
- Capacity building in all aspects of ground water development and management through training, information dissemination, education and awareness
- To enhance ground water sustainability through artificial recharge and rainwater harvesting as a measure for checking the depleting trend of ground water.
- Regulation of ground water development and sustainable management of ground water resources in coordination with State Government Organizations.
- Promoting R&D programme in the field of ground water quality improvement.
- Technical assistance to defence and Govt. organizations for identification of ground water sources for their water supply.

1.3 ORGANIZATIONAL SET UP

The Central Ground Water Board is headed by the Chairman and has six full time Members namely, Member (Exploratory Drilling & Material Management), Member (Sustainable Management & Liaison), Member (Survey Assessment & Monitoring), Member (RGI), Member (Water Quality & Technology Transfer) and Member (Finance). The other Members of the Board are all ex-officio being the nominees of institutions in related fields of expertise. The ex-officio members are:

1. The Joint Secretary (A), Ministry of Water Resources, River Development and Ganga Rejuvenation.
2. The Joint Secretary & Financial Adviser, Ministry of Water Resources, River Development and Ganga Rejuvenation.
3. The Joint Secretary, Ministry of Environment & Forests, Paryavaran Bhawan, New Delhi.
4. The Chief Engineer, IMO (WP &P),CWC, Sewa Bhawan, New Delhi.
5. The General Manager, ONGC, Ministry of Petroleum & Natural Gas, Dehradun.

Central Ground Water Board has five main wings. Each wing is headed by a Member.

1. **Survey, Assessment & Monitoring wing (SAM)**

The Survey, Assessment & Monitoring wing looks after following work:-

- National Aquifer Mapping & Management Programme (NAQUIM) .
- Preparation, implementation and progress monitoring of Annual Plan of Central Ground Water Board.
- Monitoring of Ground Water regime & development.
- Remote Sensing and GIS.
- Ground Water Modelling studies.
- Data information storage, retrieval, processing and dissemination (NDC & Web hosting).
- e-Governance and IT Plan.
- Preparation of EFC/SFC memo pertaining to activities of Ground Water Management and Regulation.
- Hydrology Project.
- Drawing and Map Section.
- Administrative & technical supervision of activities of the Regional Directorates and Divisional offices of MER/NCCR/SER/ER/NER.

2. **Sustainable Management and Liaison wing (SM&L)**

The Sustainable Management and Liaison wing looks after the following work:-

- Artificial recharge studies and water conservation.
- Project Appraisal and Perspective Planning for sustainability of ground water resources.
- Matters related to Parliamentary Committees, Parliament Questions and VIP references.
- Conjunctive use studies of surface and ground water.
- Liaison with Central and State Agencies including institutional financing agencies viz., NABARD, CAPART, NGOs and Panchayati Raj Institutions, and other banks etc. for ground water development and management.
- Preparation of EFC/ SFC memo pertaining to respective activities.
- IEC activities in Central Ground Water Board.
- Administrative & technical supervision of activities of the Regional Directorates and Divisional offices of NWHR/ NHR/ NWR/ UR/ NR/ SUO, Delhi.
- Acts as Member Secretary, Central Ground Water Authority. The activities include:
  a. Regulation of Ground Water Development and Management.
  b. Policy, planning and implementation of regulatory activities.
  c. Notification of areas for ground water development and management and monitoring of regulatory directions.
  d. Issuance of NOC for ground water withdrawal to industrial/ infrastructural/ mining projects.
  e. Legal matters pertaining to CGWA.

3. **The Exploratory Drilling and Material Management wing(ED&MM)**

The exploratory drilling and material management wing looks after the following:-

- Activities Related to Exploratory Drilling and its Monitoring.
- Preparation of EFC/SFC for their activities.
- Activities Related to Material Management.
- Activities Related to Stores, procurement of machinery & equipments etc. (including scientific instruments)

- Preparation of Tenders & EOI etc. for Outsourcing of work for scientific and engineering activities.
- Administrative & technical supervision of activities of the Regional Directorates and Divisional offices of SR/ SWR/ SECR/ KR.

4. Water Quality & Technology Transfer wing (WQ&TT)

The Water quality and Technology Transfer Wing of the Board looks after the following:-

- All activities related to Water Quality & Technology Transfer.
- Assessment of ground water resources.
- Preparation of Hydrogeological atlases, maps etc.
- Plan and monitor Geophysical activities of the Board.
- Plan and monitor Hydrological and Hydrometeorological activities of the Board.
- Benchmarking and technological upgradation of CGWB.
- Special studies on various aspects.
- International & Bilateral cooperation, symposia, National/ International Trainings/ Awards/ Fellowships etc.
- Preparation and publication of Bhujal News
- Liaison with Water Quality Assessment Authority (WQAA)/Research Institutions/ Universities for R&D schemes.
- Preparation of EFC/ SFC memo pertaining to respective activities.
- Liaison with to Water Quality Assessment Authority.
- All chemical labs & accreditation of Chemical labs.
- Ground Water Pollution Studies, Isotope studies/Chemical cell planning and monitoring.
- Climate change studies under National water mission.
- Technology transfer to National & International institutions and various Central / State organizations
- Administrative and technical supervision of activities related to water quality, Assessment of Water Resources.
- Administrative and technical supervision of activities of the Regional Directorates and Divisional offices of WR/ WCR/ CR/NCR.

5. Rajiv Gandhi National Ground Water Training and Research Institute (RGI)

Rajiv Gandhi National Ground Water Training and Research Institute (RGI) located at Raipur, Chhattisgarh caters to the training requirements of Central Ground Water Board and also many Central and State Govt. Organizations, Academic Institutes, NGOs etc. During XII Plan, RGI under HRD and Capacity Building Scheme of Ministry of Water Resources, River Development and Ganga Rejuvenation is implementing a three tier training programme keeping in view the requirements of the National Project on Aquifer Management. These trainings will enable creation of a trained workforce for implementation of National Project on Aquifer Management and overall sustainable development of ground water resources.

The administrative & financial matters of the Board are being dealt with by the Director (Administration) and Member (Finance).

6. **Member (Finance)** looks after the following works:-

- Compilation and submission of the Budget Estimates, Revised Estimates, Performance Budget, Notes for Demands for Grants, Supplementary Grants, Annual Plan, Five year Plan proposals of the Board to the Ministry.

- Allocation of budget to all the offices of the Board and to monitor and control the expenditure as per the sanctioned budget. Compilation and submission of the expenditure returns to the Ministry and Controller of Accounts etc.
- Scrutiny of the cases relating to procurement of stores, equipment, machinery etc. from financial angle.
- To attend and settle the audit paras, audit notes, audit objection etc and to prepare a disposal sheet of outstanding paras whenever so required.
- Advise and apprise Chairman and Members of the Board in respect of financial matters of the Board from time to time.

Central Ground Water Board had undertaken various studies through 18 Regional Directorates, supported by 17 Engineering Divisions and 11 State Unit Offices. The Board had a fleet of 85 rigs for taking up drilling operations during 2015-16.

2. NATIONAL AQUIFER MAPPING AND MANAGEMENT PROGRAMME (NAQUIM)

OBJECTIVES

Considering the existing issues of ground water over-exploitation, contamination and other related issues, Central Ground Water Board under MoWR, RD & GR has embarked upon the new initiative of Aquifer Mapping and Management Programme. The programme has been taken up under Ground Water Management and Regulation Plan Scheme of XII plan. Major objectives of the programme are:

- Delineation and characterization of aquifers in three dimensions
- Identification and quantification of issues
- Development of management plans to ensure sustainability of ground water resources.

Under the initiative, management plans for each aquifer system are being prepared suggesting various interventions to optimize ground water withdrawal and identifying aquifers with portable groundwater for drinking purpose in quality affected areas. The management options also includes identification of feasible area for artificial recharge to ground water and water conservation which help in arresting declining water levels besides demand side management option including crop diversification, increasing water use efficiency etc.

METHODOLOGY AND APPROACH

A multidisciplinary approach using advanced tools and techniques including remote sensing, GIS, geophysical techniques, ground water modeling etc. is being followed for preparation of aquifer maps and development of management plans. In order to study the application of advanced techniques six pilot projects were taken up in 5 different States representing the hydrogeological complexity of the country. The areas were Maharashtra (part of Nagpur district), Rajasthan (parts of Dausa and Jaisalmer districts), Bihar (part of Patna district), Karnataka (part of Tumkur district) and Tamilnadu (part of Cuddalore district). The learning of the Pilot projects have been synthesized and adopted in nationwide Aquifer Mapping and Management programme.

A mutli-tier evaluation process has been put in place to ensure quality of outputs. The aquifer maps and management plans prepared by the team of officers are first reviewed by the Regional Directors of the respective regions of CGWB. The revised maps and management plans are then presented before the concerned members of CGWB at the central headquarters level. Subsequently the maps and management plans are presented before the central level expert committee constituted for this purpose. Domain specialists, who are part of the expert committee include ground water specialists from JNU, Delhi; IIT, Roorkee; retired Chairman of CGWB; Agriculture Scientists etc. Agriculture scientists of ICAR have also been associated in finalization of management plans for each State. In order to coordinate on various issues related to aquifer mapping, between the State and Union Government, State Ground Water Coordination Committee (SGWCC) has been formed in each state and UT, headed by the principal secretary of the concerned department. The outputs are shared and deliberated in State Ground Water Coordination Committee with an objective to have mutual agreement on the proposed aquifer-wise ground water management plans which can be implemented by State Government. The approach followed for preparation of aquifer management plans is summarized in Fig.1.

TARGETS AND ACHIEVEMENTS

As a part of the programme, an area of 8.89 lakh km2 out of the entire 23 lakh Km2 mappable area of the country is envisaged to be covered during XII plan. The areas have been prioritiesed considering over-exploitation, ground water contamination and other issues. Major

thrust is given to an area of 5.26 lakh km2 covering parts of eight priority States (Haryana, Punjab, Rajasthan, Gujarat, Andhra Pradesh, Telangana, Karnataka, Tamil Nadu) and Bundelkhand areas of Uttar Pradesh and Madhya Pradesh.

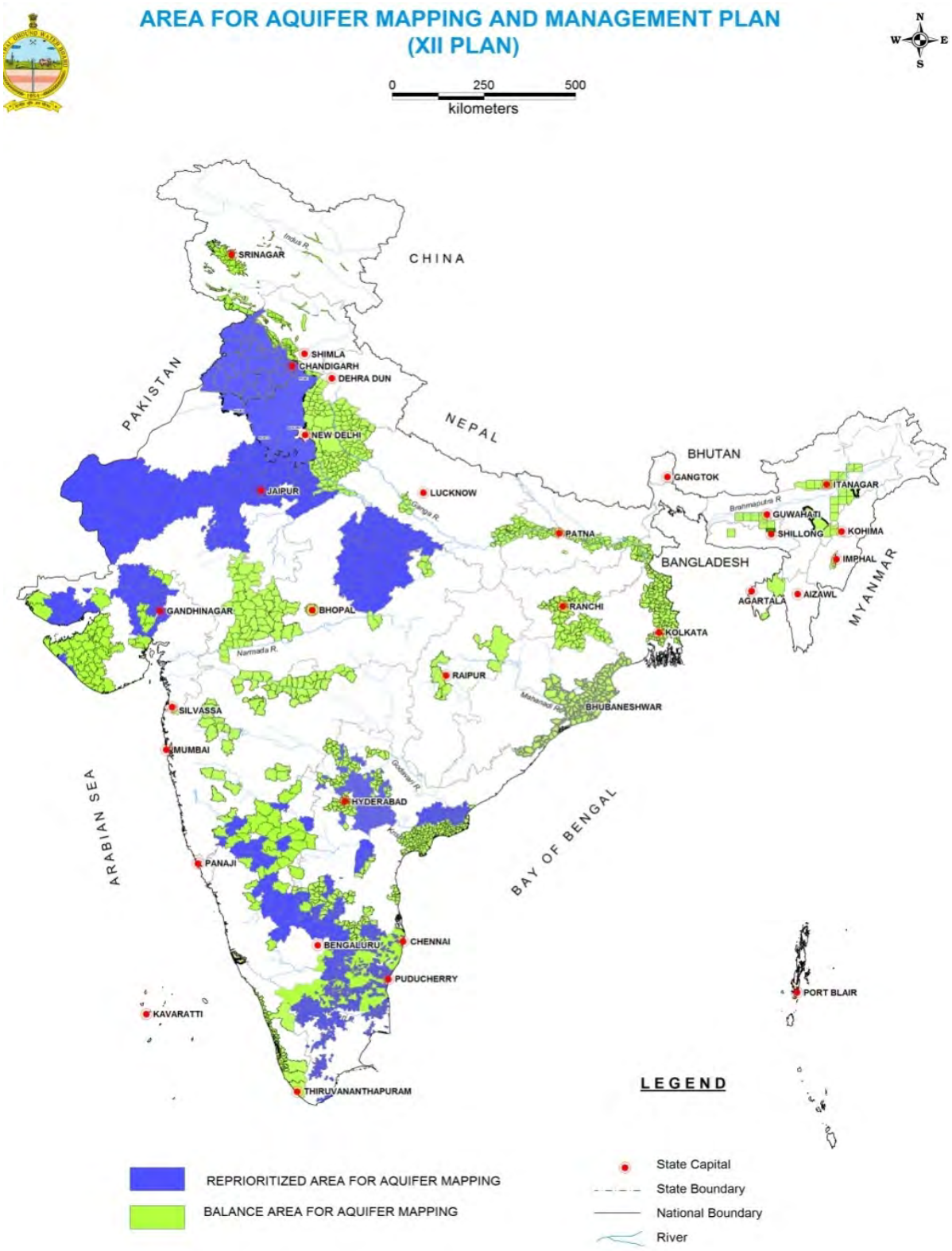


Figure 2.1: Area reprioritized for aquifer mapping

By the end of March 2016, aquifer maps were prepared and management plans were developed for an area of 2.28 lakh km^2 covering parts of 17 States including 1.87 lakh km^2 in parts of eight priority states and Bundelkhand areas as mentioned above.

Table1.1: State wise cumulative progress under National Aquifer Mapping and Management Programme as on 31st March 2016.

State/UT	Achievements as on 31st March 2016 (Km^2)
Haryana	37369
Punjab	23734
Rajasthan	50033
Gujarat	22731
Karnataka	11175
Tamil Nadu	10764
Telangana	11041
Bihar	4886
Chhattisgarh	4984
Jammu & Kashmir	3000
Kerala	720
Madhya Pradesh	2179
Maharashtra	12165
Odisha	2977
West Bengal	8008
Uttar Pradesh	17893
National Capital Territory Delhi	1483
Area covered under special studies in parts of five States (Bihar, Rajasthan, Maharashtra, Karnataka, Tamil Nadu and Bihar)	3006
Grand Total	**228148**

HIGHLIGHTS OF AQUIFER MANAGEMENT PLANS FOR PARTS OF PRIORITY STATES

I. NCT DELHI

Aquifer mapping programme has been taken up in NCT Delhi. Major issues identified and their respective Management Plans suggested are as follows:

- Areas with rising water level- Eleven tehsils having shallow water levels have been identified for ground water development. It is estimated that 120 MCM ground water can be safely withdrawn.
- Areas with rising water level but depth of ground water level more than 8 mbgl. Such areas like Najafgarh tehsil and western part of Saraswati Vihar tehsil are recommended for ground water withdrawal as well as recharge.
- Area with declining water level- Artificial recharge plan has been formulated in 26 tehsils having depth to ground water level more than 8 mbgl.
- Areas having polluted ground water quality - Ground water should be used only after proper treatment. Site selection and design of landfill sites should be based on sound scientific considerations. There should be strict monitoring of waste disposal in industrial belts.
- Yamuna flood plain –Potential areas viz. Palla-Hiranki Sector, Akshardham Mandir-Mayur Vihar Sector, DND Flyover Sector and Kalindi Kunj-Jaitpur Sector have been identified for construction of high yielding tubewells. There is scope for withdrawal of additional 190 MLD (40 MGD) water.
- Fresh water aquifers along Western Yamuna Canal in Northwest district: Aquifers can be used by constructing tubewells of depth 40 to 50 m all along the canal, which can yield 5 MGD water.
- Area with saline ground water - It is recommended to withdraw poor quality water, which can be used for growing salt tolerant crops like cotton, wheat, guar, chickpea, soyabean, sugarcane, sunflower etc. in agricultural belts. In rest of the areas, saline water can be used after blending for uses other than drinking. Withdrawal of saline water will lead to void space in the aquifer, which when recharged during subsequent monsoon, will help in improving the water quality

II. HARYANA

- Nearly 23941 Km^2 area has been covered under aquifer mapping management plan for Haryana states. Out of 23941Km^2 area, 10,578 Km^2 areas are in parts of Ambala, Panchkula, Kurukshetra, Karnal, Kaithal & Yamunanagar districts and 13363Km^2 comprising of Jind, Hissar, Sirsa and Fatehabad districts.
- The major ground water issues are Over-exploitation and water quality. With stage of ground water development reaching upto 361% in some parts. Three potential aquifer systems upto 300m depth have been identified with thicknesses ranging from 20 to 182m.
- The studies have revealed that in ground water irrigated areas through open unlined channels, huge amount of water is lost to seepage and evaporation. Total conveyance loss is estimated at 30% of the volume of water transported.
- The management plan recommends use of lined channels to convey water to reduce ground water extraction, resulting in increased water availability especially for irrigation and construction of 1,64,593 artificial recharge/rainwater harvesting structures. It is estimated that such interventions would result in reduction of existing stage of ground water withdrawal upto 12%.
- Artificial recharge, roof top rain water harvesting system, use of underground pipelines instead of unlined channels and crop diversification are also proposed in these areas.

Management Plan recommends construction of 60213 artificial recharge / rain water harvesting structures, adoption of various management scheme including mitigation of wastage of groundwater may bring drastic changes in over exploitation.

III. PUNJAB

Total 23734 sqkm area covered under aquifer mapping and out of that around 8499 sq. km area comprising of Amritsar, TaranTaran, Pathankot and Gurdaspur districts and Under NAQUIM Phase II, 15235 Sq km of area comprising Bathinda, Ferozpur, Fazilka, Faridkot, Moga & Muktsar districts, in Punjab State have been covered.

In first phase major issues includes:

- Over-exploitation is the major issue in the area, with stage of ground water withdrawal ranging from 159 to 197 %. Declining ground water levels are being observed due to overexploitation for irrigation requirements.
- Based on aquifer mapping four potential alluvial aquifers have been identified down to the depth of 450 m with thicknesses ranging from to 138m to 232 m.
- The management plan suggested are:
  - Lining of unlined channels for reducing seepage losses (30%) for increased water availability especially for irrigation
  - Farmers participation for artificial recharge to ground water by utilizing about 27900 existing wells as recharge structures in agriculture fields, Construction of 1447 recharge structures along the National Highways, Construction of 33427 Rooftop Rain Water Harvesting (RTWH) structures in rural areas and about 8483 RTRWH structures in urban areas to augment ground water resources.
  - Discontinuing the practice of free electricity supply for agricultural / irrigation practices in the State.

In the second phase:

- Over exploitation, Water logging and Salinity are the major issues. Water levels are declining in Moga, Faridkot and major part of Bathinda, Ferozpur & Fazilkha districts. In these areas, stage of ground water development ranges from 106 to 257%. Rise in water levels have been observed in Muktsar and small part of Bathinda, Ferozpur and Fazilkha districts which is causing waterlogging conditions. High salinity is the major quality issues in these districts. Higher concentration of Fluoride and Nitrate are observed at sporadic locations.
- On the basis of Aquifer Mapping of these areas Aquifer groups (AQUIFER-1A, 1B & Combined Multiple Aquifer) are identified up to the maximum depth of 300m. Fresh and saline water interface have also been delineated.
- The management plans as suggested are:
  - **In overexploited areas:** Wastage of water due to seepage from water courses need to be reduced. Unlined open channel need to be abolished to de-stress the depleted aquifers by laying Underground pipes. Conservation of rainwater for Artificial Recharge through recharge pits to promote “Khet Ka Pani Khet Mein”. Rainwater Harvesting and Artificial Recharge to Ground Water. Change in Cropping Pattern from paddy and Promotion of Pulses & Oil Seeds in O.E. Blocks. Adoption of Micro Irrigation Methods i.e. laser leveling, drip/sprinkler irrigation etc. Free Electricity to farmers must be discontinued to conserve groundwater.
  - **In Saline water areas:** Mixing of Canal Water and Groundwater for irrigation. Construction of sump well to collect surface water and pumped to irrigated lands/ discharged drains or canals. Pumping of groundwater by constructing number of tube well in water logged areas (Multiple well point System). Lining of unlined

canals. Repairs of broken linings to avoid seepage of water to the adjacent areas. Adoption of methods like Leaching and blending (to meet the problem of salt encrustation on ground as well as problem of reduced infiltration). In Soil salinity/alkalinity hazards areas, application of gypsum is suggested in March when the field comes to optimum moisture (Water) conditions.

- **Water logging Area:** Conjunctive use of canal water and groundwater in fresh water aquifers using shallow wells. Laying of underground pipelines in place of open channels used for tubewell based irrigation. Construction of more surface drains in the area to drain out excess rain water and shallow sub surface waters. Change in cropping pattern grows crops which can be harvested in water logged conditions like rice etc. Tree plantation of eucalyptus etc. Curtailing of canal discharge during non-irrigation period.

IV. RAJASTHAN

- Total area of 74164 km^2 area was covered in aquifer mapping in Rajasthan state and about 13800 sq. m area comprising Sikar and Jhunjhunu districts have been covered in phase I and About 60367 sq. Kms area comprising 84 blocks of the 10 districts namely Alwar, Ajmer, Bhilwara, Bharatpur, Dausa, Dhaulpur, Karauli, Jaipur,Jhunjhunu and Sikar covered in phase II . Over-exploitation is the major issue in the area, with stage of ground water withdrawal ranging from 151% for Sikar and 225% for Jhunjhunu. About 93% area has deep water level (>20m) and maximum water level is about 100 meter. Ground Water quality is also affected by Inland salinity in some parts of the study area.
- The alluvial aquifers are underlain by hard rock aquifers. Thickness of alluvial aquifers is up to 147 m in the area followed by hard rock aquifers.
- The management plan recommends for phase I includes the following
  - Improved irrigation practices which will save around 308 MCM of water annually
  - Adoption of Rainwater harvesting & artificial recharge and water conservation practices will conserve around 10 MCM water annually.
  - Change in cropping pattern (by reducing area of sowing of water intensive crops) will reduce the overdraft of ground water from 27 to 50 %.
- The management plan recommends for phase II includes
  - Improved irrigation practices will save around 752 MCM of water annually
  - Adoption of Rainwater harvesting, Artificial recharge and water conservation practices will conserve around 72 MCM water annually. Artificial Recharge structures recommended are mainly Recharge Shafts within existing pond.
  - Change in cropping pattern (by reducing the area of sowing of water intensive crops) will reduce the overdraft of ground water from 5 % (Bharatpur district) to 81 % (Sikar district)

V. TAMIL NADU

- Aquifer mapping was completed for Upper Ponnaiyar Aquifer System covering 7130 Km^2 and in 10,764 Sqkm for Upper Ponnaiyar and Upper Cauvery basins covering districts of Krishnagiri, Dharmapuri and parts of Salem, Tiruvannamalai and Vellore districts. Two aquifer systems have been delineated in these hard rock terrains. Major issues identified include declining water levels in the range of 0.2 to 0.7 m/year in Dharampuri and Krishnigiri district, which are drought prone districts as well. In these areas 38 out of 57 firkas are over-exploited.
- Management interventions proposed include construction of nearly 5000 rainwater harvesting/ artificial recharge structures. Estimated recharge from these structures is

nearly 115 MCM, which is expected to raise the water level in the area by 2.36 m thereby reducing stress on the aquifers.

- Aquifer mapping studies was completed in Upper Cauvery Aquifer system covering an basin area of 4561 Sq.km with 3634 sq.km as mappable area. Dharmapuri, Krishnagiri and Salem districts are covered in parts covering 32 firkas (15 OE and 8 Semi-critical).
- The region is an intensively agricultural region with 85 % of the agricultural area irrigated with groundwater. The Declining water levels, sustainability of wells & high F are the major issues.
- Two aquifer units were deciphered with aquifer Unit - I being the weathered, occurs from ground level to 36 m bgl and Aquifer Unit –II is the fractured/Jointed zone existing from 11 to 140 m bgl (2-5 fractures are encountered).
- Construction of AR structures (CD-302, PP-421, RS-300 & Revival of Ponds with RS - 689), water use efficiency (2250 ha) and water conservation structures (Farm ponds 2250) at a cost of 308.55 cr would create an additional resource of 61.75 mcm/yr. This would help in preventing further groundwater level decline.

VI. GUJARAT

Aquifer Map and Aquifer Management Plan is taken up in three districts constituting Porbandar (2297 sq), Bansakantha (10400 Sq.km.) covering 12 blocks (OE-6, Critical-1, Saline 2 and safe 3) , Patan (5731 sq.km.) covering 7 blocks (OE- 3, saline -4) and totalling 16131 Sq. Km. Area of Mahesana (4407 Sq.Km.) covering 9 blocks (OE-8 and Critical-1) was completed in Dec 2016. Out of the 28 blocks of these three districts of North Gujarat region 17 blocks are overexploited, one critical, 6 saline and 2 under safe category.

- Aquifers comprises of sedimentary and hard rock formation with decline upto 3 m in isolated patches in Porbandar districts. The thick alluvial deposit forms the multi-layer aquifer system with yield upto 53 m^3/hr, within alluvium. Ground water occurs under phreatic, semi confined and confined condition. The hard rock granite and gneiss and metasediments in the north-eastern part of area form aquifer with yield prospects upto 42 m^3/hr. Depth to water level ranges from 2 to 70 meters below ground level(mbgl) in Phreatic and 6.5 – 179 mbgl in first confined aquifer and GL to 185 mbgl in second confined aquifer.
- Sea water intrusion and inherent salinity are the major issue in the Porbandar district and Over exploitation of ground water, Lateral and Vertical change in Ground water yield and quality, high demand of water for existing irrigation practices are some of the major ground water related issues in the area. Deeper water levels more than 10 m are observed in Northern and Eastern part.
- Accordingly suitable Groundwater management interventions are suggested for the districts.
- Also, augmentation of Ground water Recharge of 239 MCM through Rain water Harvesting and Artificial Recharge by construction of 627 Percolation Tanks, 1851 Farm ponds and 1197 Recharge shafts/Point recharge structures.

VII. TELANGANA

- During January to March 2016, an area of 6764 sq. km, in parts of Nalgonda district, Telangana state has been covered. A total of 37 mandals (full/part) have been covered. Weathered and fractured granites constitute aquifers.
- The major ground water related Issues are sustainability of ground water sources, declining ground water levels and occurrence of fluoride.
- The suggested management plan include construction of 1528 artificial recharge structures like Check dams and Percolation tanks. Apart from Repair, Renovation &

Restoration of water bodies/ tanks (351 no's) taken up by State Government, desilting of balance 1650 tanks is also suggested. It is suggested that ~ 54900 ha of additional land that can be brought under micro-irrigation (@100 ha/village). The proposed Mission Bhagiratha Scheme by Government of Telangana is envisaged to provide drinking water to all rural and urban habitations through surface water supply. Thus all habitations (including fluoride affected) will be covered with the implementation of this project.

- With the suggested interventions costing Rs 486.45 crores (excluding the cost involved in Mission Kaktiya and Mission Bhagiratha), the likely benefit would be the net saving of 173 MCM of ground water. This will bring down the stage of ground water development by 15 % (from 64% to 49 %).

VIII KARNATAKA

About 3975 sq. km area in Kolar district have been covered and Chikballapur district (full) covering 4250 sq. km and 987 sq.km area in Hukkeri taluk, Belgaum district (part) have been covered during January to March 2016.

- Major issue in these districts is overexploitation of ground water with stage of ground water withdrawal upto 195% and top aquifer has become completely devoid of water. Water level of bottom fractured aquifers has gone very deep (>50 m) in about 25**%** of the area. Irrigation borewells have gone very deep (upto 450m) and more than 60% wells have yield < 1lps and sustainability issue during lean period due to less thickness of fractured aquifers.
- Bagepalli taluk is mostly affected by Flouride problem.
- The management plan suggests:
  - Alternate drinking water supply from Yettinahole Project
  - Augmentation of groundwater through artificial recharge by constructing 383 recharge structures in Kolar district and 424 recharge structures in Chikballapur district.
  - Promote Water Use Efficient methods and introduction of drip / sprinkler irrigation in uncovered areas (30%).
  - Augmentation of groundwater through filling up of (i) 196 tanks from Yettinahole project and (ii) 32 tanks from treated waste water from Bangalore city**.**
  - Promote Water Use Efficient methods and introduction of drip / micro irrigation in uncovered areas (30%).
  - In Hukkeri taluk, about 591 sq.km is prone to water logging in command area, where water level is <5 mbgl. Management plan also recommends irrigating additional Non-command area by withdrawing ground water from Command area by adopting conjunctive use plan.

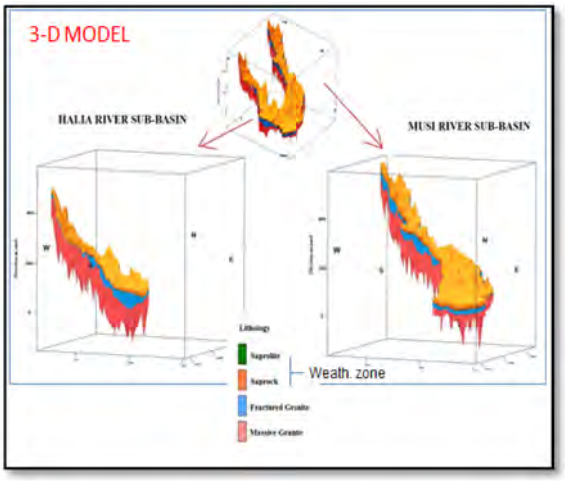
IX. CHHATARPUR, MADHYA PRADESH (PARTS OF BUNDELKHAND)

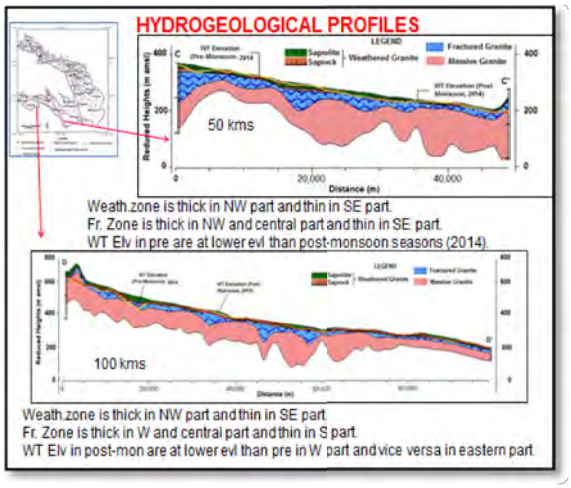
- An area of 895 Km^2 in parts of Badamalhera block of Chhatarpur district of Madhya Pradesh was covered under NAQUIM.
- The major issue is exploitation of ground water with stage of ground water withdrawal upto 75.57%, Major geological formation is granitoids. Water level of bottom fractured aquifers has gone very deep and shallow aquifer almost dries up from the beginning of April month. About 80% of area is ground water based irrigation and tube wells have dwindling discharge and sustainability issues in the lean period due to limited fracture thickness in the aquifers.

- The management plans proposes construction of Percolation tank (40), Check dam/nala bund/ cement plug (286), Recharge shaft (82) and renovation of village pond (163).

X. NCR Area / Parts of Ghazipur, Sambhal and Jhansi districts (UTTAR PRADESH)

- Aquifer mapping was completed in parts of Nation Capital Region (Six districts i.e. Baghpat, Hapur, Meerut, Bulandshahar, G.B.Nagar & Gaziabad) and in parts of Ghazipur, Sambhal and Jhansi districts covering 17,893 sq kms.
- Three (3) aquifer systems have been delineated in NCR area down to 450 mbgl (drilled depth)
- Two aquifer systems have been delineated down to 300 mbgl in parts of Sambhal and Gazipur districts.
- In Hard rock areas of Jhansi district, weathered zone and potential fracture zones were identified down to 200 meter depth.
- The major issues identified include declining in water levels which ranges from 0.03 to 1.0 m/year in parts of Baghpat, G.B.Nagar, Meerut and Ghaziabad districts.Arsenic in shallow aquifers in parts of Ghazipur district and sustainability of ground water sources in parts of Jhansi district have been identified. In the area, out of 65 blocks, 18 blocks are under “Over Exploited” category.
- The management interventions proposed includes arresting decline in water levels through construction of artificial recharge and rainwater harvesting structures viz Check Dams, recharge shaft, renovation of existing ponds, roof top rain water harvesting etc. Increasing water use efficiency in irrigation through piped water supply in parts of NCR and Sambhal district. In parts of Jhansi district for ground water sustainability, construction of check dams, construction of farm ponds, renovation of water bodies and use of sprinklers & drip irrigation for water use efficiency. In Ghazipur district, in arsenic affected areas, deep tube wells are to be constructed tapping deeper aquifers & cement sealing of first aquifer.





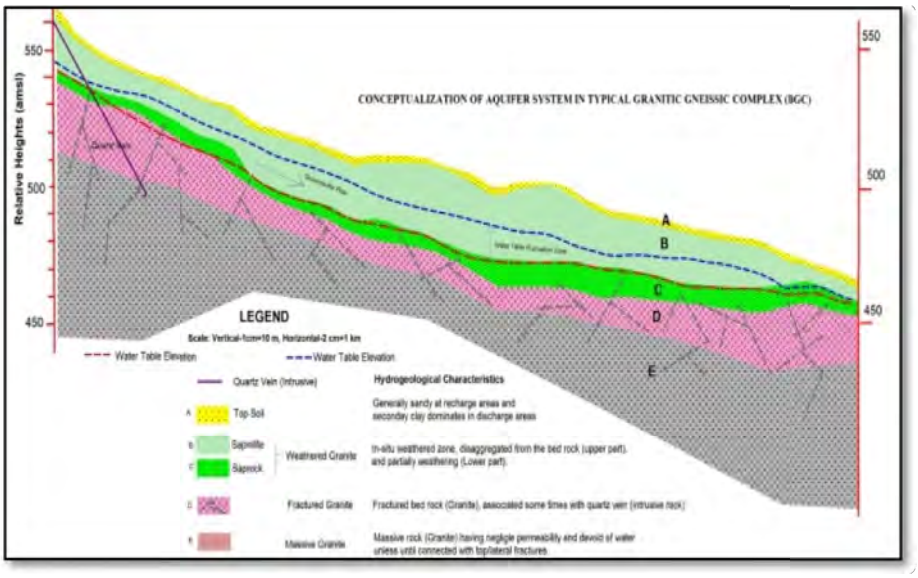
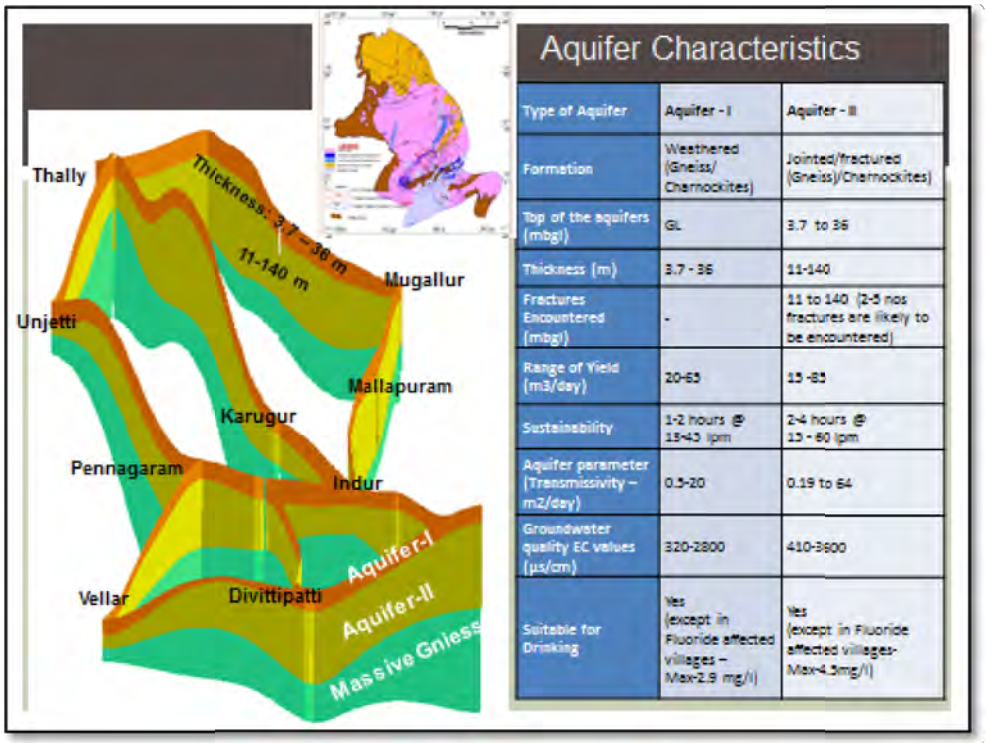


Figure 2.2: 3D aquifer Model, Hydro geological profiles and aquifer conceptualization for Halia River Sub basin and Musi River Sub basin of Telangana State



Aquifer Characteristics

Type of Aquifer	Aquifer - I	Aquifer - II
Formation	Weathered (Gneiss/ Charnockites)	Jointed/fractured (Gneiss)/Charnockites)
Top of the aquifers (mbgl)	GL	3.7 to 36
Thickness (m)	3.7 - 36	11-140
Fractures Encountered (mbgl)	-	11 to 140 (2-5 nos fractures are likely to be encountered)
Range of Yield (m3/day)	20-65	15 -85
Sustainability	1-2 hours @ 15-45 lpm	2-4 hours @ 15 - 60 lpm
Aquifer parameter (Transmissivity – m2/day)	0.5-20	0.19 to 64
Groundwater quality EC values (µs/cm)	320-2800	410-3600
Suitable for Drinking	Yes (except in Fluoride affected villages – Max-2.9 mg/l)	Yes (except in Fluoride affected villages- Max-4.3mg/l)

Figure 2.3: 3D aquifer Model for Upper Cauvary basin and aquifer characteristics of Tamil Nadu State

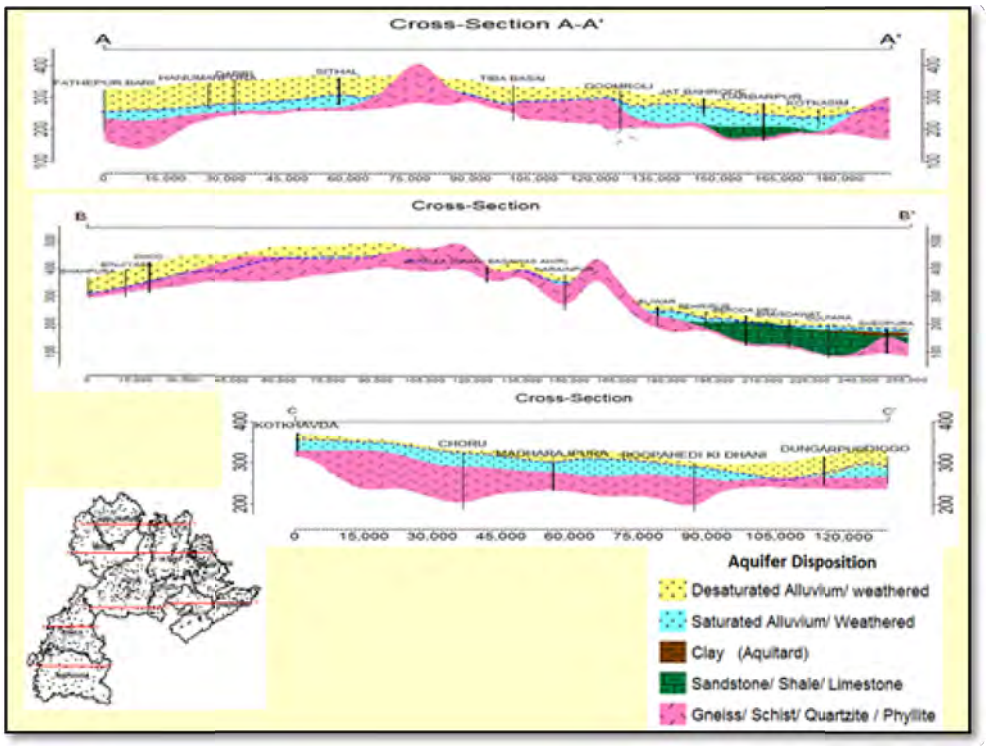


Figure 2.4: 2D- Aquifer disposition for Rajasthan state

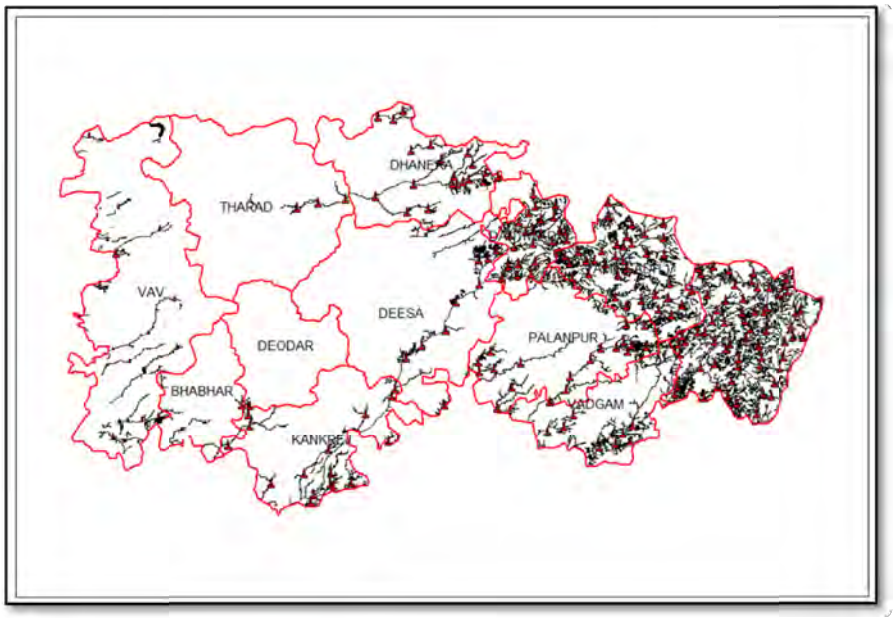


Figure 2.5: Recharge Management Plan proposed for Banaskantha District of Gujarat

Figure 2.6: An interactive session of senior officers of CGWB, Nodal officers of Aquifer Mapping with Eminant Agriculture scientist

Figure 2.7: Soil infiltration test conducted in parts of Dharmpuri district of Tamil Nadu

Figure2.8: Unlined open canal in Parts of Haryana

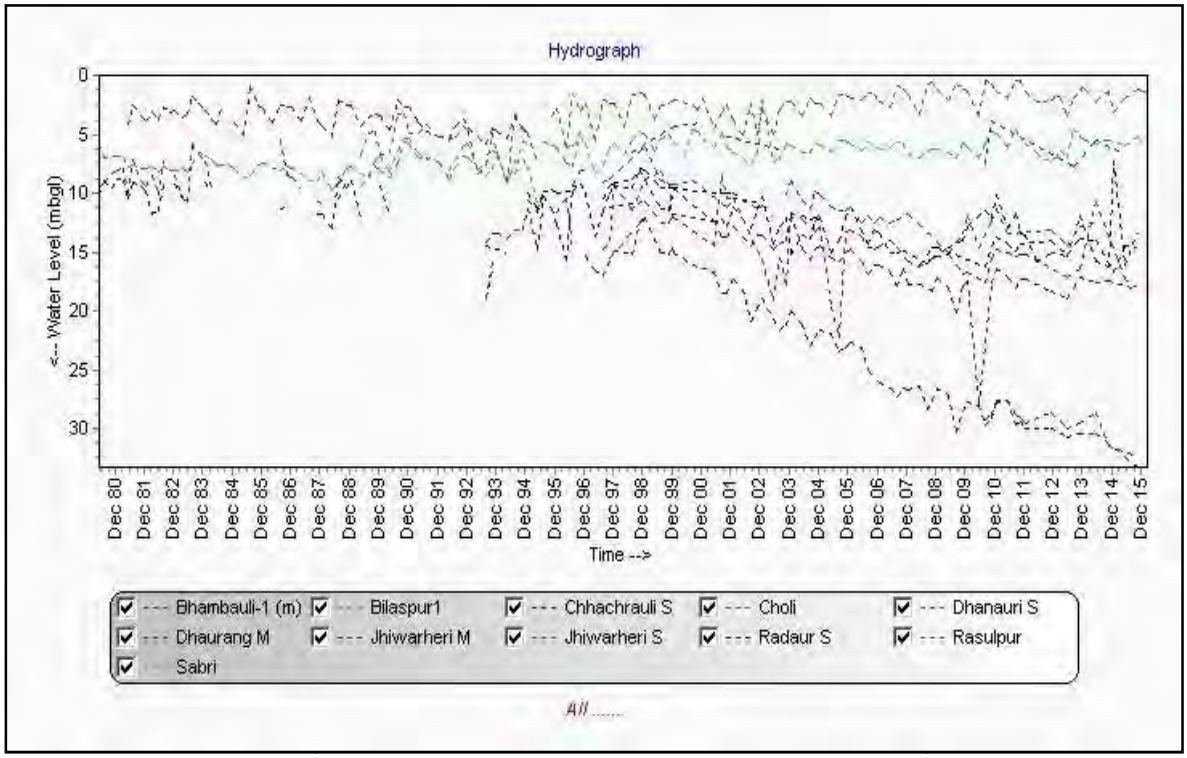


Figure 2.9: Long term water level trends in Yamuna Nagar District of Haryana

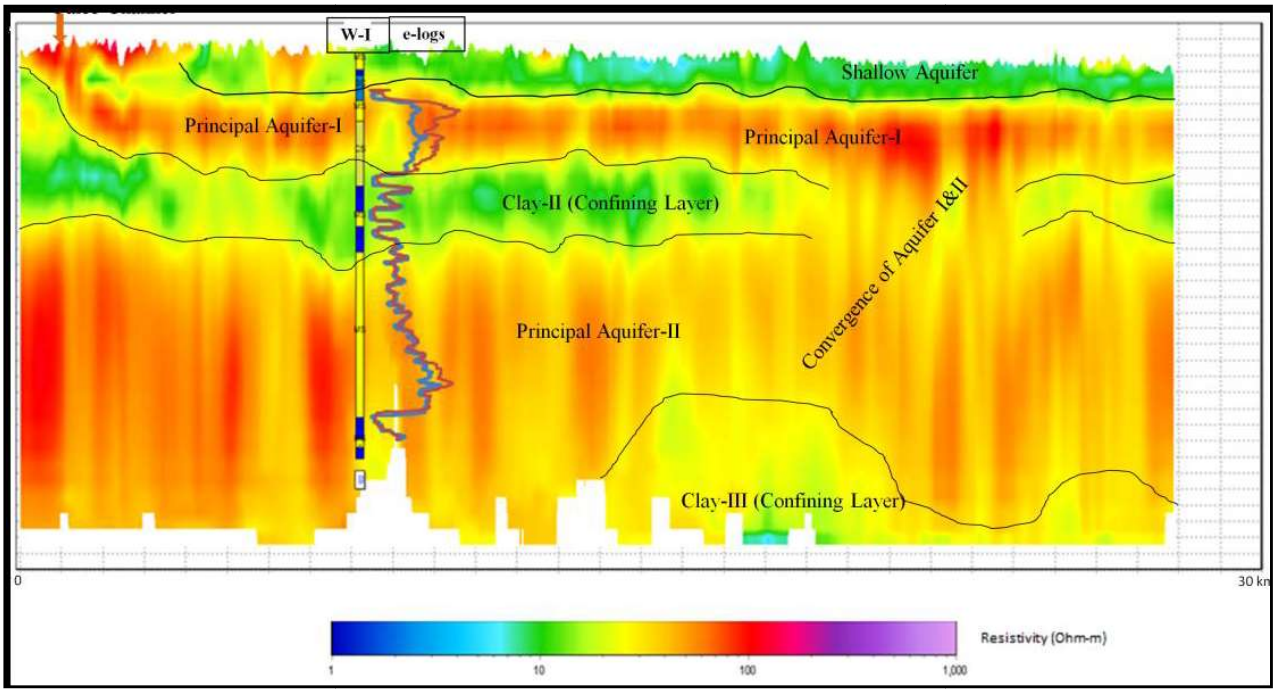


Figure 2.10: Interpretted Sky TEM data conducted in parts of Sone and the Ganga Rivers

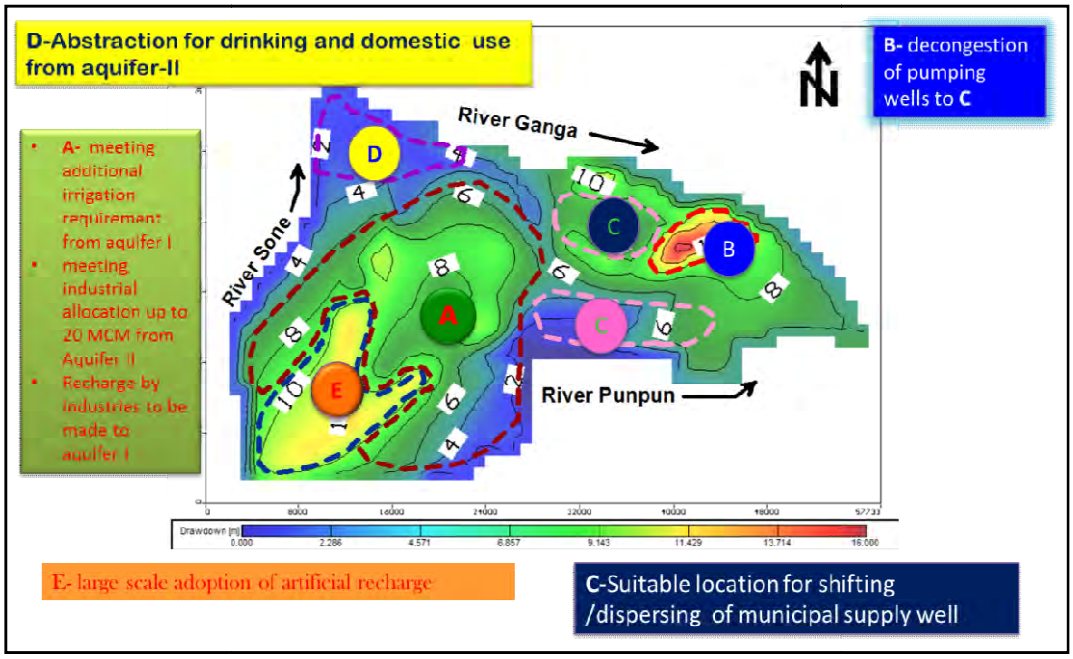


Figure2.11: Proposed Aquifer Management strategy for Sone and the Ganga Rivers confluence Bihar

Fig.2.12: Collection of samples for 14C analysis for absolute age determination of ground water

Fig.2.13: Meeting of central level expert committee for review of aquifer maps and management plans.

Figure 2.14: Deliberations & Brain storming during the Technical sessions at IISC Bangalore

STATUS OF SHARING OF AQUIFER MAPS AND MANAGEMENT PLAN WITH STATE GROUND WATER COORDINATION COMMITTEE

The aquifer maps and management plans prepared are being shared with the respective State Government. In order to coordinate on various issues related to aquifer mapping, between the State Govt. and CGWB, State Ground Water Coordination Committee (SGWCC) has been formed, headed by the concerned Principal Secretary of the State Department dealing with ground water. In such States Aquifer Maps and management plans have been prepared and presented to the SGWCC periodically.

STATUS OF NATIONAL INTER-DEPARTMENTAL STEERING COMMITTEE (NISC) MEETING FOR NAQUIM

National Inter-Departmental Steering Committee (NISC) under Chairmanship of Secretary (WR, RD &GR) was constituted by the Ministry of Water Resources on 25.07.2012 which was modified in 10/10/2013.

On Regular Basis NISC meeting was conducted in Ministry for proper implementation of NAQUIM. In total three meeting were conducted on dated 21/11/2013, 16/05/2014, 11/05/2015 till 31st March, 2016. In a meeting chaired by the then Secretary (WR), on 18/08/2015 it was decided to reprioritize the areas for aquifer mapping considering ground water stressed areas, water quality issues as well contiguity of the areas being taken up for NAQUIM. The Project Monitoring Unit (PMU) was constituted in CGWB, Faridabad on 25th August,2015.

Area for aquifer mapping reprioritized: Major thrust was laid on 8 States viz. Haryana, Punjab, Rajasthan, Gujarat, Andhra Pradesh, Telangana, Karnataka, Tamilnadu and Bundelkhand Region (covering parts of MP and UP) covering an area of 5.25 lakh km^2.

SUCCESS STORIES OF NAQUIM

NAQUIM outcomes have helped in providing practical solutions to variety of ground water issues in the country like conceptualisation of the largest ever artificial recharge plan,

sustainability of hot springs, arsenic contamination etc. Some of the notable outcomes are listed below.

- Project on Tapi Mega Recharge being initiated as an outcome of Aquifer mapping study.
- The study of Rajgir springs was taken up as a part of aquifer mapping to explore possibilities and ways of sustaining the springs.
- Construction of 25 wells in drought affected areas of Latur district Maharashtra on war footing during May June 2016 and handing over to the state govt.
- Under the ongoing NAQUIM programme studies were taken up for source finding in water scarce villages in Tikamgarh district for PHED. A total of 18 wells were constructed in the fractured granites.
- On the basis of findings of NAQUIM, improvised well design was proposed to deal with groundwater contamination in Rosanabad area of Haridwar city, which was discussed and accepted by the SGWCC.
- Tamilnadu Water Supply and Drainage Board (TWAD) have constructed wells tapping Fluoride safe aquifers in upper Ponnaiyar Aquifer system based on the findings of NAQUIM.
- Detailed studies were carried out in Bairiya Block of Ballia District and Karanda Block of Ghazipur District in Uttar Pradesh. Wells tapping arsenic safe aquifers in 30 villages in Bairiya Block and 15 villages in Karanda Block were constructed by CGWB.
- The work carried out in parts of Mehrauli Block in Delhi-NCR on the issue of rising water levels on the basis of findings of NAQUIM and extended investigations has been highly appreciated by the Hon'ble Delhi High Court in its judgment.
- Based on Aquifer mapping recommendations Govt of Tamilnadu has initiated actions to control withdrawal of ground water in the coastal areas of Cuddalore District.
- As a part of NAQUIM programme in Ri Bhoi district, Meghalaya, CGWB has drilled 18 successful bore wells. The study has shown that ground water based irrigation can be taken up in this area.

3. PILOT PROJECT ON AQUIFER MAPPING

During 2015-16, under the Hydrology Project-II, the implementation of Pilot Project on Aquifer Mapping has been completed in six different Hydrogeological terrains of the country covering states of Bihar, Rajasthan, Tamil Nadu, Karnataka and Maharashtra. The activity of data generation to fill the data gaps has been completed. Various ground geophysical survey viz. VES, Ground TEM and ERT and Heliborne Survey by CSIR-NGRI have been completed in all six pilot areas. Reports have been submitted by CSIR-NGRI. Geophysical techniques of VES, TEM, ERT and Advanced Heliborne TEM have been used in the project and on the basis of results, efficacy of different geophysical technique have been ascertained and protocol for use of geophysical techniques for aquifer mapping in different hydrogeological terrains has been prepared. Aquifer maps and aquifer management plan have been prepared and reports have been finalized and released by the Hon'ble Minister of Water Resources, RD &GR on the occasion of Jalmanthan-2 during February 22-23, 2016 at Vigyan Bhawan, New Delhi. The reports have been hosted in CGWB website.

A brief about the project and outcomes of the project are given below.

Pilot Areas

- Alluvium overlying hard rocks in Baswa-Bandikui, Dausa District, Rajasthan
- Part of Thar Desert Terrain in Jaisalmer District, Rajasthan
- Alluvial plains of Ganga basin in Watershed GNDK013, Patna District, Bihar
- Basaltic traps underlain by Gondwanas in Watershed WGKKC-2, Nagpur District, Maharashtra
- Crystalline rocks in Parts of Tumkur District, Karnataka
- Coastal sediments in Lower Vellar Watershed, Cuddalore District, Tamil Nadu

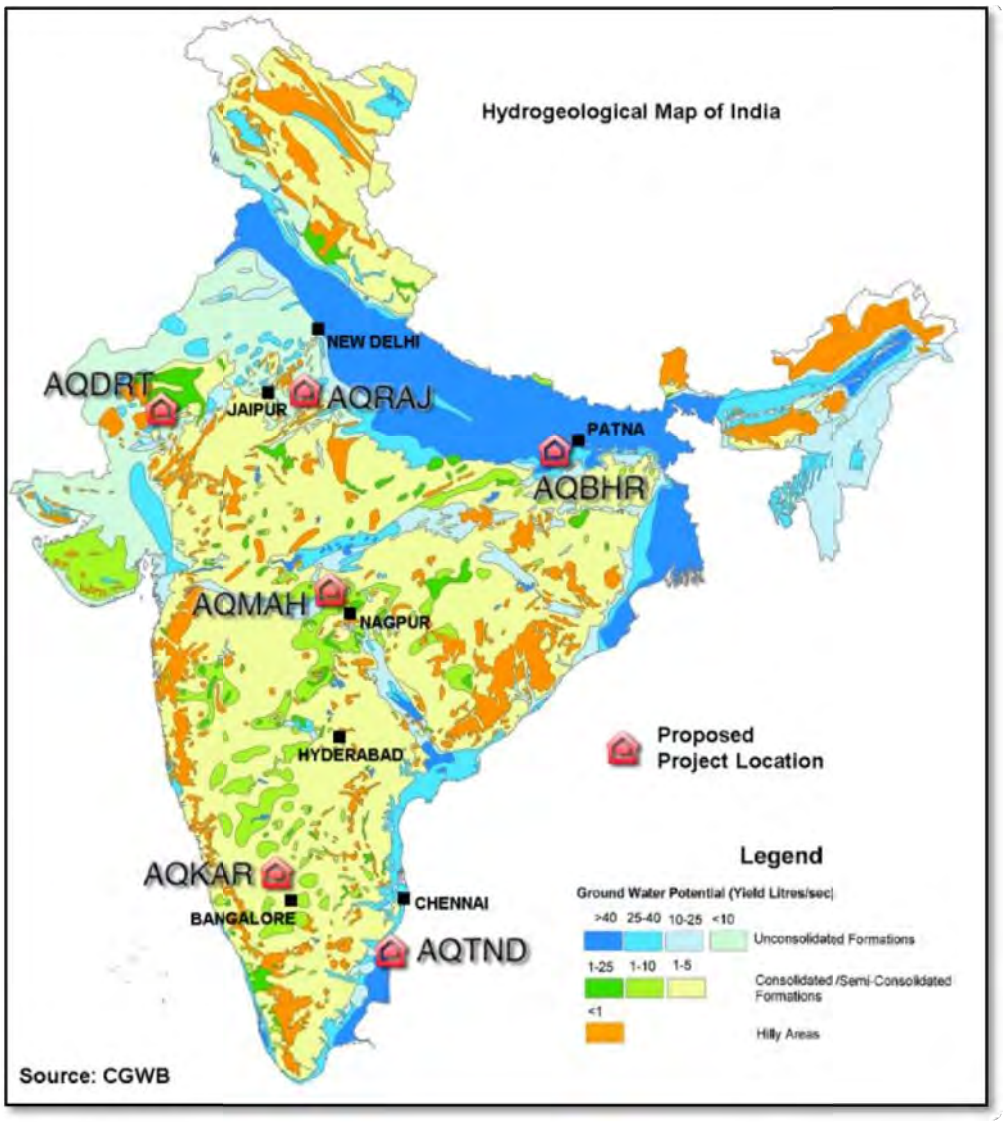


Fig 3.1: Project Location of Pilot Project of Aquifer Mapping

Objectives

- To define the geometry of aquifers on 1:50,000 scale; to establish hydraulic characteristics and geochemistry of Multi-layered aquifer systems; to study ground water regime behaviors.
- Application of new geophysical techniques and establishing the utility, efficacy and suitability of these techniques in different hydrogeological setup.
- Finalizing the approach and methodology on which National Aquifer mapping programme of the entire country can be implemented.
- The experiences gained can be utilized to upscale the activities to prepare micro level aquifer mapping.
- Aquifer Characterization using advanced geophysical techniques and to establish the efficacy of various geophysical techniques for different Hydrogeological terrains.

For Aquifer Characterization using advanced geophysical techniques and to establish the efficacy of various geophysical techniques for different Hydrogeological terrains, **C**SIR-NGRI was engaged as a consultant and contract agreement between CGWB and CSIR-NGRI was

signed on 21-05-2012. The contract was subsequently extended up to 25 March, 2015. CSIR-NGRI applied different advanced geophysical techniques with corroboration from existing borehole information to provide precise information about shallow and deep aquifers with their geometry at a reasonable scale (1: 50,000) in six pilot project areas including, latest state of art Aquifer mapping methods using Heliborne Transient Electromagnetic techniques.

In the Pilot Aquifer mapping project, the activities carried out were broadly grouped into compilation of existing data and identification of data gap; generation of data; preparation of Aquifer Maps; formulation and Implementation of Aquifer Management Plan. During the year 2014-15 the compilation of relevant data and identification of data gaps was completed. Various thematic layers were prepared & conceptualization of aquifer system with existing data was completed. The activity of data generation to fill the data gap was also completed. Refinement of Aquifer system was carried out during 2015-16 based on data generated. Various ground geophysical survey viz., VES, Ground TEM and ERT and Heliborne Survey by CSIR-NGRI were completed in all six pilot areas. Preparation of aquifer maps and formulation of aquifer management plan have finalized during 2015-16. The report were released by Hon'ble Minister of Water Resources, RD & GR on the occation of *JALMANTHAN-2* organized by the Ministry of Water Reources RD & GR during 22-23.02.2016 at Vigyan Bhawan, New Delhi.

Outcomes

By integrating the data generated from hydrogeological studies including exploration and geophysical studies, geometry of aquifer has been delineated; aquifer characteristics has been established and aquifer maps have been prepared.

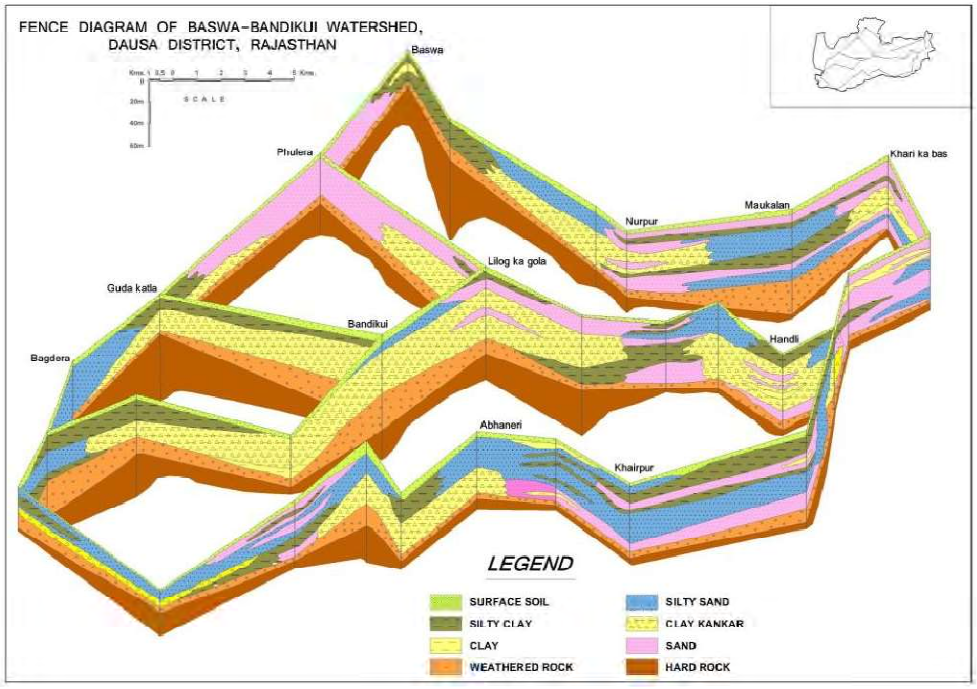
Geophysical techniques of VES, TEM, ERT and Advanced Heliborne TEM have been used in the project and on the basis of results, efficacy of different geophysical technique have been ascertained and protocol for use of geophysical techniques for aquifer mapping in different hydrogeological terrains has been prepared.Aquifer Management Plan has been formulated using the aquifer response modeling technique for the groundwater related issues identified during the course of project.

Area-wise outcome has been summarized below.

Rajasthan: Alluvium terrain underlain by crystalline-Dausa district

Two aquifer systems are inferred and characterized. Aquifer unit –I comprising of alluvium occurs from ground level and has a thickness of 5 to 72 m with yield potential ranging from 90 to 1200 cu.m/day. Groundwater is suitable for drinking & irrigation purpose except for few locations with salinity and Fluoride. Aquifer unit-II comprising for weathered formation ranges in thickness from 1 to 33 m has yield of 40 to 130Cu.m/day. The issues in the area are that the entire Baswa-Bandikui watershed is over-exploited and continuous decline of water levels have been observed in both the aquifers.

Management interventions recommended include various recharge mechanisms along with demand side on-farm micro-irrigation practices for entire area. Adopting water saving micro-irrigation techniques will reduce demand for ground water by 35 % and about 25 mcm of ground water is envisaged to be saved through on-farm water management practices. It is also suggested to restrict further enhancement in ground water withdrawal through governance.

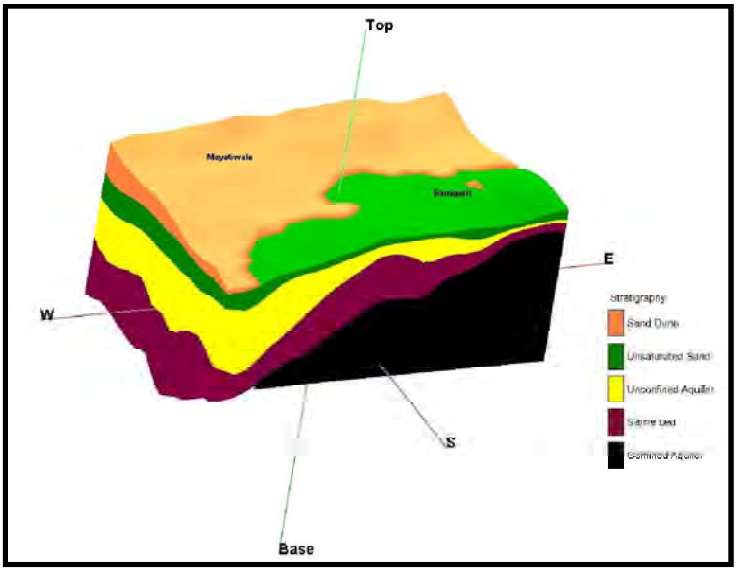


Rajasthan: Desert Terrain-Sam Panchayat Samiti (block), Jaisalmer district

Three aquifer units are inferred and characterized. Aquifer Unit-I comprising of alluvium occurs from ground level to 59m bgl. Aquifer unit –II comprising of alluvium & Sandstone occurs from 2 to 75m bgl with a thickness range of 1 to 180 m. both the aquifer units are not suitable for drinking and irrigation. Aquifer unit III comprising of sandstone and limestone occurs from 7 to 278 m bgl and is not used.

The issues are meagre ground water resources and unit annual ground water recharge is very meagre (~ 3.44 mm /Yr, 2% of the annual rainfall). Even this meagre resource is brackish due to intrinsic property of the rock formations, thus rendering it to be unsuitable for use.

The management interventions proposed in the desert project area are up-scaling traditional water harvesting system and controlled use of limited fresh ground water pockets especially in canal command area (INGP Canal).

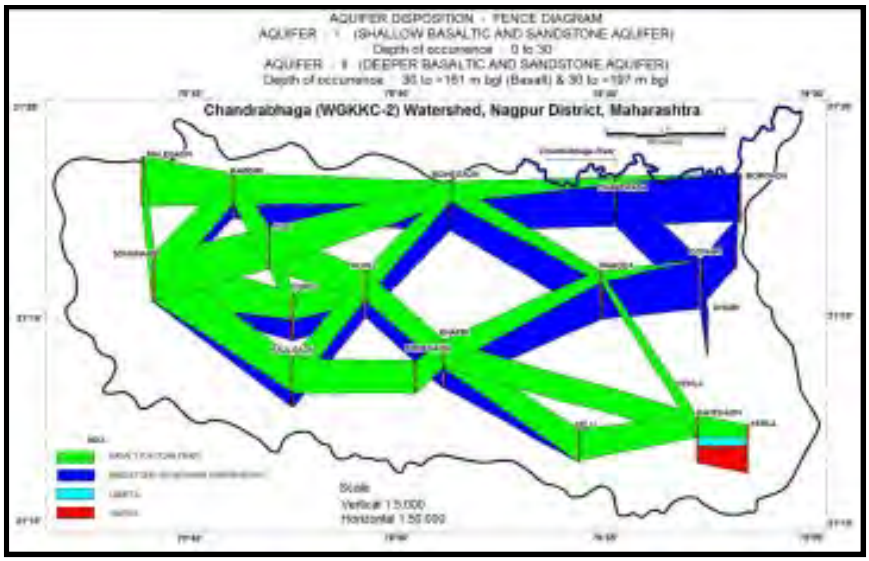


Maharashtra: Basaltic Terrain - Chandrabhaga Watershed, Nagpur district

Two types of aquifers inferred and characterized. Aquifer I - Unconfined aquifer, consisting basalt & sandstone in the NE part. This aquifer generally occurs to the depth of 20 to 30m bgl. Yield of these wells in basalt & sandstone range from 12 to 432 &118 to 508 Cu.m/day. Aquifer II – Semi-confined to confined aquifer. Basaltic aquifer occurs between depth range of 30 and 161 m bgl and has a yield of 5 to 155 Cu.m/day. Sandstone aquifer occurs between 45 and 197 m bgl and yield of this formation ranges from 255 to 650 Cu.m/day. Both the aquifers are suitable for drinking and irrigation purpose except for few locations.

The issues in the area are high ground water withdrawal for agricultural and industrial uses and with present rate of groundwater withdrawal watershed will become critical in near future.

Management interventions recommended include construction of Percolation tanks and check dams on 2nd& 3rd order stream, Construction of KT weir and UGB at mini and micro-watershed level.

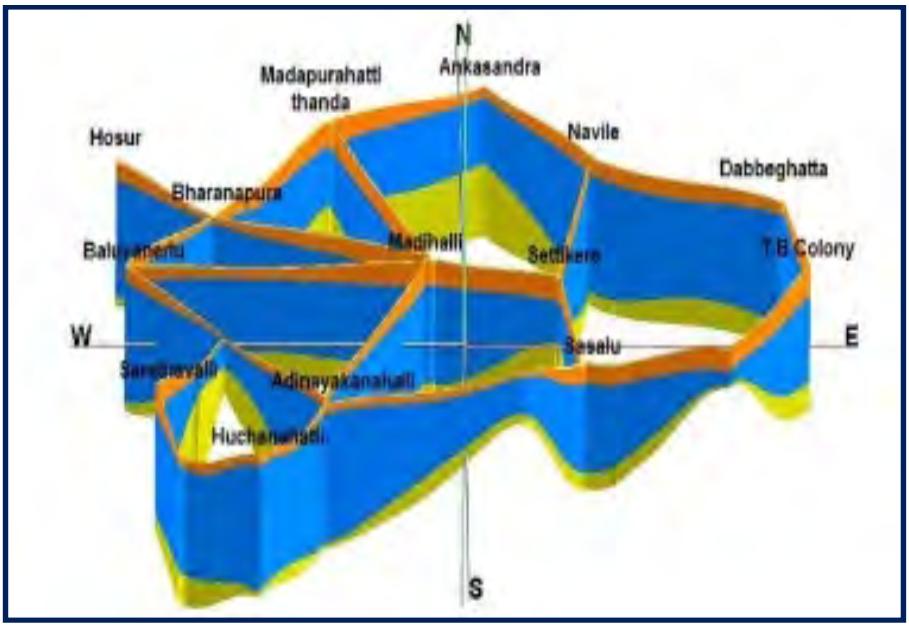


Karnataka: Crystalline Terrain - Ankasandra watershed, Tumkur district

The area is characterized by Granites, Schists & Gneisses and has both weathered residum and fractured aquifer system.The weathering ranges from 18 to 52m bgl and it is observed that 2 to 3 sets of fractures are likely to be encountered down to the depth of 190m bgl with a yield potential of 2 to 36 Cu.m/day. However, presently the weathered residuum is desaturated because of over exploitation of ground water in major part of the study area. The occurrence and movement of ground water is mostly restricted to fracture zones.

The issues in the area are high stage of ground water development, heterogeneity of aquifer, erratic rainfall condition & drying up of wells.

Management interventions include groundwater development in few areas which are demarcated and Artificial recharge through transfer of water from Hemavathi (Cauvery basin) to the tune of 1,200 ha.m /year (12 MCM) and fill up all the existing tanks after desiltation continuously for 10 years so that deep aquifers are recharged & water level is expected to rise 5-10 m bgl.

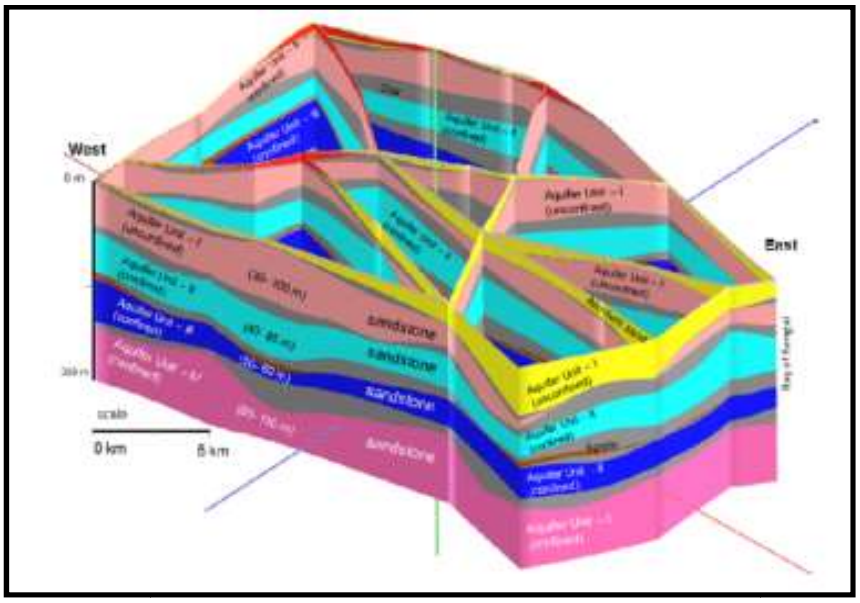


Tamil Nadu: Lower Vellar watershed, Cuddalore district, Tamil Nadu

Four aquifer units are inferred and characterized. Aquifer unit-I comprising of alluvium/sandstone occurs at ground level & has thickness ranging from 30-100m with a yield potential of 100 to 200 cu.m/day. Aquifer unit-II comprising of Mio-Pliocene Sandstone occurs between 35 to 110 m bgl& thickness of 40 to 55 m with yield potential ranging from 200-220 cu.m/day. Aquifer unit-III & IV comprising of Eocene sandstone occurs between 90 to 160 & 150 to 280 m bgl& thickness ranging from 55-100 &>250 m with an yield potential between 800-900 & 1200 to 1300 cu.m/day respectively.

The project study revealed that for the present rate of groundwater abstraction ie. 1213 mcm/year, the coastal sandstone aquifer is safe and no threat of sea water intrusion exists. Only aquifer unit I and II are vulnerable to sea water intrusion if the groundwater abstraction increases by 700 mcm annually for each aquifer unit from the present rate of pumping. The aquifer management plan was generated for all four aquifer units by taking into the future demand and needs to ensure sustainable management of the Cuddalore coastal aquifer system.

Management interventions recommended that Aquifer unit I & II should be kept for mainly domestic purposes and partly agricultural purpose, Aquifer III for agriculture & mining activity, Aquifer-IV for drinking water supply for Chennai City.

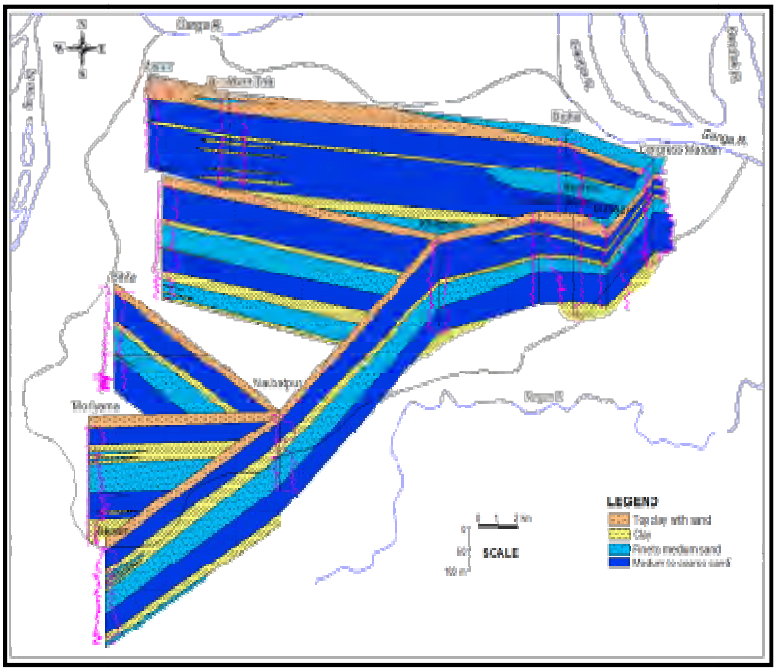


Bihar: Maner-Khagaul Area covering parts of Patna district

Two aquifers inferred and characterized. Aquifer unit occurring between the depth ranges of 35 to 130m bgl has a thickness of 50 to 80m and has a yield potential of 3600 to 6000Cu.m/day. It is utilized for drinking and irrigation purposes. Arsenic concentration beyond permissible limit at scattered patches in top portion in the north-western and north part of the area is observed. Aquifer unit II occurring between the depth ranges of 110 to 265m bgl has a thickness of 65 to 150m and has a yield potential of 300 to 5400Cu.m/day.

Issues identified in the area are huge dependence on Groundwater for domestic water supply for Patna urban area and Arsenic contamination in groundwater in scattered patches.

The ground water stress areas were demarcated. The management interventions suggested is decongestion of municipal water supply wells and shifting them to alternate areas having abundant groundwater. Aquifer I is recommended for meeting additional requirement of irrigation and Aquifer II is recommended only for drinking & domestic purposes.



4. GROUND WATER EXPLORATION

Ground Water Exploration aided by drilling is one of the major activities of the Board. It is aimed at delineation of aquifers in different hydrogeological setups and determination of their hydraulic parameters. The exploratory drilling operations have enabled demarcation of aquifers both in lateral and vertical extensions and evaluation of various aquifer parameters, designing of suitable structures and assessment of their yield potential in various hydrogeological settings. These studies have helped in identifying areas worthy for future ground water development. Ground Water Exploration contributes to a large extent in guiding the States to implement ground water development schemes.

It is being carried out by the Board through a fleet of 85 drilling rigs (31 Direct Rotary, 46 Down the Hole and 8 Percussion Combination types). During the year 2015-16, Central Ground Water Board under their Ground Water Exploration programme, 840 wells were constructed (EW-544, OW-219, Pz-77. . Priority was accorded to Over Exploited /Critical/Semi-Critical/Drought Prone and areas affected with ground water pollution etc. Out of 840 exploratory wells 669 wells were constructed in hard rock, 161 wells in alluvium and 10 wells in bouldary formations (Table 4.4). 74 wells were constructed in Tribal areas and 86 wells were constructed in drought prone areas (Table4.5). The statement showing State and Division & Region wise distribution of boreholes drilled/completed during 2015-16 is presented in Table 4.1 & 4.2(a) & (b) & Fig 4.1 & Fig. 4.2.

The Board has drilled total of 33611 bore holes (Including 3090 bore holes through outsourcing) as on 31.03.2015 to identify areas for ground water development in the country. The statement showing State-wise distribution of boreholes drilled/completed till March, 2016 in the country is presented in Table 4.3.

Fig 4.1 .Exploratory well at Trikkakara, Kerala Yielding 50400 lph

Fig 4.2: Exploratory well Uttamsara, Bhatukli Taluka, Amravati District, Maharastra

Table:4.1: STATE WISE WELLS CONSTRUCTED BY CGWB DURING THE YEAR 2015-16						
Sl. No.	**STATE/U.T.**	**EW**	**OW**	**Pz**	**TOTAL**	**REMARKS**
STATES						
1.	Andhra Pradesh	0	0	0	**0**	
2.	Arunachal Pradesh	1	0	0	**1**	
3.	Assam	5	4	0	**9**	
4.	Bihar	0	0	0	**0**	
5.	Chhattishgarh	27	10	0	**37**	
6.	Goa	0	0	0	**0**	
7.	Gujarat	25	12	0	**37**	
8.	Haryana	14	8	0	**22**	
9.	Himachal Pradesh	8	6	0	**14**	
10.	Jammu & Kashmir	25	5	0	**30**	
11.	Jharkhand	24	16	2	**42**	
12.	Karnataka	43	12	1	**56**	
13.	Kerala	21	10	0	**31**	
14.	Madhya Pradesh	56	14	0	**70**	
15.	Maharashtra	60	15	2	**77**	
16.	Manipur	2	2	1	**5**	1Pz count as Slim hole.
17.	Meghalaya	6	6	0	**12**	
18.	Mizoram	0	0	0	**0**	
19.	Nagaland	0	0	0	**0**	
20.	Orissa	42	11	1	**54**	
21.	Punjab	6	3	0	**9**	
22.	Rajasthan	40	18	13	**71**	
23.	Sikkim	0	0	0	**0**	
24.	Tamil Naidu	59	16	0	**75**	
25.	Tripura	1	2	0	**3**	
26.	Telangana	30	16	42	**88**	
27.	Uttarakhand	6	0	0	**6**	
28.	Uttar Pradesh	30	19	9	**58**	
29.	West Bengal	13	14	6	**33**	
		544	**219**	**77**	**840**	

Table 4.2(a) Division wise wells constructed by Central Ground Water Board during 2015-16

DIVISION		TARGET (2015-16)				ACHIEVEMENT (2015-16) (01.04.15 TO 31.03.2016)				% ACHIEVEMENT
		EW	OW	PZ	T	EW	OW	PZ	T	
I.	**Ahmedabad**	25	24	0	**49**	25	12	0	**37**	**76%**
II.	**Ambala**	15	14	0	**29**	20	11	0	**31**	**107%**
III.	**Varanasi**	19	17	0	**36**	22	11	9	**42**	**117%**
IV.	**Chennai**	34	37	0	**71**	72	21	0	**93**	**131%**
V.	**Ranchi**	27	24	0	**51**	24	16	2	**42**	**82%**
VI.	**Nagpur**	46	17	6	**69**	60	15	2	**77**	**112%**
VII.	**Guwahati**	17	15	0	**32**	15	14	1	**30**	**94%**
VIII.	**Jammu**	21	9	0	**30**	25	5	0	**30**	**100%**
IX.	**Hyderabad**	27	24	20	**71**	30	16	42	**88**	**124%**
X.	**Bhubneshwar**	53	28	0	**81**	42	11	1	**54**	**67%**
XI.	**Jodhpur**	24	22	14	**60**	40	18	13	**71**	**118%**
XII.	**Bhopal**	51	19	0	**70**	56	14	0	**70**	**100%**
XIII.	**Raipur**	24	21	0	**45**	27	10	0	**37**	**82%**
XIV.	**Bangalore**	46	28	0	**74**	53	15	1	**69**	**93%**
XV.	**Kolkata**	16	15	0	**31**	13	14	6	**33**	**106%**
XVI.	**Bareilly**	15	9	0	**24**	14	8	0	**22**	**92%**
XVII.	**Dharamshala**	11	10	0	**21**	8	6	0	**14**	**67%**
	TOTAL	**471**	**333**	**40**	**844**	**546**	**217**	**77**	**840**	**99.53%**

Table 4.2(b). Region wise wells constructed by Central Ground Water Board during 2015-2016

REGION	TARGET 2015-16				ACHIEVEMENT 2015-16				% ACHIEVEMENT	REMARKS
	EW	OW	PZ	T	EW	OW	PZ	T		
NWHR. Jammu	21	9	0	**30**	25	5	0	**30**	100.00%	
NWR. Chandigarh	15	14	0	**29**	20	11	0	**31**	106.90%	
WR. Jaipur	24	22	14	**60**	40	18	13	**71**	118.33%	
WCR. Ahmedabad	25	24	0	**49**	25	12	0	**37**	75.51%	
NCR. Bhopal	51	19	0	**70**	56	14	0	**70**	100.00%	
NCCR. Raipur	24	21	0	**45**	27	10	0	**37**	82.22%	
CR. Nagpur	46	17	6	**69**	60	15	2	**77**	111.59%	
NR. Lucknow	28	26	0	**54**	30	19	9	**58**	107.41%	
MER. Patna	27	24	0	**51**	24	16	2	**42**	82.35%	
ER. Kolkata	16	15	0	**31**	13	14	6	**33**	106.45%	
NER. Guwahati	17	15	0	**32**	15	14	1	**30**	93.75%	
SER. Bhubaneshwar	53	28	0	**81**	42	11	1	**54**	66.67%	
SR. Hyderabad	27	24	20	**71**	30	16	42	**88**	123.94%	
SWR. Bangalore	36	24	0	**60**	43	12	1	**56**	93.33%	
SECR. Chennai	26	30	0	**56**	59	16	0	**75**	133.93%	
KR. Trivandrum	18	11	0	**29**	21	10	0	**31**	106.90%	
UR. Dehradun	6	0	0	**6**	6	0	0	**6**	100.00%	
NHR. Dharamsala	11	10	0	**21**	8	6	0	**14**	66.67%	
TOTAL	**471**	**333**	**40**	**844**	**544**	**219**	**77**	**840**	**99.53%**	

Table 4.3: STATUS OF BORE HOLES DRILLED BY CGWB AS ON 31.03.2016.

Sl. No.	STATE/UT	EW	OW	PZ	Total	EW	OW	PZ	SH	DW	Total	TOTAL (I + II)
		(I) Through Outsourcing (Contractual)				(II) Through Departmental Rigs						
A.	**STATES**											
1	Andhra Pradesh	90			90	719	368	263	9	4	1363	1453
2	Arunachal Pradesh				0	37	5	0	1	1	44	44
3	Assam				0	405	184	59	16	42	706	706
4	Bihar				0	298	185	74	10	514	1081	1081
5	Chhattisgarh	300		105	405	695	226	161		28	1110	1515
6	Goa				0	58	18	14		31	121	121
7	Gujarat	165			165	1036	477	498	27	255	2293	2458
8	Haryana	21	2	80	103	398	267	224	23	170	1082	1185
9	Himachal Pradesh				0	218	21	5	1		245	245
10	Jammu & Kashmir	21			21	412	83	36	8	114	653	674
11	Jharkhand	82	8		90	372	186	42	4	71	675	765
12	Karnataka	134			134	1388	645	354	7	5	2399	2533
13	Kerala	10			10	518	188	231	16	13	966	976
14	Madhya Pradesh	364	8	80	452	1173	686	176	8	149	2192	2644
15	Maharashtra	92	2	88	182	1428	500	164	2	166	2260	2442
16	Manipur				0	27	13	1		2	43	43
17	Meghalaya				0	100	30	2	2	8	142	142
18	Mizoram				0	3	3	0			6	6
19	Nagaland				0	15	6	1		3	25	25
20	Orissa	439		67	506	1501	355	140	21	191	2208	2714
21	Punjab	19	3		22	205	203	91	20	14	533	555
22	Rajasthan	240			240	1259	471	565	93	591	2979	3219
23	Sikkim				0	31	9	0			40	40
24	Tamil Nadu	110		179	289	1089	396	278	13	93	1869	2158
25	Tripura				0	61	28	0	4	22	115	115
26	Telangana				0	677	492	509	5	27	1710	1710
27	Uttarakhand	20	4		24	71	6	2	1	129	209	233
28	Uttar Pradesh	245	12		257	945	630	196	40	501	2312	2569
29	West Bengal			100	100	492	237	177	12	82	1000	1100
TOTAL (A)		**2352**	**39**	**699**	**3090**	**15631**	**6918**	**4263**	**343**	**3226**	**30381**	**33471**

B.	**UNION TERRITORIES**											
1	Andaman & Nicobar				0	46	13		1		60	60
2	Chandigarh				0	7	17	14	2	15	55	55
3	Dadra & NagarHaveli				0	14	1				15	15
4	Delhi				0	149	64	160	13	380	766	766
5	Daman & Diu				0			7			7	7
6	Pondicherry				0	30	20	8	5	14	77	77
TOTAL(B)		**0**	**0**	**0**	**0**	**246**	**115**	**189**	**21**	**409**	**980**	**980**
GRAND TOTAL (A+B)		**2352**	**39**	**699**	**3090**	**15877**	**7033**	**4452**	**364**	**3635**	**31361**	**34451**

Table 4.4: DIVISION/ STATE/ FORMATION WISE ACHIEVEMENT DURING 2015-16 (as on 31.03.2016)

DIVISION		STATE/ UT	HARD ROCK				ALLUVIUM				BOULDERY				TOTAL			
			EW	OW	PZ	T	EW	OW	PZ	T	EW	OW	PZ	T	EW	OW	PZ	T
I.	**Ahmedabad**	Gujarat	16	5		21	9	7		16				0	25	12	0	37
II.	**Ambala**	Haryana				0	14	8		22				0	14	8	0	22
		Punjab				0	3	3		6	3			3	6	3	0	9
		Delhi				0				0				0	0	0	0	0
III.	**Varanasi**	Uttar Pradesh	17	6	5	28	5	5	4	14				0	22	11	9	42
IV.	**Chennai**	Tamil Nadu	57	13		70	2	3		5				0	59	16	0	75
		Kerala	11	7		18				0				0	11	7	0	18
V.	**Ranchi**	Bihar				0				0				0	0	0	0	0
		Jharkhand	22	14	2	38	2	2		4				0	24	16	2	42
VI.	**Nagpur**	Maharashtra	60	15	2	77				0				0	60	15	2	77
VII.	**Guwahati**	Assam	11	10		21				0	1			1	12	10	0	22
		Manipur				0	2	2	1	5				0	2	2	1	5
		Meghalaya				0				0				0	0	0	0	0
		Tripura				0	1	2		3				0	1	2	0	3
VIII.	**Jammu**	Jammu & Kashmir	22	5		27				0	3			3	25	5	0	30
IX.	**Hyderabad**	Andhra Pradesh				0				0				0	0	0	0	0
		Telangana	30	16	42	88				0					30	16	42	88
X.	**Bhubaneswar**	Orissa	41	11		52	1		1	2				0	42	11	1	54
XI.	**Jodhpur**	Rajasthan	24	9	1	34	16	9	12	37				0	40	18	13	71
XII.	**Bhopal**	Madhya Pradesh	56	14		70				0				0	56	14	0	70
XIII.	**Raipur**	Chattisgarh	27	10		37				0				0	27	10	0	37
XIV.	**Bangalore**	Karnataka	43	12	1	56				0				0	43	12	1	56
		Kerala	10	3		13				0				0	10	3	0	13
XV.	**Kolkatta**	West Bengal				0	11	14	6	31	2			2	13	14	6	33
XVI.	**Bareilly**	Uttarkhand	5			5				0	1			1	6	0	0	6
		Uttar Pradesh				0	8	8		16				0	8	8	0	16
XVII.	**Dharamshala**	Himachal Pradesh	8	6		14				0				0	8	6	0	14
TOTAL			**460**	**156**	**53**	**669**	**74**	**63**	**24**	**161**	**10**	**0**	**0**	**10**	**544**	**219**	**77**	**840**

1 PZ constucted in Manipur state is count as SH

Table 4.5: DIVISION/ STATE/ HEAD WISE ACHIEVEMENT DURING 2015-16 (As on 31.03.2016)																		
DIVISION		**STATE/ UT**	**NORMAL**				**TRIBAL**				**DROUGHT**				**TOTAL**			
			EW	**OW**	**PZ**	**T**	**EW**	**OW**	**PZ**	**T**	**EW**	**OW**	**PZ**	**T**	**EW**	**OW**	**PZ**	**T**
I.	**Ahmedabad**	Gujarat	25	12		**37**				**0**				**0**	25	12	0	**37**
II.	**Ambala**	Haryana	14	8		**22**				**0**				**0**	14	8	0	**22**
		Punjab	6	3		**9**				**0**				**0**	6	3	0	**9**
		Delhi				**0**				**0**				**0**	0	0	0	**0**
III.	**Varanasi**	Uttar Pradesh	5	5	4	**14**				**0**	17	6	5	**28**	22	11	9	**42**
IV.	**Chennai**	Tamil Nadu	30	10		**40**	29	6		**35**				**0**	59	16	0	**75**
		Kerala	11	7		**18**				**0**				**0**	11	7	0	**18**
V.	**Ranchi**	Bihar				**0**				**0**				**0**	0	0	0	**0**
		Jharkhand	24	16	2	**42**				**0**				**0**	24	16	2	**42**
VI.	**Nagpur**	Maharashtra	60	15	2	**77**				**0**				**0**	60	15	2	**77**
VII.	**Guwahati**	Assam				**0**	12	10		**22**				**0**	12	10	0	**22**
		Manipur				**0**	2	2	1	**5**				**0**	2	2	1	**5**
		Meghalaya				**0**				**0**				**0**	0	0	0	**0**
		Tripura	1	2		**3**				**0**				**0**	1	2	0	**3**
VIII.	**Jammu**	Jammu & Kashmir	25	5		**30**				**0**				**0**	25	5	0	**30**
IX.	**Hyderabad**	Telangana	30	16	42	**88**				**0**				**0**	30	16	42	**88**
X.	**Bhubaneswar**	Orissa	15	4	1	**20**	8	4		**12**	19	3		**22**	42	11	1	**54**
XI.	**Jodhpur**	Rajasthan	24	9	2	**35**				**0**	16	9	11	**36**	40	18	13	**71**
XII.	**Bhopal**	Madhya Pradesh	56	14		**70**				**0**				**0**	56	14	0	**70**
XIII.	**Raipur**	Chattisgarh	27	10		**37**				**0**				**0**	27	10	0	**37**
XIV.	**Bangalore**	Karnataka	43	12	1	**56**				**0**				**0**	43	12	1	**56**
		Kerala	10	3		**13**				**0**				**0**	10	3	0	**13**
XV.	**Kolkatta**	West Bengal	13	14	6	**33**				**0**				**0**	13	14	6	**33**
XVI.	**Bareilly**	Uttarkhand	6			**6**				**0**				**0**	6	0	0	**6**
		Uttar Pradesh	8	8		**16**				**0**				**0**	8	8	0	**16**
XVII.	**Dharamshala**	Himachal Pradesh	8	6		**14**				**0**				**0**	8	6	0	**14**
TOTAL			**441**	**179**	**60**	**680**	**51**	**22**	**1**	**74**	**52**	**18**	**16**	**86**	**544**	**219**	**77**	**840**
			1 PZ constucted in Manipur state is count as SH.															

4.1. DEVELOPMENT AND TESTING OF WELLS

A tube well is developed during its construction to increase its specific capacity to prevent sand rushing into the well and to obtain maximum well life. Thereafter, pumping tests are conducted for evaluating aquifer parameters i.e. Transmissivity, storage co-efficient and well parameters viz. Specific capacity and well efficiency, with a view to evolve efficient design for tube wells, assessment of yield capabilities and spacing criteria for tube wells. Total of 164 wells were developed and tested during the year 2015-16. Division wise and State wise achievement has been presented in Table 4.6

Table 4.6: Region wise/State wise Pumping Tests Conducted in the Year 2015 – 2016

DIVISION		STATE	No. of Wells constd. During the current year and tested	No. of Wells constd. During the earlier years and tested	Balance No. of wells to be tested (Backlog)
1	Ahmedabad	Gujrat	-	1	51
2	Ambala	Haryana	-	-	14
		Punjab	-	-	16
		Delhi	-	9	5
3	Varanasi	Utter Pradesh	1	5	39
4	Chennai	Tamilnadu	-	1	20
		Kerla	5	2	-
5	Ranchi	Bihar	4	8	5
		Jahrkhand	2	2	2
6	Nagpur	Maharastra	3	10	19
7	Guwahati	Assam	-	9	40
		Meghalya	-	-	10
		Nagaland	-	-	-
		Arunachal Pradesh	-	-	3
8	Jammu	Jammu&Kashmir	3	8	16
9	Hyderabad	Andhra Pradesh	2	31	62
1	Bhubneshwar	Orissa	5	8	34
1	Jodhpur	Rajasthan	8	7	16
1	Bhopal	Madhya Pradesh	1	-	18
1	Raipur	Chattishgarh	1	2	-
1	Bangalore	Karnatka	4	4	15
		Kerla	3	4	2
1	Kolkata	West Bangal	4	9	29
1	Bareilly	Uttar Pradesh	-	2	39
		Uttranchal	-	-	-
1	Dharamshala	Himachal Pradesh	-	6	4
TOTAL			**46**	**118**	**373**

4.2 TAKING OVER OF EXPLORATORY WELLS BY STATES

The exploratory drilling sites are selected in consultation with the State Government Departments considering that, successful exploratory wells would be converted into production wells once taken over by States. Till March 2016, a total of 15877 wells have been drilled, out of which 12738 successful exploratory wells were offered for handed over and only 5920 wells have so far been accepted /taken over by State Governments while 4681 successful wells are yet to be accepted/ taken over by them and 2137 successful wells are yet to be handed over. The status of handing over of exploratory wells drilled by Central Ground Water Board to the State Government as on 31-03-2016 is presented in table 4.7.

Fig 4.3: Pumping Test at Kochewahi District Durg

Fig 4.4: Auto flowing Irrigation TW at Paschim Jalefa, Satchand Block, Tripura

Table 4.7: Handing over of wells drilled by CGWB (As on 31.03.2016)

S.No.	State/UT	Total No of Exploratory Wells drilled	No. of Successful Wells	No. of Wells Handed Over		No. of Wells yet to be handed over to state agencies
				No. of wells accepted by the state agencies	No. of wells offered to the state agencies but yet to be accepted	
A. STATES						
1	Andhra Pradesh	719	514	391	105	18
2	Arunachal Pradesh	37	32	14	4	14
3	Assam	405	339	124	133	82
4	Bihar	298	241	89	143	9
5	Chhattisgarh	695	624	163	370	91
6	Goa	58	49	0	49	0
7	Gujrat	1036	713	431	104	178
8	Haryana	398	227	145	65	17
9	Himachal Pradesh	218	204	85	84	35
10	Jammu & Kashmir	412	314	170	86	58
11	Jharkhand	372	301	100	165	36
12	Karnataka	1388	1226	474	489	263
13	Kerala	518	386	274	63	49
14	Madhya Pradesh	1173	834	507	175	152
15	Maharashtra	1428	1223	794	214	215
16	Manipur	27	19	14	0	5
17	Meghalaya	100	100	15	26	59
18	Mizoram	3	3	3	0	0
19	Nagaland	15	9	5	1	3
20	Orissa	1501	1425	405	863	157
21	Punjab	205	179	79	85	15
22	Rajasthan	1259	945	258	544	143
23	Sikkim	31	10	6	0	4
24	Tamil Nadu	1089	795	513	169	113
25	Telangana	677	516	349	63	104
26	Tripura	61	57	36	12	9
27	Uttrakhand	71	61	23	10	28
28	Uttar Pradesh	945	782	194	404	184
29	West Bengal	492	439	168	201	70
TOTAL(A)		15631	12567	5829	4627	2111
B. UNION TERRITORIES						
1	Andaman & Nicobar	46	12	0	10	2
2	Chandigarh	7	7	6	0	1
3	Dadra & NagarHaveli	14	8	8	0	0
4	Delhi	149	131	64	44	23
5	Pondicherry	30	13	13	0	0
Total (B)		**246**	**171**	**91**	**54**	**26**
GRAND TOTAL(A+B)		**15877**	**12738**	**5920**	**4681**	**2137**

4.3. HIGH YIELDING WELLS

During 2015-16, Board under its scientific exploratory drilling programme has explored high yielding aquifers in various parts of the Country based on hydrogeological studies coupled with remote sensing and geophysical techniques. High yielding wells with discharge ranging from 147 litres per minute to 2500 litres per minute have been explored in the states of Telangana, Chhattisgarh, Jharkhand, Kerala, Karnataka, Rajasthan, Madhya Pradesh, Maharashtra, Gujarat and Tamilnadu. The study will help in identifying ground water sources in other parts of the state having similar hydrogeological conditions and in guiding the States to adopt follow up action with regard to ground water development for drinking water supply and other demands. High Yielding Wells explored during 2015-16 are presented in Table 4.8.

Table 4.8 High Yielding Wells Explored During 2015 - 16

Sr.No.	State	District	Location	Discharge
1	Telangana	Nalgonda	Veerareddipalli	270 liter per minute (lpm)
2		Nalgonda	Vemulapalli village	456 lpm
3		Nalgonda	Manimade village	225 lpm
4	Chhattisgarh	Durg	Bahera village	180 lpm
5		Durg	Charoda village	1138 lpm
6	Jharkhand	Saraikela-Kharsawana	Utkramit Middle School Campus	270 lpm
7		West Singhbhum	Purnia High School	270 lpm
8		Lohardega	Rampur Village	270 lpm
9		Ranchi	Itki Village	270 lpm
10		Bokaro	State Agriculture Farm, Peterbar block	420 lpm
11		Bokaro	Kasmar block campus	342 lpm
12		Bokaro	Near FCI quarters	336 lpm
13		Bokaro	Saram (PHED Campus), Gomia block	180 lpm
14	Kerala	Ernakulam	Thrikkakara	840 lpm
15		Ernakulam	Kummassery	720 lpm
16		Ernakulam	Angamali	600lpm
17		Ernakulam	Angamali	430 lpm
18		Ernakulam	Maneed	240 lpm
19		Thrissur	Chalakkudy	780lpm
20		Thrissur	Chalakkudy	1140 lpm
21		Thrissur	Alagappanagar	330 lpm
22		Ernakulam	Moovattupuzha	330 lpm
23		Ernakulam	Moovattupuzha	600 lpm
24	Karnataka	Chikaballapur	Tummanahalli	147lpm
25		Bellary	Navli, Hadgali taluk	360 lpm
26		Bellary	Kalvi, Hadgali taluk	300 lpm
27		Tumkur	Madhugiri taluk	600 lpm
28		Chikaballpar	Dodikadirapalli, Bagepalli taluk	200 lpm
29		Tumkur	Totamadagalu , Madhugiri taluk	150 lpm
30		Chikkaballapur	Billur in Bagepally taluk	607lpm

31		Tumklur	Shivanagere in Madhugiri taluk	986 lpm
32		Bangalore Rural	Doddballapur taluk	848 lpm
33		Tumkur	Dodda Dalavatta Viggae in Madhugiri	720 lpm
34		Chickaballapur	Thimappalli Bagepalli taluk	600 lpm
35		Bangalore Rural	Sakragollahalli Doddaballapur taluk	201 lpm
36		Tumkur	Kodalapura , Madhugiri taluk	607 lpm
37		Chikkaballapur	Gorthipalli Bagepalli taluk	840 lpm
38		Bangalore Rural	Pittur Doddaballapur taluk	330 lpm
39		Bellary	Mylara Huvinahadagali taluk	203 lpm
40	Rajasthan	Jodhpur	Netran , Block:-Baori	2500 lpm
41	Madhya Pradesh	Bhopal	Bhopal	264 lpm
42		Sagar	Behrol Village, Banda Block	768 lpm
43		Sagar	Kanjia, Bina Block	768 lpm
44		Sagar	Sagar Civil Lines, Gour Bhawan Block	186 lpm
45	Maharashtra	Latur	Renapur Taluka	266 lpm
46		Latur	Nilanga Taluka	356 lpm
47		Aurangabad	Rawala Soygaon Taluka	226 lpm
48		Aurangabad	Rawala Soygaon Taluka	660 lpm
49		Pune	Chandgudewadi, Baramati Taluka	276 lpm
50		Jalgaon	Kurha Hardo, Taluka Bodvad	742 lpm
51		Nasik	Sawargaon, Niphad Taluka	466lpm
52		Pune	Dorlewadi, Baramati Taluka	180 lpm
53		Nagpur	Khangaon, Katol Taluka	1070 lpm
54		Nagpur	Khangaon, Katol Taluka	590 lpm
55		Nasik	Niphad , Niphad Taluka	190 lpm
56		Nasik	Niphad , Niphad Taluka	350 lpm
57		Beed	Tandul wadi Baramati Taluka	592 lpm
58		Amravati	Loni , Amravati Taluka	732lpm
59		Amravati	Uttamsara , Bhatukli Taluka	592 lpm
60		Nasik	Kankapur, Deola taluka	526lpm
61		Nasik	Kankapur, Deola taluka	659lpm
62		Amravati	Uttamsara , Bhatukli taluka	590 lpm
63	Gujarat	Ahmedabad	Viramgam taluk	600 lpm
64		Kheda	Umiyapura	290 lpm
65		Sabarkantha	Dhanali, Vadali Taluka	960 lpm
66		Banaskantha	Dhanali , Vadgam Taluka	538 lpm
67		Sabarkantha	Sherpur, Idar Taluka	456 lpm
68	Tamilnadu	Krishnagiri	Chindagampalli	600lpm
69		Tiruvannamlai	Andapattu Tiruvannamalai Block	1138 lpm

Fig 4.5: Exploratory well at Trikkakara, Kerala yielding 50400 lph

Fig 4.6: Exploratory well Uttamsara, Bhatukli Taluka. Amravati District. Maharastra.

4.4 DROUGHT MITIGATION IN LATUR DISTRICT

Construction and Handing Over of Exploratory Wells for drought mitigation in Latur district from other NAQUIM areas

Three number DTH rigs of 200 m/300 m capacity have been diverted from other NAQUIM areas to Latur district for construction of 25 exploratory wells in drought affected Latur, Ausa, Renapur, Chakur and Nilanga talukas. The target of 25 wells had been completed and all the wells have been handed over to the district administration for restoring water supply. These wells can cumulatively provide water supply to about 23000 persons @ 40 lpcd if wells are pumped for 10 hrs/day intermittently. This would go a long way in helping the district administration to provide a sustainable source of water supply to these villages. The assistance provided by CGWB in short period of 1 month during extreme exigency has been appreciated by District Collector.

5. GEOPHYSICAL STUDIES

Geophysical investigations are mainly used for exploration of groundwater and in delineating the underground structures which control the occurrence, distribution and movement ground water.Application of geophysical techniques for ground water investigations on regular basis commenced in CGWB during the seventies. The Board has made extensive use of both the surface and the subsurface (well logging) geophysical techniques in the search of groundwater and proper construction of water wells. The findings of the geophysical studies, as a practice, are combined with the hydrogeological and geomorphologic investigations to place them on firm footing. The techniques have become an integral part of the ground water exploration programme.

Borehole geophysics is used in groundwater to obtain information pertaining to lithology, fractures, permeability, porosity and, water quality so as to delineate subsurface disposition of aquifers, Borehole-geophysical logging determines the character and thickness of the different geologic units in drilled boreholes. Saline / brackish water bearing aquifers are present in different parts of India. Fresh water bearing aquifers are often intervened by the saline water aquifers. Such information is essential for proper placement of casing and screens in water-supply wells and for characterizing and remediation of problems related to ground-water salinity. The proper positioning and condition of casing and screen pipes in a well can be rapidly evaluated with geophysical logging.

Various other techniques like Self Potential, Induced Polarization, Mise-a-la-masse of electrical method, refraction seismic, electromagnetic – the Horizontal Loop, Very Low Frequency (VLF) & Transient Electromagnetic *and* magnetic, Imaging Resistivity 2-D survey and Heliborne Survey were gradually incorporated through several foreign aided collaborative groundwater projects and other CSIR department of India.

Central Ground Water Board has carried out surface geophysical surveys specially the traditional electrical Resistivity survey in soft and hard rock formations to delineate the ground water bearing zones/structures, pin-pointing sites for construction of boreholes and providing inputs for formulating proposals for constructing artificial recharge structures. Geophysical survey has also been conducted for delineating the bedrock topography and sandy horizon of non – perennial channel. Apart far these, resistivity survey (VES) were carried out for short-term water supply investigation on request of other Government organization and Public Sector Undertakings.

Aquifer Mapping Programme

Under the Aquifer mapping programme, Central Ground Water Board has planned for delineating the Aquifers upto 300 m depth in areas underlain by Soft rock and upto 200 m in areas underlain by hard rock formations in which Geophysical survey and techniques play a vital role.

During the year 2015-16, geophysical investigations have been carried out under Aquifer Mapping program under which 3303 VES, 18.88 line Km profiling, 3.2 line Kms 2-D profiling and 168 borehole logging were carried out (Table 5.2). An important highlight of the programme during 2015-16 was the conduction of Electrical resitivity survey in mission mode in the Rajasthan where 2040 VES were conducted by deploying a team of 21 Geophysicists from different Regional offices of CGWB.

Table 5.1 Geophysical Surveys & Bore Hole Logging during 2015-2016

Sl. No	Regions	Achievement 2015-16			
		VES	1- D profiling LKM	2-D profiling LKM	GP-Logging
1	NWHR, Jammu	3			3
2	NWR, Chandigarh	43	1.5		18
3	WR, Jaipur	0	0		0
4	WCR, Ahmadabad	150	0		8
5	NCR, Bhopal	16	0		0
6	NCCR, Raipur	49	3		0
7	CR, Nagpur	8	0		0
8	NR, Lucknow	21	0	3.2	15
9	MER, Patna	17	7.28		1
10	ER, Kolkata	0	0		4
11	NER, Guwahati	136	0		2
12	SER, Bhubaneswar	60	0		3
13	SR, Hyderabad	307	0	0	46
14	SWR, Bangalore	241	5.7		40
15	SECR, Chennai	200	0		22
16	KR, Trivandrum	5	0		0
17	UR, Dehradun	7	1.4		0
18	NHR, Dharamshala	0	0		6
19	SUO, Delhi	0	0		0
20	Rajasthan Mission	2040	0		0
	Total	**3303**	**18.88**	**3.2**	**168**

Fig. 5.1 Conducting Resistivity survey in Jharkhand

6. WATER QUALITY STUDIES

Central Ground Water Board has 16 Regional Chemical Laboratories to carry out chemical analysis of major and minor inorganic constituents in water samples. Action has been initiated for getting accreditation of laboratories from National Accreditation Board for Testing and Calibration Laboratories (NABL) and ISO 9001:2008 certificate. The Chemical laboratories are well equipped to carry out Basic analysis & Trace metal and Toxic elements determinations using sophisticated instruments like Atomic Absorption Spectrophotometer (AAS), Digital PC based UV- VIS Spectrophotometer, Ion meter, Flame Photometer, pH meter, Conductivity meter, and Nephelometer. The laboratories are also provided with Electronic Monopan and Top loading Balances, Deionizer, Double Distillation Plant, Hot Air Oven, Water Bath, Magnetic Stirrer and Hot Plates. Four Regional Laboratories at Kolkata, Hyderabad, Lucknow and Raipur are also equipped with Gas Chromatograph (GC) to undertake the analysis of organic pollutants (Pesticides) at µg/l level. The Chemical Laboratory at Hyderabad is additionally equipped with Inductive Coupled Plasma Spectrometer (ICPS) for sequential analysis of multiple toxic elements with high accuracy. Total Organic Carbon (TOC) analyzer is installed in the Regional Chemical Laboratory at Kolkata. The chemical analysis data generated by these laboratories is utilized for monitoring and evaluating the groundwater quality in compliance with National Standards (BIS 2012) for its designated use, to study the impact of anthropogenic activities on ground water quality, to demarcate critical areas where there is water quality deterioration and to assess the point and non-point sources of ground water pollution so as to take necessary action for management of ground water resources.

During 2015-16, a total number of 34155 water samples have been analyzed, out of which 17372 water samples have been analyzed for determination of basic constituents, 4576 water samples was carried out under specific studies while analysis of 12207 No. of water samples has been done for the Trace elements like As, Cd, Co, Cr, Cu Fe, Mn, Ni, Pb and Zn etc. The details of water samples analyzed by different Chemical Laboratories during 2015- 16 are presented in table 6.1

Central Ground Water Board has also initiated industrial pollution cluster studies, which are identified by Central Pollution Control Board throughout in India. A special training was organised at Rajiv Gandhi National Ground Water Training and Research Institute, (RGNGWTRI), Raipur, Chhattisgarh for training man power on chemical analysis, interpretation and validation of data on water chemistry.

Besides the analytical work, chemists from the various laboratories have participated in mass awareness programmes and trade fairs and have prepared exhibits, posters, handouts diagrams, etc. on water quality, for display. They have demonstrated the testing of various chemical parameters present in water and their impact on human body. The importance of water quality for artificial recharge to ground water through rain water harvesting and impact of chemical quality of the water being used for drinking, agricultural and industrial purposes has also been explained to farmers, visitors and students.

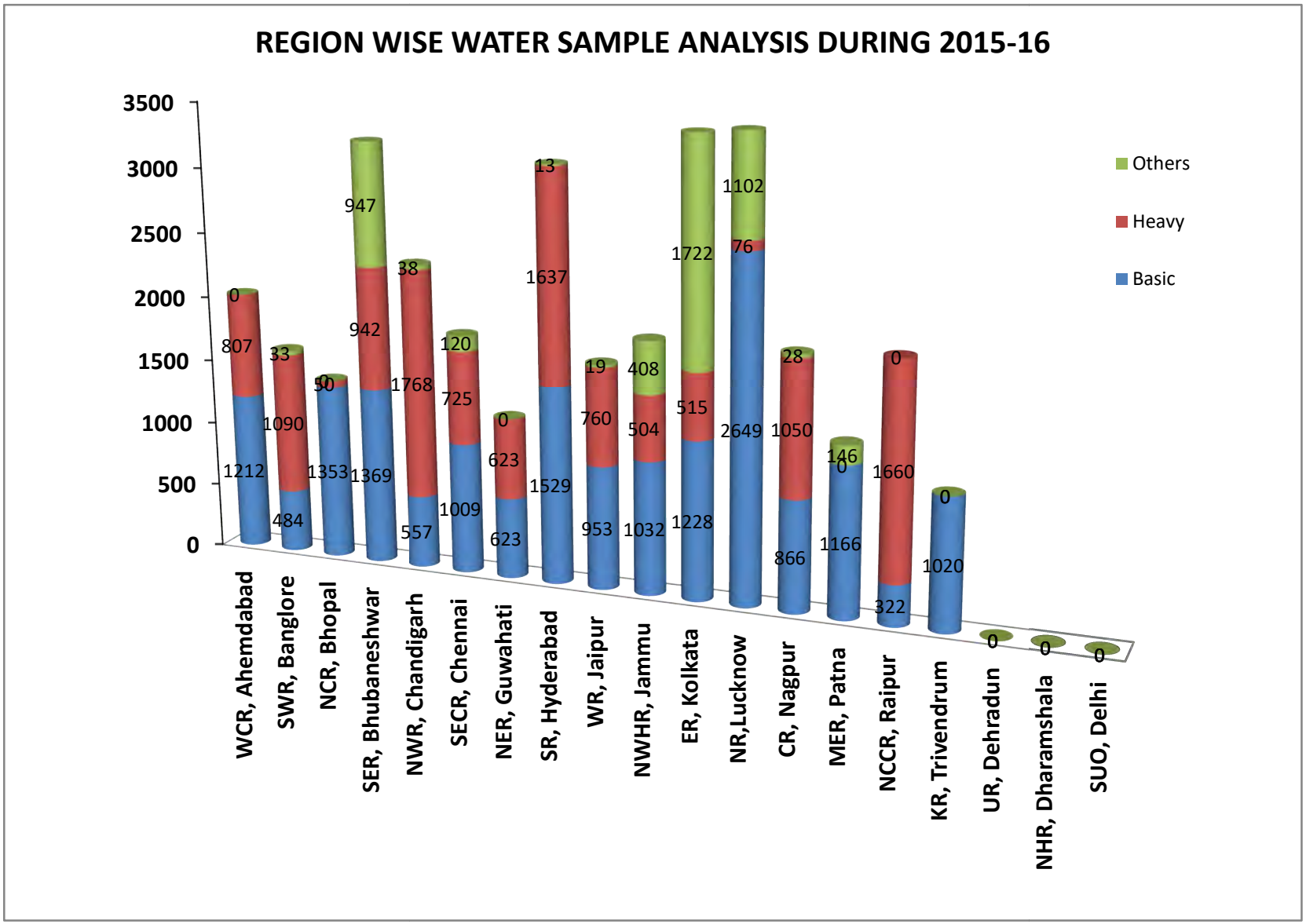
During 2015-16, the study was carried out on Assessment of Efficacy of the Zero Budget Techniques of Swami Hardas Life Systems in Improving the Ground Water Quality of Fluoride Affected Areas of Yavatmal District, Maharashtra on PMO reference. The report was submitted. The results of the investigations carried out by CGWB to study the efficacy of Swami Hardas Life Systems (SHLS) techniques on Fluoride contamination do not indicate any significant or notable change / improvement in fluoride concentration of water samples collected from the study area. Thus the application of SHLS in the area has not vindicated the desired results as claimed by the SHF. The report has been submitted to the Parliament Cell, CGWB, New Delhi.

Table 6.1 Region-wise Water Samples Analysis during 2015-2016

The samples of UR & SUO Delhi have been analysed by NWR Lab and samples of NHR analysed at

Region	Number of Sample			
	Basic Analysis	**Heavy**	**Others**	**Total Sample Analyzed**
WCR, Ahemdabad	1212	807	0	2019
SWR, Bangalore	484	1090	33	1607
NCR, Bhopal	1353	50	0	1403
SER, Bhubaneshwar	1369	942	947	3258
NWR, Chandigarh	557	1768	38	2363
SECR, Chennai	1009	725	120	1854
NER, Guwahati	623	623	0	1246
SR, Hyderabad	1529	1637	13	3179
WR, Jaipur	953	760	19	1732
NWHR, Jammu	1032	504	408	1944
ER, Kolkata	1228	515	1722	3465
NR,Lucknow	2649	76	1102	3827
CR, Nagpur	866	1050	28	1944
MER, Patna	1166	0	146	1312
NCCR, Raipur	322	1660	0	1982
KR, Trivendrum	1020	0	0	1020
UR, Dehradun	0	0	0	0
NHR, Dharamshala	0	0	0	0
SUO, Delhi	0	0	0	0
Total	**17372**	**12207**	**4576**	**34155**

NWHR Lab.

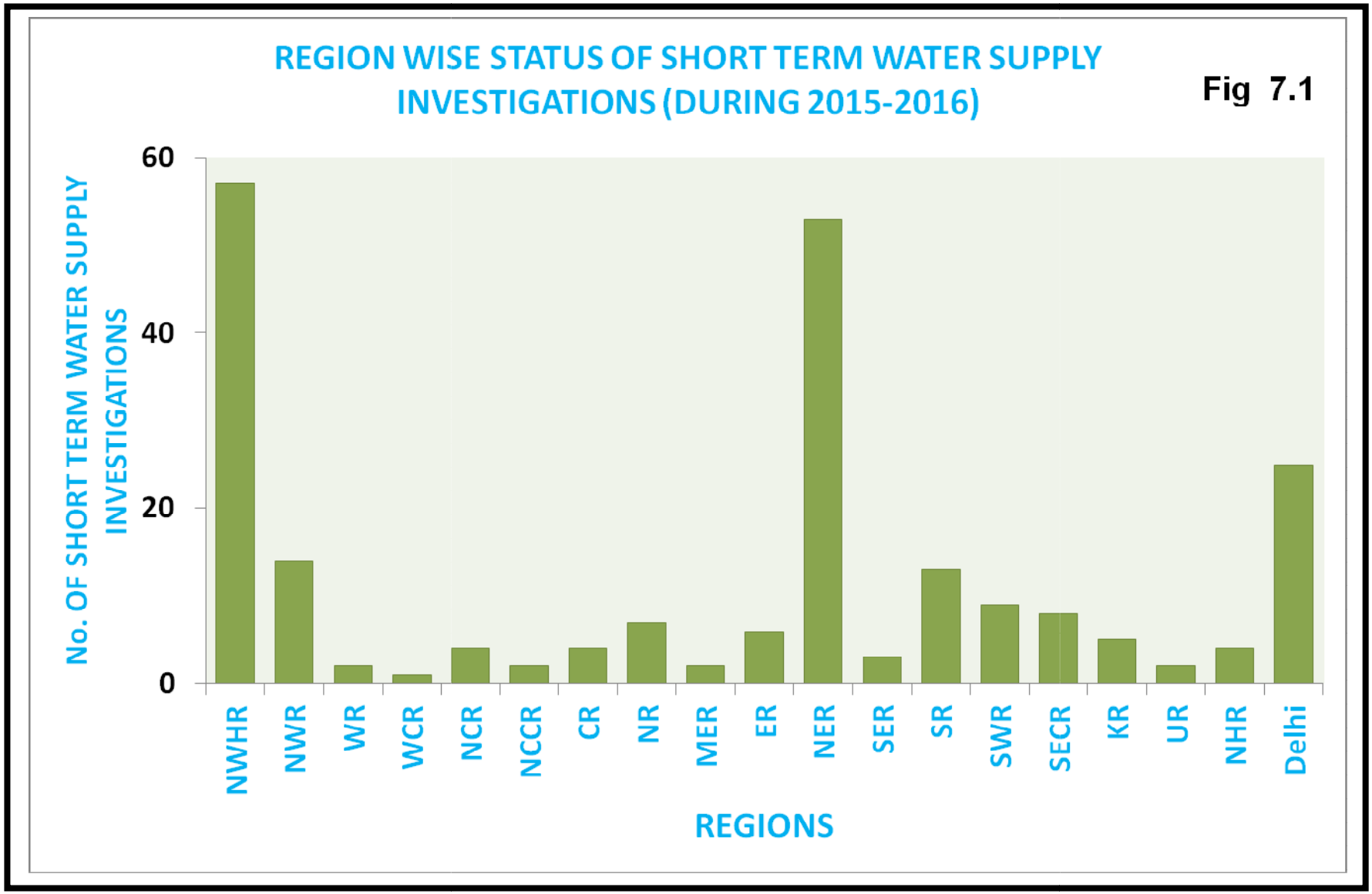

REGION WISE WATER SAMPLE ANALYSIS DURING 2015-16
3500
3000
2500
2000
1500
1000
500
0
Others
Heavy
Basic
WCR, Ahemdabad
SWR, Banglore
NCR, Bhopal
SER, Bhubaneshwar
NWR, Chandigarh
SECR, Chennai
NER, Guwahati
SR, Hyderabad
WR, Jaipur
NWHR, Jammu
ER, Kolkata
NR,Lucknow
CR, Nagpur
MER, Patna
NCCR, Raipur
KR, Trivendrum
UR, Dehradun
NHR, Dharamshala
SUO, Delhi
0
807
1212
33
1090
484
30
1353
947
942
1369
38
1768
557
120
725
1009
0
623
623
13
1637
1529
19
760
953
408
504
1032
1722
515
1228
1102
76
2649
28
1050
866
146
0
1166
0
1660
322
0
1020
0
0
0

7. WATER SUPPLY INVESTIGATIONS

The Board provides assistance to defence and Government agencies / establishments to solve their immediate water supply problems by selecting suitable sites for construction of ground water abstraction structures. During 2015-16, 221 Water Supply Investigations were carried out and region wise/state wise status is given in table 7.1 and fig. 7.1.

Table 7.1: Region/State wise Water Supply Investigations taken up during 2015-2016

Sl. No	Regions	States	Number of Water Supply Investigations
1	**North Western Himalayan Region**	Jammu & Kashmir	57
2	**North Western Region**	Punjab	14
		Haryana	
		Chandigarh	
3	**West Central Region**	Gujarat	1
4	**Western Region**	Rajasthan	2
5	**North Central Region**	Madhya Pradesh	4
6	**North Central Chhattisgarh Region**	Chhattisgarh	2
7	**Central Region**	Maharashtra	4
8	**Northern Region**	Uttar Pradesh	7
9	**Eastern Region**	West Bengal	6
10	**North Eastern Region**	Assam	53
		Arunachal Pradesh	
		Tripura	
		Meghalaya	
		Nagaland	
11	**Mid Eastern Region**	Bihar Jharkhand	2
12	**South Eastern Region**	Orissa	3
13	**Southern Region**	Andhra Pradesh Telangana	13
14	**South Western Region**	Karnataka	09
15	**South Eastern Coastal Region**	Chennai	8
16	**Kerala Region**	Kerala	05
17	**UR, Dehradun**	Uttaranchal	2
18	**NHR,Dharamshala**	Himachal Pradesh	4
19	**SUO, Delhi**	NCT,Delhi	25
Total			**221**


REGION WISE STATUS OF SHORT TERM WATER SUPPLY INVESTIGATIONS (DURING 2015-2016)
Fig 7.1
No. OF SHORT TERM WATER SUPPLY INVESTIGATIONS
60
40
20
0
NWHR
NWR
WR
WCR
NCR
NCCR
CR
NR
MER
ER
NER
SER
SR
SWR
SECR
KR
UR
NHR
Delhi
REGIONS

8. GROUND WATER REGIME MONITORING

Monitoring of ground water regime is an effort to obtain information on ground water level and chemical quality through representative sampling. The important attributes of ground water regime monitoring are ground water level, ground water quality and temperature. The primary objective of establishing the ground water monitoring network stations is to record the response of ground regime to the natural and anthropogenic stresses of recharge and discharge parameters with reference to geology, climate, physiography, land use pattern and hydrologic characteristics. The natural conditions affecting the regime involving 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.

Ground water levels are being measured four times a year during January, April/ May, August and November. The regime monitoring started in the year 1969 by Central Ground Water Board. At present a network of **23196** observation wells located all over the country is being monitored. Ground water samples are collected from select observation wells once a year during the month of April/May to obtain background information of ground water quality changes on regional scale. The database thus generated forms the basis for planning the ground water development and management programme. This data is used for assessment of ground water resources and changes in the regime consequent to various development and management activities.

The State-wise distribution of the ground water observation wells is given in table 8.1.

Table 8.1: The State-wise distribution of the Ground Water Observation Wells is given below.

Status of Ground Water Monitoring Stations (March 2016)				
Sl No	**Name of the State/UTs**	**Number of Ground Water Monitoring Stations**		
		DW	**PZ**	**Total**
1	Andhra Pradesh	762	104	866
2	Arunachal Pradesh	29	0	29
3	Assam	348	37	385
4	Bihar	723	33	756
5	Chhattisgarh	890	294	1184
6	Delhi	24	103	127
7	Goa	102	49	151
8	Gujarat	830	404	1234
9	Haryana	517	659	1176
10	Himachal Pradesh	128	0	128
11	Jammu & Kashmir	257	11	268
12	Jharkhand	434	20	454
13	Karnataka	1490	383	1873
14	Kerala	1411	269	1680
15	Madhya Pradesh	1161	326	1487
16	Maharashtra	1609	204	1813
17	Manipur	0	0	0
18	Meghalaya	60	4	64
19	Nagaland	31	3	34
20	Odisha	1586	89	1675
21	Punjab	170	786	956
22	Rajasthan	734	377	1111
23	Tamil Nadu	812	569	1381

24	Telangana	354	436	790
25	Tripura	70	9	79
26	Uttar Pradesh	902	321	1223
27	Uttarakhand	43	126	169
28	West Bengal	889	1027	1916
	UT s			
1	Andaman & Nicobar	110	2	112
2	Chandigarh	1	24	25
3	Dadra & Nagar Haveli	16	0	16
4	Daman & Diu	11	5	16
5	Pondicherry	10	8	18
TOTAL		**16514**	**6682**	**23196**

8.1 Ground Water Level Scenario

Depth to Water Level – Pre Monsoon 2015

Perusal of the ground water level data for Pre Monsoon 2015 indicates that in general depth to water level ranges from 2 to 20 m bgl as observed at about more than 85% of the monitoring stations. In Sub-Himalayan area and parts of Uttar Pradesh, Bihar, Chhattisgarh, Odisha, almost whole of Assam and few areas in Maharashtra, coastal Tamil Nadu, Andhra Pradesh generally the depth to water level varies from 2-5 meter below ground level. Very shallow water level of less than 2 m bgl is observed locally, in the states of Assam, Andhra Pradesh, Himachal Pradesh, and Tamil Nadu. In major area of the Country, water level is observed to be in the range of 5 to 10 m, mostly in the states of Bihar, Chhatisgarh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Telangana, Uttar Pradesh and West Bengal. Water level in the range of 10-20 m bgl is mostly observed in the states of Delhi, Gujarat, Haryana, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Telangana and West Bengal. In major parts of north-western states depth to water level generally ranges from 10-40 m bgl. In the western parts of the country, deeper water level is recorded in the depth range of 20-40 m bgl and more than 40 m bgl. In parts Delhi and a major part of Rajasthan, water level of more than 40 m bgl is recorded. Along the eastern & western coast water level is generally upto 10 m bgl. Central part of West Bengal recorded water level in the range of 10-20 m bgl. In Central and eastern India water level generally varies between 5 m bgl to 10 m bgl, except in isolated pockets where water level more than 10 m bgl has been observed. The peninsular part of country generally recorded a water level in the range of 10 to 20 m bgl depth range.

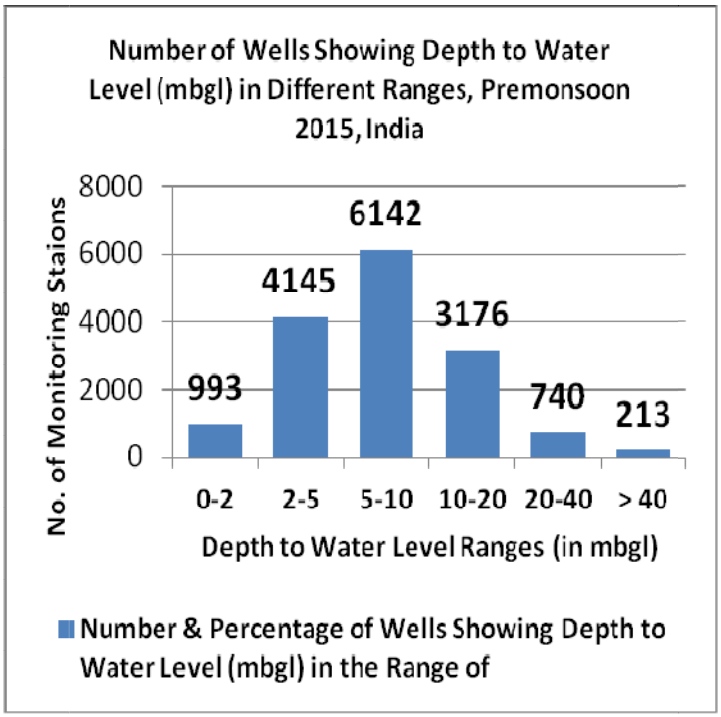


Fig. 8.1. ***Depth to Water Level – Pre Monsoon 2015***

Depth to Water Level – August 2015

Perusal of the ground water level data for August 2015 indicates Sub-Himalayan areas, Uttar Pradesh, Bihar, Odisha, Assam, Andhra Pradesh generally the depth to water level varies from 2-5 meter below ground level. Shallow water level of less than 2 m bgl is observed in the states of Assam, Chhatishgarh, Maharashtra, Orissa and Uttar Pradesh and also in isolated pockets in Madhya Pradesh. In the states of Madhya Pradesh, Jharkhand, Maharashtra, Karnataka, Telangana, Kerala and West Bengal water level generally varies from 5 to 10 m bgl with small patches showing depth to water level between 2 to 5 m bgl. In major parts of north-western states depth to water level generally ranges from 10-40 m bgl. In the western parts of the country deeper water level is recorded in the depth range of 20-40 m bgl and more than 40 m bgl. In some parts of Delhi and Rajasthan water level of more than 40 m bgl is recorded. Along the eastern & western coast water level is generally less than 10 m. In Central India water level generally varies between 2 m bgl to 10 m bgl, except in isolated pockets where water level more than 10 m bgl has been observed. The peninsular part of country generally recorded a water level in the range of 5 to 20 m bgl depth range.

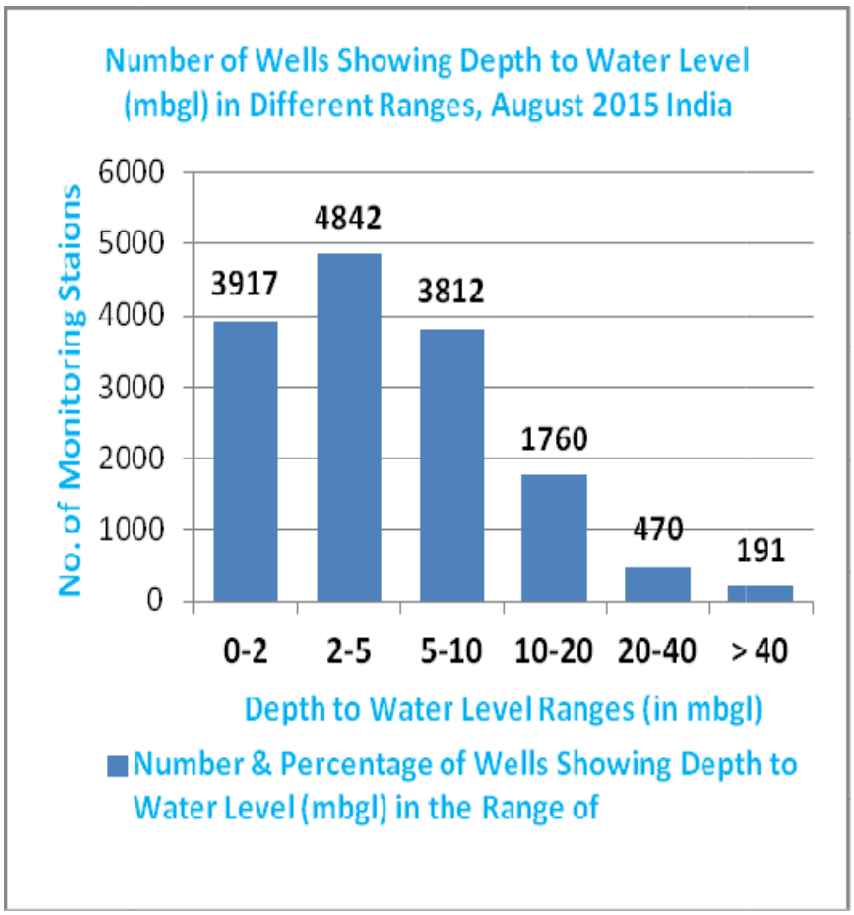
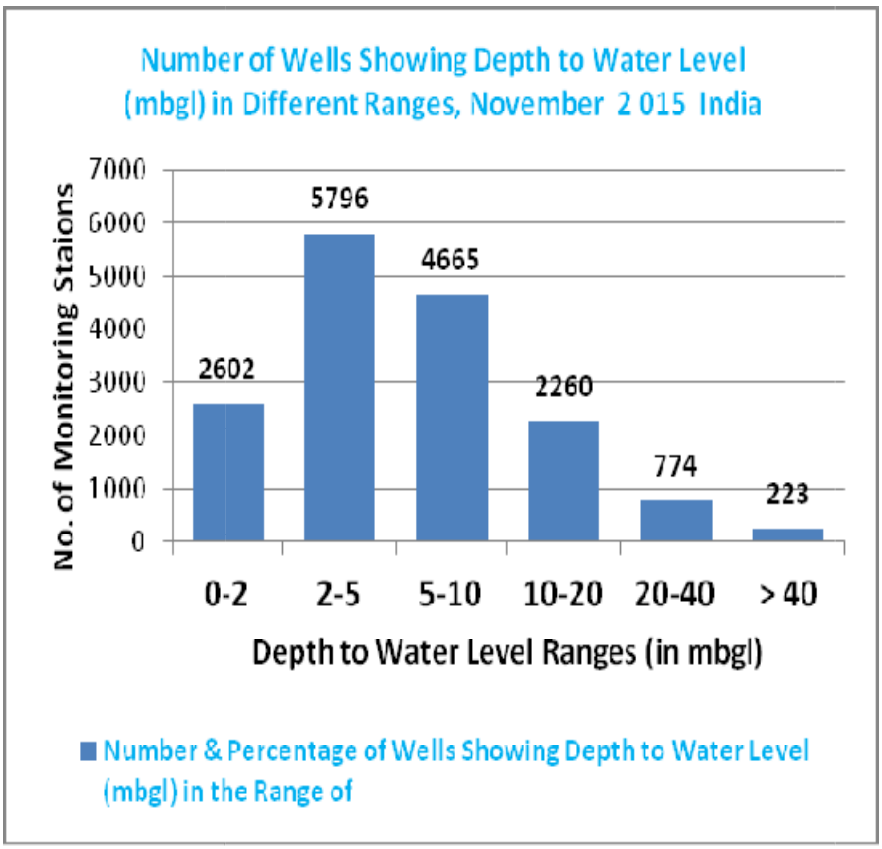


Fig. 8.2. ***Depth to Water Level – August 2015***

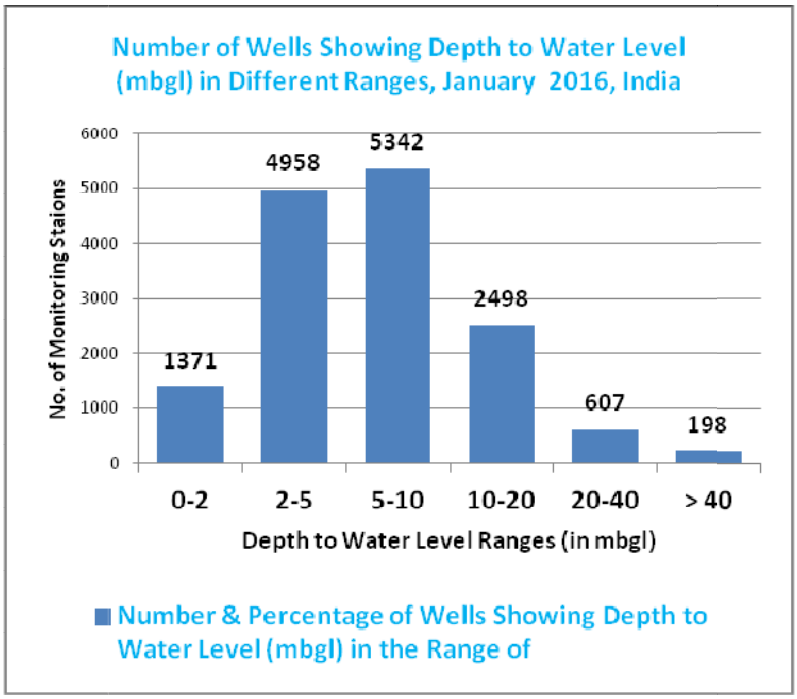
Depth to Water Level – Post Monsoon 2015

Perusal of the ground water level data for Post Monsoon 2015 indicates that in general depth to water level ranges from 2 to 10 m bgl as observed at about more than 65% of the monitoring stations. Sub-Himalayan area, north of river Ganges, Uttar Pradesh, Bihar, Odisha, Chhatishgarh, Assam, Andhra Pradesh, Maharashtra, and Tripura generally the depth to water level varies from 2-5 meter below ground level. Shallow water level of less than 2 m bgl is observed in the states of Assam, Andhra Pradesh, Chhatishgarh, Himachal Pradesh, Maharashtra, Odisha, Tripura and Uttar Pradesh and also in isolated pockets in Karnataka, Gujarat and Tamil Nadu. In the states of Madhya Pradesh, Jharkhand, Maharashtra, Chhatishgarh, Gujarat, Karnataka, Tamil Nadu, Telangana, Kerala and West Bengal water level generally varies from 5 to 10 m bgl with small patches showing depth to water level between 2 to 5 m bgl. In major parts of north-western states depth to water level generally ranges from 10-40 m bgl. In the western parts of the country deeper water level is recorded in the depth range of 20-40 m bgl and more than 40 m bgl. In some parts of Haryana, and Delhi and almost major parts of Rajasthan, water level of more than 40 m bgl is recorded. Along the eastern & western coast water level is generally upto 10 mbgl. Central part of West Bengal recorded water level in the range of 5-20 m bgl. In Central India water level generally varies between 2 m bgl to 10 m bgl, except in isolated pockets where water level more than 10 m bgl has been observed. The peninsular part of country generally recorded a water level in the range of 2 to 20 m bgl depth range.

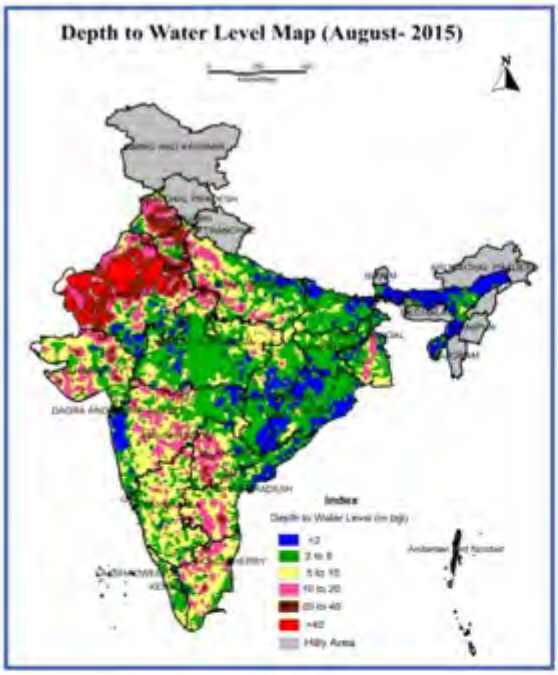


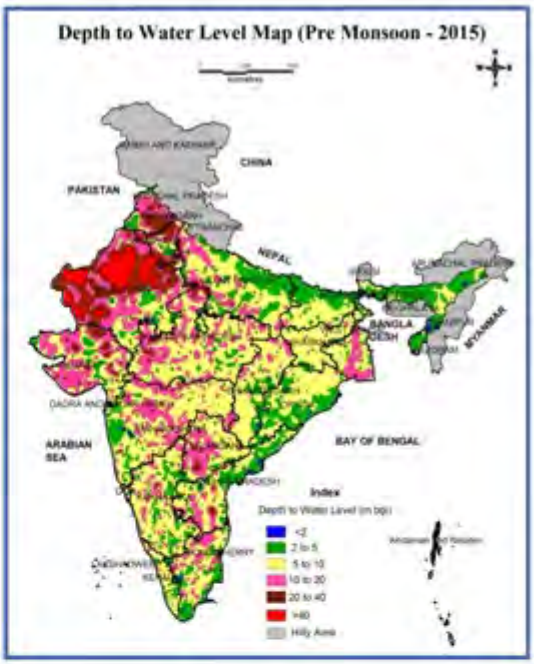
Depth to Water Level – January 2016

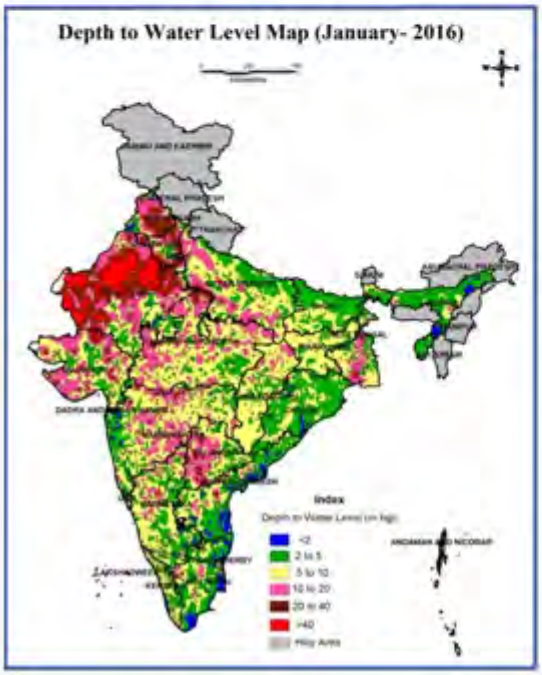
Perusal of the depth to water level data for January 2015 indicates that in general depth to water level ranges from 2 to 10 m bgl as observed at about more than 65% of the monitoring stations. Sub-Himalayan area, north of river Ganges, northern parts of Uttar Pradesh, northern parts of Bihar, Odisha, Assam, Andhra Pradesh, coastal parts of Maharashtra, and Tripura generally the depth to water level varies from 2-5 meter below ground level. Shallow water level of less than 2 m bgl is observed in the states of Assam and isolated pockets in Andhra Pradesh, Maharashtra, Odisha and Tamil Nadu. In West Bengal water level generally varies from 2 to 10 m bgl and central parts of the state shows water level of 10 m and above and deeper water level of more than 20 m bgl in small pockets. In major parts of north-western states depth to water level generally ranges from 10-40 m bgl. Water level of more than 40 m bgl is also prevalent in the north western part of the country. In the western parts of the country deeper water level is recorded in the depth range of 20-40 m bgl and more than 40 m bgl. In some parts of Haryana, and Delhi and almost major parts of Rajasthan, water level of more than 40 m bgl is recorded. Along the eastern coast water level is generally upto 5 m bgl whereas in the western coast water level of 10 m bgl is prevalent. In Central India water level generally varies between 5 m bgl to 20 m bgl, except in isolated pockets where water level of less than 5 m bgl has been observed. The peninsular part of country generally recorded a water level in the range of 2 to 20 m bgl depth range.

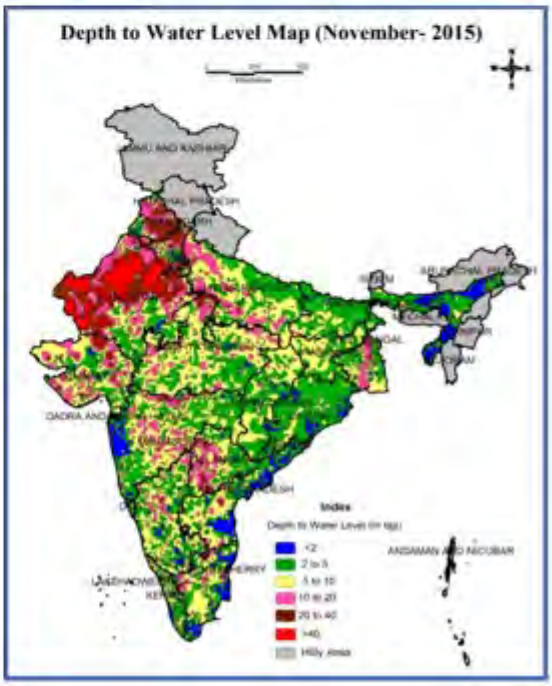

Number of Wells Showing Depth to Water Level (mbgl) in Different Ranges, January 2016, India
No. of Monitoring Staions
6000
5000
4000
3000
2000
1000
0
1371
4958
5342
2498
607
198
0-2
2-5
5-10
10-20
20-40
> 40
Depth to Water Level Ranges (in mbgl)
Number & Percentage of Wells Showing Depth to Water Level (mbgl) in the Range of

DEPTH TO WATER LEVEL MAPS AT A GLANCE









9. ACTIVITIES IN NORTH EASTERN REGION

The Central Ground Water Board is conducting scientific and technical studies for ground water assessment, development and management in the North Eastern Region. Major achievements of the North Eastern Region in the year **2015-16** are given below in table 9.1.

Table 9.1- Major achievements of the North Eastern Region during 2015-16

Sl. No.	Activities	Achievements
1.	Data Generation for Aquifer Mapping	
a	Ground water Exploration (No. of boreholes)	30 wells drilled in North Eastern Region
b	Geophysical Studies	136 Vertical Electrical Sounding and 2 bore hole logging completed.
c	Water Quality Analysis	1246 samples analyzed
2	Ground Water Regime Monitoring	Monitoring of water level from GWMS for the month of April/May, August, November, 2015 and January 2016 completed.
	Establishment of additional wells	50 wells
3	Short Term Water Supply Investigation.	53 nos.
4	Ground Water Resources Assessment (No of States/ UT) (as on 31-03-2013)	Submitted to CHQ
5	Issuance of District Brochures	All District Brochures submitted to CHQ.
6	Ground Water Year Books	Ground Water Year Book of NE State Submitted
7	State Level Painting Competition	6^{TH} State Level Painting Competition successfully completed in the Region.
8	Organizing National Ground Water Congress, Workshops, Seminars etc	3 workshop organized

10. RE-ASSESSMENT OF DYNAMIC GROUND WATER RESOURCES

As per the National Water Policy 2002, the ground water resource potential needs to be re-assessed periodically on scientific basis. Accordingly, the Ground Water Resource of the entire country is being re- assessed jointly by the Central Ground Water Board and the States based on the Ground water resources estimation methodology GEC–97.

The Dynamic ground water resource assessment as on 31st March, 2013 is in progress.Out of 36 States/ UTs, 35 states/ UTs have constituted the State Level Committee (SLC) for assessment of Dynamic Ground Water Resources of concerned states/ UTs. The reports have been approved by State level committee in 13 states namely Jammu & Kashmir, Punjab, Madhya Pradesh, Chhattisgarh, Maharashtra, Dadra & Nagar Haveli, Assam, Meghalaya, Nagaland , Tripura, Arunachal Pradesh, Kerala Lakshadweep.The states (16) for which Reports are awaiting approval from SLC are: Gujarat, Daman & Diu, Bihar, Jharkhand, Manipur, Nagaland, Odisha, Andhra Pradesh, Telangana , Karnataka, Goa, Tamil Nadu, Pondicherry, Himachal Pradesh, Delhi, Rajasthan.The states (6) where work is in advanced stage are Haryana, Chandigarh, U.P., West Bengal and Uttarakhand.

The Total Annual Replenishable Ground Water Resources of the Country have been re assessed as 433 Billion Cubic Metres (bcm) and the Net Annual Ground Water Availability is estimated as 398 bcm as on 31st March, 2011. Annual Ground Water Draft as on 31st March, 2011 for all uses is 245 bcm. The Stage of Ground Water Development is 62%. The state-wise availability of groundwater resources is given in Table 10.1. The development of ground water in different areas of the Country has not been uniform. Highly intensive development of groundwater in certain areas in the country has resulted in over-exploitation of Ground Water Resource. As per the latest assessment of ground water resources out of 6607 assessment units (Block / Mandals / Talukas/Firkas) in the country, 1071 units in various States have been categorized as 'Over-Exploited' i.e. the annual ground water draft exceeds the annual replenishable ground water resources and significant decline in long term ground water level trend has been observed in pre-monsoon & post-monsoon both. In addition 217 units are 'Critical' where the stage of ground water development is 100% of annual replenishable ground water resource and significant decline is observed in the long term water level trend in either in pre-monsoon or post-monsoon periods or both. There are 697 "Semi-Critical'' units, where the stage of ground water development is between 70-90% and significant decline in long term water level trend has been recorded in either Pre- monsoon or Post-monsoon. Apart from these, there are 92 blocks completely underlain by saline ground water. The state-wise status of over–exploited and critical and semi-critical areas is given in Table10.1.

Table 10.1 State-wise ground water resources availability, utilization and stage of development India (as on 31st march 2011) *(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	17.25	6.29	5.38	6.97	35.89	3.32	32.57	13.18	1.33	14.51	2.81	16.97	45
2	Arunachal Pradesh	3.36	0.00	1.15	0.00	4.51	0.45	4.06	0.002	0.001	0.003	0.01	4.05	0.08
3	Assam	17.90	1.64	8.64	0.34	28.52	2.73	25.79	2.86	0.64	3.49	0.78	22.14	14
4	Bihar	19.54	3.95	3.40	2.44	29.34	2.47	26.86	10.25	1.70	11.95	2.51	14.10	44
5	Chhattisgarh	9.90	0.70	0.87	0.94	12.42	0.79	11.63	3.43	0.62	4.05	0.76	7.44	35
6	Delhi	0.11	0.10	0.02	0.08	0.31	0.02	0.29	0.14	0.25	0.39	0.26	0.01	137
7	Goa	0.16	0.008	0.01	0.07	0.24	0.10	0.145	0.01	0.03	0.04	0.04	0.10	28
8	Gujarat	12.79	2.55	0.00	3.23	18.57	0.98	17.59	10.75	1.11	11.86	1.48	5.87	67
9	Haryana	3.65	2.77	1.01	3.35	10.78	0.99	9.79	12.35	0.71	13.06	0.76	-3.31	133
10	Himachal Pradesh	0.39	0.02	0.10	0.05	0.56	0.03	0.53	0.25	0.13	0.38	0.13	0.15	71
11	Jammu & Kashmir	1.45	2.06	0.36	0.37	4.25	0.43	3.83	0.20	0.61	0.81	0.76	2.87	21
12	Jharkhand	4.75	0.13	1.06	0.36	6.31	0.55	5.76	1.31	0.55	1.86	0.76	3.69	32
13	Karnataka	6.81	4.17	2.67	3.38	17.03	2.22	14.81	8.59	0.82	9.41	1.06	6.53	64
14	Kerala	4.85	0.06	0.63	1.15	6.69	0.61	6.07	1.30	1.53	2.84	1.71	3.07	47
15	Madhya Pradesh	28.22	1.17	0.79	4.87	35.04	1.75	33.29	17.48	1.35	18.83	1.91	13.90	57
16	Maharashtra	22.36	1.68	1.84	8.07	33.95	1.80	32.15	16.15	1.03	17.18	1.97	14.48	53
17	Manipur	0.23	0.01	0.19	0.01	0.44	0.04	0.40	0.0033	0.0007	0.004	0.05	0.35	1.02
18	Meghalaya	1.68	0.03	0.07	0.005	1.78	0.18	1.60	0.0015	0.0002	0.0017	0.232	1.37	0.08
19	Mizoram	0.0257	Negligible	0.005	Negligible	0.030	0.003	0.027	0.00	0.001	0.001	0.002	0.025	3.52
20	Nagaland	0.40	Negligible	0.21	Negligible	0.62	0.062	0.55	0.00	0.03	0.03	0.04	0.51	6.13
21	Odisha	11.29	2.53	1.33	2.63	17.78	1.09	16.69	3.81	0.92	4.73	1.24	11.64	28
22	Punjab	5.82	10.64	1.33	4.74	22.53	2.21	20.32	34.17	0.71	34.88	0.98	-14.83	172
23	Rajasthan	8.78	0.68	0.28	2.20	11.94	1.11	10.83	13.13	1.71	14.84	1.89	0.91	137
24	Sikkim		-	-	-	-	-	0.044	0.003	0.009	0.011	0.01	0.031	26
25	Tamil Nadu	7.38	10.28	1.69	2.18	21.53	2.15	19.38	13.17	1.76	14.93	1.82	4.39	77

26	Tripura	1.248	0.000	0.740	0.598	2.587	0.229	2.358	0.093	0.069	0.163	0.200	2.065	7
27	Uttar Pradesh	42.13	11.57	5.15	18.34	77.19	5.53	71.66	48.74	4.04	52.78	6.55	19.64	74
28	Uttarakhand	1.09	0.26	0.20	0.49	2.04	0.04	2.00	1.10	0.03	1.13	0.09	0.80	57
29	West Bengal	18.53	5.72	1.42	3.58	29.25	2.67	26.58	9.72	0.97	10.69	1.48	15.38	40
	Total States	**252.11**	**68.99**	**40.56**	**70.44**	**432.11**	**34.55**	**397.60**	**222.21**	**22.66**	**244.86**	**32.28**	**154.34**	**62**
	Union Territories													
1	Andaman & Nicobar	0.262	Nil	0.046	Nil	0.308	0.022	0.286	0.001	0.012	0.013	0.014	0.272	4.44
2	Chandigarh	0.015	0.001	0.005	0.001	0.022	0.002	0.019	0.000	0.000	0.000	0.000	0.000	0
3	Dadara & Nagar Haveli	0.043	0.003	0.009	0.007	0.062	0.003	0.059	0.007	0.006	0.013	0.010	0.042	22
4	Daman & Diu	0.014	0.002	0.000	0.002	0.018	0.001	0.017	0.014	0.002	0.016	0.003	0.000	97
5	Lakshdweep	0.000	0.000	0.000	0.000	0.011	0.007	0.0035	0.000	0.0023	0.0023	0.000	0.000	67
6	Puducherry	0.089	0.060	0.008	0.032	0.189	0.019	0.170	0.124	0.029	0.153	0.032	0.057	90
	Total Uts	**0.42**	**0.07**	**0.07**	**0.04**	**0.61**	**0.05**	**0.56**	**0.15**	**0.05**	**0.20**	**0.06**	**0.37**	**36**
	Grand Total	**252.53**	**69.06**	**40.63**	**70.48**	**432.72**	**34.60**	**398.16**	**222.36**	**22.71**	**245.06**	**32.34**	**154.71**	**62**

Blocks- Bihar, Chattisgarh, Haryana, Jharkhand, Kerala, M.P., Manipur, Mizoam, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura, UP, UttaraKhand, WB,
Taluks (Command/Non-Command) –Karnataka, **Mandal** – Andhra Pradesh
Taluks – Goa, Gujarat, Maharashtra, NCT Delhi
Districts (Valley) – Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Meghalaya, Manipur, Mizoram, Nagaland, Sikkim, Tripura

Islands – Lakshdweep, Andaman & Nicobar Islands
Region – Puducherry
UT – Chandigarh, Dadar & Nagar Haveli, Daman & Diu

Table10.2 Categorization of Blocks/Mandals/ Talukas in India (as on 31st March 2011)												
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	1110	877	79	97	9	15	1	83	7	38	3
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	533	522	98	11	2	0	0	0	0	0	0
5	Chattisgarh	146	125	86	18	12	2	1	1	1	0	0
6	Delhi	27	2	7	5	19	2	7	18	67	0	0
7	Goa	20	20	100	0	0	0	0	0	0	0	0
8	Gujarat	223	171	77	13	6	5	2	24	11	10	4
9	Haryana	116	23	20	7	6	15	13	71	61	0	0
10	Himachal Pradesh	8	5	63	0	0	2	25	1	13	0	0
11	Jammu & Kashmir	14	14	100	0	0	0	0	0	0	0	0
12	Jharkhand	210	199	95	5	2	0	0	6	3	0	0
13	Karnataka	270	152	56	34	13	21	8	63	23	0	0
14	Kerala	152	126	83	23	15	2	1	1	1	0	0
15	Madhya Pradesh	313	218	70	67	21	4	1	24	8	0	0
16	Maharashtra	353	325	92	16	5	2	1	10	3	0	0
17	Manipur	8	8	100	0	0	0	0	0	0	0	0
18	Meghalaya	7	7	100	0	0	0	0	0	0	0	0
19	Mizoram	22	22	100	0	0	0	0	0	0	0	0
20	Nagaland	8	8	100	0	0	0	0	0	0	0	0
21	Orissa	314	308	98	0	0	0	0	0	0	6	2
22	Punjab	138	22	16	2	1	4	3	110	80	0	0
23	Rajasthan	243	25	10	20	8	24	10	172	71	2	1
24	Sikkim	4	4	100	0	0	0	0	0	0	0	0
25	Tamil Nadu	1129	437	39	235	21	48	4	374	33	35	3
26	Tripura	39	39	100	0	0	0	0	0	0	0	0
27	Uttar Pradesh	820	559	68	82	10	68	8	111	14	0	0
28	Uttaranchal	18	11	61	5	28	2	11	0	0	0	0
29	West Bengal	271	217	80	53	20	1	0.37	0	0	0	0
	Total States	**6554**	**4484**	**68**	**693**	**11**	**217**	**3**	**1069**	**16**	**91**	**1**
Union Territories												
1	Andaman & Nicobar	36	36	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	0	0	1	50	0	0	1	50	0	0
5	Lakshdweep	9	6	67	3	33	0	0	0	0	0	0
6	Pondicherry	4	2	50	0	0	0	0	1	25	1	25
	Total UTs	**53**	**46**	**87**	**4**	**8**	**0**	**0**	**2**	**4**	**1**	**2**
	Grand Total	**6607**	**4530**	**69**	**697**	**11**	**217**	**3**	**1071**	**16**	**92**	**1**

Note
Blocks- Bihar, Chhattisgarh, Haryana, Jharkhand, Kerala, M.P., Manipur, Mizoram, Orissa, Punjab, Rajasthan, Tripura, UP, Uttarakhand, WB
Taluks (Command/Non-Command) –Karnataka, Goa, Gujarat, Maharashtra
Mandal – Andhra Pradesh
Districts (Valley) – Arunachal Pradesh, Assam, Himachal Pradesh, Jammu & Kashmir, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura
Islands – Lakshdweep, Andaman & Nicobar Islands
Firka-Tamil Nadu
Region – Puducherry
UT – Chandigarh, Dadar & Nagar Haveli, Daman & Diu
Tehsil-NCT Delhi

11. ARTIFICIAL RECHARGE STUDIES

11.1 Demonstrative Projects on "Artificial Recharge to Ground Water & Rain Water Harvesting"

CGWB has implemented demonstrative projects on artificial recharge to Groundwater and Rain Water Harvesting in the states of Andhra Pradesh, Arunachal Pradesh, Bihar, Chhattisgarh, Delhi, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharastra, Nagaland, Odisha, Punjab, Rajasthan, Tamil Nadu,telengana Uttar Pradesh, West Bengal and UT Chandigarh, (22 States/UT) during XI Plan. A total of 133 projects amounting to Rs. 99.87 Crore envisaging construction of 1661 recharge structures were approved and funds of Rs. 92.69 Crore were released till March 31, 2015. During 2015-16, no spillover balance funds was released as second installment for the ongoing projects. (as on 31stMarch,2016). A total of 43 artificial recharge structures were constructed during 2015-16 and total structures constructed under the scheme are 1434 (as on 31st March, 2016).

12. NATIONAL HYDROLOGY PROJECT- II

The activities taken up under NHP scheme during 2015-16, comprises Pilot Project on Aquifer Mapping, which was a spill over activity of HP-II, which ended during May 2014. Project Implementation Plan in respect of CGWB for NHP has been submitted to ministry for approval and inclusion in the scheme of NHP. The budget provision for CGWB is Rs 85 Cr for a period of 8 years from 2016-2023. The activities of NHP have been grouped under four components and various activities proposed to be taken up by CGWB under these four components in NHP are summarized below:

- Water Resources Data Acquisition System
- Real time Monitoring of Water quality in coastal aquifer system in Tamil Nadu and Puducherry including construction of Piezometer
- Establishment of Centre of excellence at Faridabad
- Water Resources Information System (WRIS)
- Extension of e-GEMS to non HP States
- Additional Modules in e-GEMS for incorporating the data/ results of NAQUIM in the form of Aquifer Information Management System (AIMS)
- Water Resources Operation and Planning System
- PDS Study in sub-basin above Ramganga confluence of Ganga Basin
- Consultancy for Basin Management Studies along with CWC
- Institutions Capacity Enhancement & Training on collaboration with USGS.
- National Trainings &International Training (10 trainees each year).
- Domain specific training, training in operating sophisticated software (3 trainings each year)
- Awareness Programme (6 awareness programme each year).

13. CENTRAL GROUND WATER AUTHORITY (CGWA)

In pursuance of the order passed by the Hon'ble Supreme Court of India, Central Ground Water Board has been constituted as Central Ground Water Authority (CGWA) under sub-section(3) of Section 3 of the Environment (Protection) Act, 1986 vide notification No. S.O. 38 (E) dated 14.1.1997 for the purpose of regulation and control of ground water management and development in the country.

The Central Ground Water Authority was re-constituted vide S. O. 1121(E) dated 13th May, 2010. As per the Notification issued the Authority consists of Chairman & 14 members with Member (SML), CGWB as Member Secretary.

The Authority performs the following functions:-

i. Exercise of powers under section 5 of the Environment (Protection) Act, 1986 for issuing directions and taking such measures in respect of all the matters referred to in sub-section (2) of section 3 of the said Act.
ii. To resort to penal provisions contained in sections 15 to 21 of the said Act.
iii. To regulate and control, management and development of ground water in the country and to issue necessary regulatory directions for the purpose.
iv. Exercise of powers under section 4 of the Environment (Protection) Act, 1986 of the appointment of the officers.

38th CGWA meeting

The 38th CGWA meeting was held on 25.02.2016 at CGWB, Jamnagar House, New Delhi under the chairmanship of Chairman, CGWB.

Public Notice:

CGWA has issued Public Notice dated 14.11.2015 mentioning that as per Hon'ble National Green Tribunal directions all existing, new and expansion Industries /projects extracting ground water should obtain permission from CGWA.

Web Based Application:

The Beta Version of "Web Based Application of Receipt and Issue of NOC for Abstraction of Ground Water (www.cgwa-noc.gov.in)" has been launched by Hon'ble Minister of Water Resources, River Development & Ganga Rejuvenation on 28th January, 2015. During 2015-16, 62 NOCs have been issued online using the above application.In addition 194 NOCs have been issued offline and 79 renewals of NOCs have also been issued.

14. TECHNICAL EXAMINATION OF IRRIGATION SCHEMES / PROPOSALS

14.1 Scrutiny of Major/Medium Irrigation Projects:

As per the directives of Planning Commission, the CGWB is scrutinizing the Major and Medium Irrigation project reports/proposals sent by the State Government / Central Water Commission/ Command Area Development & Water Management Wing of Ministry of Water Resources from the point of view of their impact on groundwater regime. Specific recommendations are being made on the projects and submitted to the concerned for compliance. 12 projects were examined during 2015-16 as on 31.03.2016 and are listed below:

Sr. No	Project
1	Mewat Feeder Canal, Haryana
2	Rarhu Reservoir Scheme, Jharkhand
3	Burhi Gandak-None-Baya-Gandak Link Project, Bihar
4	Baksoti Barrage scheme on river Sakri, Bihar
5	Burhai Reservoir Project, Jharkhand
6	Nizamsagar Project-canals and Distributaries including CM & CD works of NS Project, Telangana
7	Upper Bhadra Project, Karnataka
8	Sanjay Sarovar (Upper Wainganga) project, Dist.Balaghat, Madhya Pradesh
9	Mohanpura Major Multipurpose Project, Madhya Pradesh.
10	ERM of Surface Irrigation Schemes in Haryana
11	Lower Tapi Major project in Tapi Basin of Maharashtra
12	RRM of UBDC System, Punjab state.

The observations on two (2) Irrigation Projects are under scrutiny at Regional offices of Board as on 31.03.2016

15. HUMAN RESOURCE DEVELOPMENT & RAJIV GANDHI NATIONAL GROUND WATER TRAINING AND RESEARCH INSTITUTE (RGNGWT &RI)

It is the earnest endeavourofCentral Ground Water Board to keep its technical personnel apprised withthelatest development in allaspects related to groundwater management and drillingtechniques. The Board also includes trainees from State Departments and candidates from abroad for different training programmes.

15.1 Rajiv Gandhi National Ground Water Training and Research Institute

Rajiv Gandhi National Ground Water Training and Research Institute (RGNGWTRI) located at Raipur, Chhattisgarh caters to the training requirements of Central Ground Water Board and other Central and State Government Organizations, Academic Institutes, NGOs etc. in the field of ground water.

During XII Plan, RGNGWTRI under HRD and Capacity Building Scheme of MoWR,RD&GR is implementing a three-tiered training programme keeping in view the requirements of the National Project on Aquifer Management (NAQUIM). These trainings will enable creation of a trained workforce for implementation of National Project on Aquifer Management and overall sustainable development of ground water resources. Total outlay for RGNGWTRI component for XII Plan is Rs 90.00 Crores.

As a part of this three-tiered training programme, during the entire plan period (2012-17) a total of 174 Tier I (National Level) training courses are proposed in which professionals from Central/State Government departments, Academic Institutions etc. are to be trained. Under Tier II (State Level) training programme, a total of 222 courses are proposed in which ground Water professionals, NGOs, VOs, PRIs etc are proposed to be trained. Similarly, 1250 Tier III (Block Level) training programme are proposed in which NGOs, PRIs, Progressive Farmers and other stakeholders at grassroots level are to be trained. During the year 2015-16, 105 training programmes (34- Tier I, 25-Tier II and 46Tier-III) were conducted by RGI and a total of 8952trainees (690- Tier I, 825-Tier II and 7437- Tier-III) were trained including 2498 female participants.The tier three training also includes three workshop on “Palaeochannel” organised at Ahmadabad, Allahabad and Jodhpur. The workshop of Jodhpur was inaugurated by **Shushri Uma Bharati, Honb’le Union Minister** for WR,RD&GR. While the National Level training programmes were conducted at RGNGWTRI, Raipur, the State and Block Level training programmes were organized by the respective Region Offices of CGWB. Out of a total 690 professionals trained as a part of Tier I training programme, 408 were from CGWB and the remaining 282 professionals were from other organizations like State Govt. organization, academic institutes, NGOs etc. Tier II and Tier III training programmes were targeted at State Govt. organizations, NGOs, PRIs and other stakeholders at grassroots level.

The actual expenditure occurred under RGI for FY 2015-16 is Rs 5.94 Cr.

Summary details of the training programmes are given in table 15.1.

Training Programme	Target (Nos.)	Achievement	Total No. of persons Trained	Participants from CGWB	Women participants
TIER – I (National Level)	32	34	690	408	79
TIER – II (State Level)	25	25	825	0	217
TIER – III (Block Level)	40	46	7437	0	2498
Total	**97**	**105**	**8952**	**508**	**2794**

Table 15.1: Summary of training programmes conducted and persons trained in RGNGWT&RI

Shushri Uma Bharati ji Hon'ble Union Minister of Water Resources, River Development and Ganga Rejuvenation addressing the audience during Palaeochannel workshop on 18th March 2016 at Jodhpur.

Prof. Shri Sanwar Lal Jat, Hon'ble Minister of State, Ministry of Water Resources, RD & GR, Govt. of India addressing the audienceduring Palaeochannel workshop on 18th March 2016 at Jodhpur

Welcome address by Sh. K.B. Biswas, Chairman, CGWB during Palaeochannel workshop on 18th March 2016 at Jodhpur

Release of workshop volume during Palaeochannel workshop on 06thOct 2015 at Allahabad

Photograps of Audience at workshop on Palaeochannel on 18th March 2016 at Jodhpur

Class on FCC image interpretation to the trainees during tier I Training Programme

16. IEC ACTIVITIES

16.1 6th NATIONAL LEVEL PAINTING COMPETITION, 2016

The 6th National Level Painting Competition for school children, aimed at creation of public awareness on the importance of water conservation and prevention of its contamination was organized by the Central Ground Water Board, Ministry of Water Resources, River Development & Ganga Rejuvenation on 29.03.2016 at Chhat Puja Ghat, Near ITO, New Delhi under IEC Scheme of the Ministry. The theme of the National Painting Competition was **"Care for Water – Secure the Future".** A total of 30 students, who won the 1st prizes in the State Level Painting Competitions from various States / UT's participated in the National Level Painting Competition.

Sh. K. B. Biswas, Chairman, Central Ground Water Board, expressed his deep sense of gratitude to Sushree Uma Bharti Ji, Hon'ble Union Minister of Water Resources, RD & GR for accepting the invitation to grace the occasion as Chief Guest. He highlighted that water Sector today is facing diverse challenges. It becomes essential to take stock of the situation and understand the dimensions of the problem and take urgent measures to address the challenges in holistic manner. He stated that this year all the painting competitions have been conducted throughout the country on the river banks as per the directives of the Ministry. Dr. Amarjeet Singh, Special Secretary, Ministry of Water Resources, RD & GR underlined the Ministry's commitment to be an active contributor to the sustainability of precious water resources and emphasized to make water conservation a way of life and let us all do our part to save water, and help spread the message of water conservation. Sushree Uma Bharti, Hon'ble Minister of Water Resources, RD & GR expressed her pleasure on the occasion of the 6th National Level Painting Competition for school children, aimed at creation of public awareness on the importance of water conservation and prevention of its contamination organized by the Central Ground Water Board. She was happy to note that this year more than 14 lakh students from more than 17,000 schools across the country participated in the School Level Competitions. During her address Hon'ble Minister highlighted that to instigate and perpetuate the idea of water conservation and its protection from pollution to Society, children are the best Ambassadors. Rewarding children with prizes is a meager incentive in front of their efforts and level of sensitivity which is being generated for all of us to learn and she admired this young generation for motivating society for such a noble cause which in last few decades has become an essential need for sustainability of water resources in the country.

The 6th National Level Painting Competition carries a First prize of Rs. 50,000/-, Two Second prizes of Rs. 25,000/- each, Three Third prizes of Rs 10,000/- each and Twenty Four (24) Consolation prizes of Rs. 5000/- each. The first prize was bagged by Kumari Ayesha Patnaik and the winners of second prizes were Master Suraj Choudhary and Master Hemchandran V. The three third prize winners were Kumari Bidipta Deb, Kumari Emora Mercy G, and Kumari Neha Sharma. North Central Chhattisgarh Region, Raipur, Southern Region, Hyderabad and West Central Region, Ahmedabad were given first, second and third best-performing Regions of CGWB respectively. On this occasion a cultural programme was presented by the students of Dyal Singh College, New Delhi.

6th National Level Painiting Competition

Participants 6th National Level Painting Competition

State Level Painting Competition organized at different places under IEC activity

- In order to encourage and develop zeal towards water conservation and protection of water from pollution, Central Ground Water Board, CR, Nagpur organized the 6th State Level Painting Competition on Water Pollution on 30th January 2016 on the banks of Kanhan River at Bina (Bina Sangam), Taluka – Kamthi, District Nagpur, Maharastra.
- The State Level Painting Competition was organized at Rangai ghat, Betwa River Bank, Vidisha District (MP) on 20.01.2016. A total of 44 out of 50 selected students of various schools of Madhya Pradesh participated.
- CGWB KR, Trivendrum conducted State level Painting competition for school children of class VI, VII and VIII on 'Water Pollution' at Thiruvananthapuram on banks of Karamana River in Kerala on 20.01.2016 and U.T. level at Kavaratti, on 24.01.2016.
- Central Ground Water Board, SWR, Bangalore has organized State Level Painting Competition on the theme "WATER POLLUTION" on 20.1.2016 on the bank of River Mandovi, Panaji, Goa. 47 students participated in the Painting competition.
- CGWB, UR, Dehradun has organized State Level Painting Competition 2016 on "Protect Groundwater and Rivers from Pollution" held at Ganga Resort (Garhwal mandal Vikas Nigam Limited), Muni Ki Reti, Rishikesh (Uttarakhand) on 23rd January, 2016 and Chief Guest of the function Sh. K. B. Biswas, Chairman, CGWB, Faridabad.
- The 6thSchool Level Painting Competition for school students of 6th, 7th & 8th standards of twenty seven (27) districts of the Chhatishgarh State was organized by CGWB, NCCR, Raipur. A total of 94096 children's have participated from 1148 schools representing both rural, urban and Naxal affected parts of the State. The best 13 paintings out of 50 have been selected by Jury for Nation Level Painting competition.
- State Level Painting Competition has been conducted by the CGWB, NWR, Chandigarh for Punjab State & UT Chandigarh on 22.01.2016 at Gurudwara Tibbi Sahib, Near Ropar Headworks, Ropar. Er. K.S.Takshi, Chief Engineer, Punjab Irrigation Department was the chief guest whereas Shri Tejdeep Singh, SDM Ropar, was the guest of honor on the occasion. The painting competition was organized at the bank of the river Satluj. The 47 nos. of students from Punjab and 46 nos. from Chandigarh have taken part in the painting competition. The efforts of MoWR, RD & GR were highly appreciated by the students, Parents/guardians and Jury Members of the competition.
- State Level Painting Competition has been conducted by the CGWB, NWR, Chandigarh for Haryana State on 18.01.2016 at Haryana Irrigation Research & Management Institute (HIRMI), Kurukshetra. Shri Rakesh Chauhan, Principal Director, HIRMI, was the chief guest on the occasion. The painting competition was organized in the Saraswati river area. The competition was attended by 42 nos. of students. The efforts of MoWR through CGWB were highly appreciated by the students, Parents/guardians and Jury Members of the competition.
- CGWB, Southern Region, Hyderabad organized State Level Painting Competition on 18th and 19th January, 2016 at BM Birla Science Centre, Hyderabad for Telengana and Andhra Pradesh States respectively.
- The 6th State Level Painting Competition was organized by CGWB, WCR, Ahmedabad on 25-01-2016 at Sardar Vallabhbhai Patel Memorial Society, Ahmedabad. The topic of the competition was "Protect Ground Water and Rivers from Pollution". Dr. Narottam Sahu, Member Secretary, Gujcost, Science & Technology Department, Government of Gujarat and Shri R.N.Shukla, Advisor, WASMO, Government of Gujarat were the Chief Guest and Guest of Honour respectively who gave away the prizes and certificates to the winners and participants.

- The 6th State Level Painting competition, 2015-16 was organized by CGWB, ER, Kolkatta on 21.01.2016 at the bank of the river Hooghly at Malancha tourist lodge ground of Govt. of West Bengal. 48 students participated in the day–long competition with vigour and enthusiasm in the serene ambience of the river Hooghly. Prizes were given away by Swami Supravananda of R.K.V. Mission, Barrackpore. The Chief Guest and the others present on the occasion applauded the noble effort of CGWB towards generation of awareness on pollution of water for the betterment of future generation.
- The 6th State Level Painting Competition for Sikkim was held on 19th Jan, 2016 near Reykhola spring in Gangtok, East Sikkim. The Prizes were given away by D R Nepal, Secretary, RMDD, Govt. of Sikkim.
- The 6th State Level Painting Competition for the Union Territory of A & N Islands was held on 22nd January, 2016 for two hours duration in the auditorium of Govt. Girls' Sr. Sec. School, Port Blair, situated close to Andaman Sea. A total of 37 candidates took part in the competition. The Prize Distribution Session was grace by Ms. Tanvi Garg, IAS, Secretary, Education Dept., A & N Administration as Chief Guest.
- State Level Painting competition has been organized by Central Ground Water Board, Western Region, Jaipur on 20.01.2016 on the bank of Chambal River at Kota town. 41 (Forty one) students (14 boys & 27 girls) from 30 nos of schools have participated in the State Level Painting Competition. Shri Om Birla, Hon'ble Member of Parliament, Kota was the Chief Guest on the occasion and Sh. Somnesh Lal Mathur Chief Engineer, WRD, Dr. V. N. Bhave Senior Hydrogeologist, GWD Kota were Guests of honour .The competition concluded with the award of certificate to the participants and Prizes to the winners.

16.2 IST Essay Competition

Central Ground Water Board, Ministry of Water Resources, RD & GR organised 1st National Essay Competition under Jal Kranti Abhiyan 2015-16 in all the States and Union Territories of the country. The Essay Competition will be held for two categories i.e. Essay Competition for the age group of 15-25 **(Category -1)** and Technical Papers **(Category-II).**

The themes were as under:

Phase –I **Role of Youth in Water Management**

Phase –II **Role of Youth for Prevention of Water Pollution.**

Prize Winners of 1st National Essay Competition (Category -1)

Winners of 1st National Essay Competition 2015-16 (Category I)					
S.No.	**Zonal Office**	**States/Uts covered**	**Prize**	**Name**	**State/UT**
1	CGWB, ER, Kolkata	Andaman & Nicobar Islands, Odisha, Sikkim, West Bengal	First	Shri Rajdeep Kar	West Bengal
			Second	Shri Saurav Mazumder	West Bengal
			Third	Ms. Ayushee Rath	Odisha
2	CGWB, NCCR, Raipur	Madhya Pradesh, Chhattisgarh, Maharashtra	First	Pushpendra Kumar	Chhattisgarh
			Second	Sheetal Singh	Madhya Pradesh
			Third	Shradha Satish Mali	Maharashtra
3	CGWB, NER, Guwahati	Assam, Nagaland, Manipur, Arunachal Pradesh	First	Aribam Rocky Sharma	Manipur
			Second	Raza Shah Ahmedy	Assam
			Third	Miss Ritusmita Gogoi	Assam
4	CGWB, NR, Lucknow	Uttar Pradesh, Bihar, Jharkhand	First	Supriya Singh	Uttar Pradesh
			Second	Vivek Anand	Jharkhand
			Third	Anukriti Singh	Uttar Pradesh
5	CGWB, NWHR, Jammu	J & K, Uttarakhand, Himachal Pradesh	First	Anshul Gupta	J&K
			Second	Bhawana Mahra	Uttarakhand
			Third	Tazeem Akhter	J&K
6	CGWB, NWR, Chandigarh	Punjab, Haryana, Chandigarh, Delhi	First	Amritpal Singh	Punjab
			Second	Rajat Bansal	Haryana
			Third	Ankur Kumar	Chandigarh
7	CGWB, SR, Hyderabad	Andhra Pradesh, Telangana, Tamil Nadu, Puducherry	First	G.Nishanth Kumar	Telangana
			Second	Kammari Srinivasa Chary	Telangana
			Third	Bhargavi Sri Dasari	Andhra Pradesh
8	CGWB, SUO, Shillong	Tripura, Meghalaya, Mizoram	First	Andrew Kharmonlang	Meghalaya
			Second	Stefan Wann Lyngdoh	Meghalaya
			Third	Sarvesh Kumar	Tripura
9	CGWB, SWR, Bengaluru	Karnataka, Kerala, Goa, Lakshadweep	First	Megha Chandran P.	Kerala
			Second	Radhika Jayashankar Pandey	Goa
			Third	Megha B.V.	Karnataka
10	CGWB, WCR, Ahmedabad	Rajasthan, Gujarat, UT of Daman & Diu, UT of Dadra & Nagar Haveli	First	Ashokgiri Gusai	Gujarat
			Second	Pragya Saini	Rajasthan
			Third	Nilesh Pawar	Gujarat

(Category-II, Technical Papers) under Jal-Kranti Abhiyan 2015-16.

First best five technical papers

Sr No	Author / Authors	Title of Technical Paper
1	Dr. Elango Lakhmanan & G. Jagadeshan	Fluoride contamination in groundwater: a pilot study on dug well recharge system for insitu mitigation
2	Ms.Ila Agnihotri	Analysis of the climate variations and their impact on water availability at west flowing rivers of kutch, saurashtra and marwar(wfr-ksm) basin using geospatial technology
3	Dr. Paulami Sahu	Groundwater management strategies for the area in and around east calcutta wetlands (ecw), west bengal, india
4	Dr. P.K.Thampi	Micro watershed based water management and popularisation of low cost ldpe subsurface dykes
5	Mrs. S.Janapriya & Santhana Bosu	Impact of climate change on water resources of manjalar sub basin of river vaigai in tamil nadu

Second best five technical papers

Sr No	Author / Authors	Title of Technical Paper
1	Mr. A.Gurunathan	Crossing climate change implications: adaption with community managed tanks and ponds in india
2	Mr. K.P.Singh, Naval Kishore, Jasbir Kaur, & Mandeep Kaur	Impact of climate change on water resources and water security in north west parts of india
3	Dr. Roopa A.Alur	Water issues including pollution and management strategies in india
4	Mr. S.Balaji, Shaukat Ahmad Bhat & Mohisin Hamid Dar	Climate change and impact on water resources with special reference to andaman and nicobar islands
5	Prof. S.B.Mishra	Water as enterprise: towards a sustainable management model-a case of coastal odisha, india

16.3 Jal Kranti Abhyan:

- Union Minister of Water Resources, River Development and Ganga Rejuvenation Sushri Uma Bharti launched the JAL KRANTI ABHIYAN, 2015-16 at Jaipur on 5th June, 2015. Programme was organized by CGWB, WR, Jaipur and WRD, Jaipur (Raj). The programme was started with brief address by Chairman, Central Ground Water Board, New Delhi. The dignitaries graced the occasion were Shri Rampratapji, Hon'ble Water Resource Minister, Rajasthan, Shrimati Kiran Maheshwari, Hon'ble Minister of PHED & GWD, Rajasthan, Shri Prabhu Lal Saini, Hon'ble Minister of Agriculture, Rajasthan, Dr. Sri Ram Vedire, Chairman, Rajasthan River Basin Authority, Shri Ramcharan Bohra, Hon'ble Member of Parliament (Jaipur), Shri.Om Birla, Hon'ble Member of Parliament (Kota). About 3500 people from all parts of the sections including Central and State Government officers & officials, Members of Zila Parishad, NGOs, Students, Farmers and stake holders were present in the grand function. A Technical Session was also conducted during the Jal Kranti Abhiyan Programme; four lectures were presented during the session.

- Jal Kranti Abhiyan was also simultaneously held at Shimla and Jhansi on 05.06.2015.

Jal Kranti Abhiyan Meeting:

- The Jal-Kranti Abhiyan meeting called by Chairman CWC on 25th June 2015 at CWC, HQ, RK Puram, New Delhi was attended by the Regional Directors and officers of CGWB. The meeting was called for sensitization of nodal officers for effective implementation of Jal-Kranti Abhiyan of the Ministry of WR, RD & GR.
- A meeting was held on 15-10-2015 with the Secretary (CADA), WRD, Mumbai for deciding the model command area under Jal Kranti Abhiyan. Shri D. Venkateswaran, Scientist-D, CGWB attended the meeting. Mr Sabinwar, Deputy Secretary, WRD, Mumbai, Chief Engineer, CWC, Nagpur and Director, CWC, Nagpur also attended the meeting. During the meeting, the Bembla Irrigation Project, Yavatmal district was selected as model command area approved by the committee.
- Scientist of CGWB, WCR, Ahmedabad attended to the field visit conducted by the State Government in respect of Jal Grams at village Pingalwda of Karjan taluka and Vachhesar of Desar teluka of Vadodara district on 16th October, 2015 in connection with the Jal Kranti Abhiyan.
- The H.O.O., CGWB, ER, along with other officers attended Video Conference with Dr. B. Rajender, Jt. Secretary (PP), MoWR, RD &GR on 08.10.2015 regarding progress/action taken for Jal Kranti Abhiyan.

16.4 Jal Gram Yojana:

496 villages to be identified as Jal Grams out of these 376 Jal Grams have been identified.

17. SEMINAR / WORKSHOP ORGANIZED

CGWB has organized number of Seminor/Workshop under following head:-

- Bhujal Manthan
- Training Workshop on Palaeochannel under TIER-III training programme
- Workshops under IEC Activties(Jal Kranti Abhiyan, Jal Manthan & Jal Gram)

The detail list has been given in Table-17.1

A. BHUJAL MANTHAN

One day Seminar- Bhujal Manthan was organized on 21st August, 2015 at Srimad Bhagwad Geeta Auditorium, Kurukshetra University, Kurukshetra, Haryana. The Seminar was inaugurated by Sushri Uma Bharti, Hon'ble Minister for WR, RD & GR. Shri O. P. Dhankad, Hon'ble Minister of Agriculture, Irrigation, Development and Panchayat, Government of Haryana was the Guest of Honour.

The Seminar was organized in two sessions- Morning session and Afternoon session. The morning session was inaugurated by Dr..Amarjeet Singh, Additional Secretary, Ministry of WR, RD & GR. Sh. A. B. Pandya, Chairman; Central Water Commission was the Guest of Honour. Dr. Amita Prasad, Joint Secretary, Ministry of WR, RD & GR, Dr. J. S. Samra, Ex. CEO, NRRA and Sh. K. B. Biswas, Chairman, CGWB were other dignitaries on Dias.

Four technical sessions were held entitled- (a) 'Geogenic Ground water Pollution- Special reference to Arsenic and Fluoride Anthropogenic Ground Water Pollution- Mitigation measures'; (b) 'Ground water stressed areas- Management intervention for sustainable use Ground Water Mapping and Application of Recent Techniques'; (c) 'Water Conservation Conjunctive use of Surface and Ground water in efficient manner' and (d) 'Ground water System response to climatic change and strategies Ground water efficient use and People's participation for its sustainable management'.

The afternoon session was inaugurated by Sushri Uma Bharti, Hon'ble Minister, WR, RD & GR. Sh. O. P. Dhankad, Hon'ble Minister of Agriculture, Irrigation, Development and Panchayat, Government of Haryana was the Guest of Honour. Member of Parliament and Member of Legislative Assembly from Haryana and Delhi and Vice Chancellor of Kurukshetra University were also present.. The Seminar was addressed by Sushri Uma Bharti, Hon'ble Cabinet Minister, WR, RD & GR and Sh. O. P. Dhankad, Hon'ble Minister of Agriculture, Irrigation, Development and Panchayat, Government of Haryana and the M.P.'s and M.L.A.'s and V.C., Kurukshetra University.

More than 2000 people participated in the Seminar which included Officers from Central Government, State Departments of Haryana and Punjab, Experts and Professionals in Ground water, Professors and students from various departments of Kurukshetra University, NIIT Kurukshetra and various other Engineering Colleges, Regional Directors of various Regions of CGWB, and Officers and Officials of CGWB, Chandigarh, New Delhi, Faridabad and Division II, Ambala.

Key Recommendations of the Technical Sessions

- Studies to be taken up for better understanding of impact of geogenic /anthropogenic contamination on human health.
- Pilot studies on remediation of groundwater contamination should be taken up more vigorously.

- Community participation in the fight against groundwater contamination should be ensured through an intensive mass awareness and capacity building campaign
- Advanced Geophysical studies like ERT and Heli-borne surveys should be taken up to undertake large scale mapping for the whole country.
- The current method of computing the ground water recharge and draft can be supplemented by remote sensing techniques.
- Artificial recharge techniques should be employed to push the freshwater-seawater interface into sea & alternate arrangements for source water to be planned.
- Implementation of two pilot projects for conjunctive use of surface and ground water may be taken up in two of the larger canal command areas where studies have already been completed.
- Use of ground water from deep aquifers for conjunctive use with surface canal water has been successfully demonstrated but the legal aspects of its impact on the shallow tube well of the farmers should be considered.
- Large-scale ground water development is feasible in Eastern states of the country and there is need for a second 'green revolution' in these areas to help India achieve food security.
- Best practices from successful agro-ecologies need to be replicated in areas of unsustainable ground water development such as parts of North-eastern India.
- A workable water resource management plan must be made mandatory for clearance of any proposal for large-scale mining involving excavation below the water table.
- Efforts are to be made for conservation of springs in the hilly areas of the country through limiting indiscriminate construction of bore wells, conservation of spring catchments and through implementation of suitably designed water conservation structures to replenish the ground water resources.
- Climate adaptation strategies should include groundwater management to meet the current and projected water scarcity as a result of climate change, particularly in relation to agricultural needs
- In order to improve the efficiency of water application from groundwater through drip and sprinkler technology, aquifer characteristics should be linked to the yield from groundwater abstraction structures.
- Women especially from the rural areas should be made aware of all the dangers of drinking non-potable water and its associated health hazards through awareness programs. They should be trained to learn various techniques to preserve water, measure the level of water in open wells, and test the properties of water and treat water and make it safe for use. They should be made partners in distribution of water to all areas which will instill a sense of responsibility, justice and respecting the rights and entitlements of the poor.

Table 17.1 Details of Seminar /Workshop organized during 2015-16				
Sr. No.	**Office**	**Date**	**Venue**	**Title of the Seminar /Workshop**
A. BHUJAL MANTHAN				
1	NWR, Chandigarh	21.08.2015	Srimad Bhagwad Geeta Auditorium, Kurukshetra University, Kurukshetra	Bhujal Manthan
B. TRAINING WORKSHOP ON PALAEOCHANNEL UNDER TIER III TRAINING PROGRAMME				
1.	WCR, Ahmedabad	20.07.2015	AMA Hall at Ahmedabad	"Palaeochannels- A Ground Water Repository"
2.	NR, LUcknow	06.10.2015	Allahabad	"Ground Water Prospect of Palaeochannels"
3.	WR, Jaipur	18.03 2016	Dr. S. N. Medical College Auditorium, Jodhpur	"Ground Water Sustainability in Palaeochannels"
C. WORKSHOP UNDER IEC ACTIVITY (JAL KRANTI ABHIYAN , JAL MANTHAN, JAL GRAM ETC.)				
1.	WR, Jaipur	22.12.2015	Irrigation Management and Training Institute(IMTI), Kota, Rajasthan	"Water Resource Development & Management Issues"
2.		22.03. 2016	Indira Gandhi Panchayati Raj & Gramin Vikas Sansthan, Jaipur	"Ground Water Issues and Way forward: Rajasthan State"
3.	CR, Nagpur	16.10.2015	Nagpur	"Water Conservation, Water Security and Water Quality"
4		28.01.2016	WALMI, Aurangabad	Workshop-cum-training on Jal Kranti Abhiyan
5.		22.03.2016	YASHADA, Pune	"Ground Water Development Issues and Management Options"
6.	ER, Kolkata	15.10.2015	Rabindra Tirtha, New Town, Kolkata	Water Conservation, Water Security and Water Quality
7.		27.11.15	Conference Hall of ICAR-CIARI at Port Blair, Andaman & Nicobar Islands.	Workshop under Jal Kranti Abhiyan 2015-2016
8.		28.03.2016	ER, Kolkata	"Sustainable Development and Management of Ground Water Resources, its Remedial Measures for Emerging Crisis and Climate Change in West Bengal"
9.	KR, Thiruvananthapuram	10.02.2016	Kavaratti, Lakshadweep	'Water Security in U.T of Lakshadweep – Challenges and Options'
10.		14.10.2015	KR, Thiruvananthapuram	'Water Security in Kerala state - Challenges & Options"
11.	MER, Patna	18.03.2016	A. N. Sinha Institute, Gandhi Maidan, Patna, Bihar	Ground Water Development Prospects and Water Quality Issues in Bihar"

12.	NCCR, Raipur	05.11.2015	NCCR, Raipur	"Ground Water Issues and Challenges in Chhattisgarh State with Special Reference to its Security and Quality"
13.	NER, Guwahati	30.09.2015	Naharlagun	"Water conservation, water security, water quality, climate change & best practices"
14.		23.11.2015	Sivsagar	"Water conservation, water security, water quality, climate change & best practices"
15.		29.01.2016	Bongaigaon	"Water conservation, water security, water quality, climate change & best practices"
16.		19.02.2016	Agartala	"Water conservation, water security, water quality, climate change & best practices"
17.		22.03.2016	Guwahati	"Water conservation, water security, water quality, climate change & best practices"
18.	NR, Lucknow	30.03.2016	Auditorium of Geological Survey of India, Aliganj, Lucknow	"Ground Water Resources in Uttar Pradesh: Challenges & Management"
19.	NWR, Chandigarh	28.10.2015	Chandigarh	"Ground Water Management in Alluvial terrains of North Western India"

PHOTOGRAPHS OF BHUJAL MANTHAN

Inaugural Session

Inauguration by Lighting of Lamp

Dignitaries on Diaz

Address by Chief Guest (AS, WR, RD & GR)

Address by Chairman, CGWB

Participation by
Professionals, Farmers, Students & Academic

Inaugural Session in progress

Exhibition

Inauguration by JS (A), MoWR, RD & GR

Visit to stalls in Exhibition by AS, MoWR, RD & GR

Visit to stalls in Exhibition by Dignitaries & Participants

Technical Sessions

Panelist of Technical session I

Technical session II in Progress

Technical session IV in Progress

Concluding Session

Inauguration by Lighting of Lamp

Dignitaries on Diaz

Address by Hon' ble Union Minister of Water Resources, RD & GR

View of Participants in Bhujal Manthan

Release of Seminar Volume by Hon'ble Union Minister of Water Resources, RD & GR

Release of IEC materials Hon'ble Union Minister of Water Resources, RD & GR

PRESS CLIPPINGS OF BHUJAL MANTHAN

जग मार्ग कुरुक्षेत्र। शनिवार, 22 अगस्त 2015

विश्व की 10 नदियों में होगी गंगा : उम

कृषि की नवीनतम तकनीकी को अपनाकर पानी की करें बचत

केंद्रीय मंत्री उमा भारती कुवि के ऑडिटोरियम हॉल में केंद्रीय भू-जल बोर्ड द्वारा आयोजित भू-जल मंथन कार्यक्रम का दीप प्रज्वलित कर शुभारम्भ करते हुए।

कुरुक्षेत्र। जगमार्ग न्यूज : केंद्रीय जल संसाधन मंत्री उमा भारती ने कहा कि अब गंगा नदी दुनिया की सबसे गंदी 10 नदियों में से एक नदी है, जो कि चिंता का एक विषय है। इसलिए केंद्र सरकार ने प्रधानमंत्री कृषि सिंचन योजना के तहत गंगा नदी को 3 से 7 सालों के बीच दुनिया की सबसे अच्छी 10 नदियों में शामिल करने का संकल्प लिया है। गंगा नदी के साथ-साथ यमुना नदी को असली स्वरूप देने के लिए हरियाणा, उत्तर प्रदेश और दिल्ली राज्यों से मिलकर केंद्र सरकार का सहयोग करने की अपील की गई है। यदि ये तीनों राज्य मिलकर अपने-अपने प्रदेशों में पानी बचाने और कृषि की नवीनतम तकनीकी को अपनाकर पानी की बचत करके पानी को यमुना नदी में प्रवाह करें तो यमुना नदी फिर से प्रयाग तक बहने लगेगी। केंद्र सरकार ने वर्ष 2018 तक नदियों को बचाने और पानी को व्यर्थ बहने से रोकने का लक्ष्य भी निर्धारित किया है।

उमा भारती शुक्रवार को कुरुक्षेत्र विश्वविद्यालय के ऑडिटोरियम हॉल में केंद्रीय भू-जल बोर्ड द्वारा आयोजित भू-जल मंथन कार्यक्रम में बोल रही थीं। केंद्रीय मंत्री ने कहा कि हरियाणा प्रदेश में 116 ब्लाकों में 71 ब्लाकों में जरूरत से ज्यादा का दोहन हो चुका है। हरियाणा साथ लगते पंजाब राज्य में इससे भी ज्यादा खराब है।

हरियाणा के कृषि मंत्री ओम प्र धनखड़ ने कहा कि हरियाणा प्रदे भू-जल को एक बैंक खाते की देखा जा रहा है। प्रदेश का भू-जल करोड़ एकड़ का है और भूमि से दोहन 60 लाख फिट किया जा है। इसमें 40 लाख फिट का गया है इसलिए जल को बचाना बहुत बड़ी चुनौती उनके सामने प्रदेश के महेंद्रगढ़, फतेहा गुड़गांव, कैथल, कुरुक्षेत्र करनाल आदि जिलों में भू-जल की स्थिति काफी चिंताजनक है विधानसभा क्षेत्र में 2 करोड़ खर्च करके नहर के पानी को तक पहुंचाने के लिए पाईप बिछाई जाएगी और ट्रेन को रिचार्ज करने का काम किया जा

कुरुक्षेत्र केसरी SATURDAY, AUGUST 22, 2015.

केंद्र सरकार कुरुक्षेत्र के विकास के लिए लाएगी नए प्रोजैक्ट : उमा भारती

कहा- देश-विदेश के पर्यटकों को आकर्षित करेंगी परियोजनाएं

पानी बचाने के लिए हरियाणा भी कर रहा नई तकनीक का प्रयोग : धनखड़

HINDUSTAN TIMES, CHANDIGARH
SATURDAY, AUGUST 22, 2015

Uma refuses to intervene in Punjab-Haryana water row

Vishal Joshi
vishal.joshi@hindustantimes.com

Union water resources minister Uma Bharti at a national seminar organised by the Central Ground Water Board at Kurukshetra University on Friday. HT PHOTO

KURUKSHETRA: Union minister for water resources and river development Uma Bharti on Friday refused to intervene in the water dispute between Punjab and Haryana.

Bharti, who was here to chair a national seminar on water resource management organised by the Central Ground Water Board, told reporters here that water was a sensitive issue and it should be resolved only through dialogue.

"Leave aside courts, I am not even in support of approaching tribunals for water issues. Water is vital not only for humans, but is also most essential for infrastructural development. Both the states (Punjab and Haryana) should sit together and find an amicable solution to it without a third party intervention," she said.

DHANKAR HAD SOUGHT INTERVENTION

Earlier at the seminar, state irrigation minister Om Prakash Dhankar had urged the union minister to assist Haryana in getting its due share of river waters from the neighbouring Punjab.

However, Bharti chose to ignore the demand but commented that associating the word 'dispute' with water was unjustified and 'two states may only have issues on water which should be addressed only on the table'.

The minister called for building a national consensus against use of safe water in construction and industries.

She favoured a water policy that allows use of water based on its classified quality.

"A total of 71 blocks in Haryana are declared dark zones and underground water table is depleting at an alarming rate all over the country. Similarly, river waters are polluted and under such circumstances limited drinking water resources cannot be allowed for activities like construction or industry," she said.

The minister also ruled against allowing treated water to be flown in the rivers.

"Delhi has set an example where treated water is used for irrigation of parks and horticulture. While the Centre is working towards checking inflow of pollutants in rivers, we are planning to stop putting even treated water back into the rivers and using it for other purposes," she said.

Bharti said that Haryana and other states battling the problem of depleting underground water table should encourage plantation of trees with deep roots having the ability to store water.

"States should promote drip irrigation, water sprinkling and other proven innovative technologies that not only ensure judicious use of water but also reduce evaporation from natural esources," she said.

Bharti, who also holds the charge of Ganga rejuvenation ministry, said that she had planned to make Ganga as one of the 10 cleanest rivers in the world in the next five to seven years.

She said that active public support and initiative of the state governments was needed to make the dream of an arsenic-free Ganga.

Bharti said that there was no denial that another river of religious importance, Yamuna, ceased to exist beyond Hathnikund barrage in Yamunanagar where it was channelised into canals.

"What flows in the Yamuna riverbed beyond Hathnikund to elhi and Mathura is only sullage," she said.

NON-COMMITTAL ON SARASWATI REVIVAL

Bharti also avoided making any commitment to support the Haryana government's 'Saraswati revival' initiative. "ISRO is supporting Haryana on Saraswati project and experts from my ministry may consider to assist it, if a request comes in," she said.

B. TRAINING WORKSHOP ON PALAEOCHANNEL UNDER TIER III TRAINING PROGRAMME:

The **TIER III** training also includes three workshops on "Palaeochannel" organised at Ahmadabad, Allahabad and Jodhpur. The workshop of Jodhpur was inaugurated by **Shushri Uma Bharati, Honb'le Union Minister** for WR,RD&GR. The details of the workshops on "Palaeochannel" organised are as below:

1. Training Workshop "Palaeochannels- A Ground Water Repository" was organized on 20.07.2015 at AMA Hall, Ahmedabad.
2. Training Workshop "Ground Water Prospect of Palaeochannels" was organized on 06.10.2015 at Allahabad, UP.
3. Training Workshop "Ground Water Sustainability in Palaeochannels" was organized on 18.03 2016 at Dr. S. N. Medical College Auditorium, Jodhpur.

C. WORKSHOPS UNDER IEC ACTIVITY (JAL KRANTI ABHIYAN)

Under Jal Kranti Abhiyan, fifteen (15) Workshops on Water Conservation, Water Security, Water Quality, and Climate Change & Best Practices were organized in the states of Assam, Upper Assam, Arunachal Pradesh, Tripura, Chhattisgarh, Goa, Kerala, Lakshadweep, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Puddichery, West Bengal, Andaman & Nicobar Islands. The details of some of the workshops organized under Jal Kranti Abhiyan are given below-

Workshop on "Ground Water Management in Alluvial Terrains of North Western India" at Chandigarh on 28.10.2015.

One-day Workshop on "Ground Water Management in Alluvial terrains of North Western India" was organized in Chandigarh on 28.10.2015 in collaboration with the Institution of Engineers (India), Chandigarh. Dr. Brijendra Pateriya, Director, Punjab Remote Sensing Centre, Ludhiana was invited as the Chief Guest, while Er. P.S. Bhogal, Chief Engineer, Department of Irrigation, Govt. of Punjab was the Guest of Honour. About 150 delegates from diverse backgrounds, such as scientists, engineers, NGOs, academics, students and consultants, from all related fields participated in the Workshop.


Tribune
NEWS
New terminal plays host to swanky
TODAY
in salt intake
ent stroke
IMEN AT HIGHER RISK
Experts dwell on groundwater management at workshop

Workshop on "Water Conservation-Water Security and Water Quality"

Central Ground Water Board, South Western Region, Bangalore has organised one day workshop under Mass Awareness Programme of Jal Kranti Abhiyan 2015-16, a flag ship programme of Ministry of Water Resources, River Development and Ganga Rejuvenation to consolidate water conservation and management in the country through a holistic and integrated approach involving all stakeholders, making it a mass movement. The workshop was organized on 27.11.2015 at Goa Science Centre Panaji, Goa with a focal theme "Water Conservation, Water Security and Water Quality". Shri.S.T.Nadakarni, Chief Engineer ,Water Resources Department ,Government of Goa has graced the inaugural function as Chief Guest and released the workshop proceeding. This workshop aimed to look into the problems of dwindling water resources coupled with adverse impact of climate change, pollution of surface and ground water resources and sustainability of ground water resources for the coastal state of Goa which has a huge tourist influx from worldwide.

Workshop on "Water Security in Kerala State - Challenges & Options"

Recognizing the importance of preparing a water security plan for the state of Kerala a one-day workshop on 'Water Security in Kerala State - Challenges & Option' was organized as part of 'Jal Kranti Abhiyan', under the auspices of Central Ground Water Board, Kerala Region, Thiruvananthapuram on October 14, 2015 at Thiruvananthapuram. The workshop was aimed on source sustainability, Water quality and Management issues, implementation of water resources management programs at different scales in Kerala. The major objectives of the workshop were:
Importance of sustainable development of water resources without affecting its quality.
Institutional mechanism for various aspects of water resources management and role of various government / non-government organizations.

Address by Shri. K.M. Chandrasekhar Vice Chairman, Kerala State Planning Board & Former Cabinet Secretary, Govt. of India.

Workshop cum Training Programme "Water Development & Management Issues"

The "Workshop cum Training Programme "Water Development & Management Issues" under Jal Kranti Abhiyan 2015-16 organised at Conference Hall, Irrigation Management & Training Institute (IMTI), Kota, Rajasthan on 22.12.2015. Shri Kushvinder Vohra, Commissioner (Indus), CWC, MoWR, RD,GR presided over the programme as chief guest and briefed about the water management, conservation and given stress to conserve rain water wit public participation. Shri Bhupinder Singh, Sr. Joint Commissioner, Indus, Indus Wing, MoWR, RD,GR discussed about main components of Jal Kranti abhiyan. Shri.P.N.Tyagi, Chief Engineer (CAD),Shri Jugal Kishore Meena, CEO,Jila Parishad, Kota , Shri Virdi Chand, Chief Engineer & Director General, IMTI, Kota and Director, Central Water Commission, Jaipur also graced the occasion.

Ground Water Perspectives and Holistic Management in Andhra Pradesh and Telangana states

Conference on Ground Water Perspectives and Holistic Management in Andhra Pradesh and Telangana states under "Jalkranti Abhiyan" was held in NGRI-CSIR, Hyderabad on 28.03.2016 under Jalkranti Abhiyan. Scientists from various State/Central Government organizations, renowned personalities working on water conservation activities, retired Regional Directors of CGWB, VOs, NGOs participated in good numbers. \

Conference on "Ground Water Development Issues and Management Options" under Jal Kranti Abhiyan:

A one day State Level Conference on 'Ground Water Development Issues and Management Options' under 'Jal Kranti Abhiyan' programme of Ministry of Water Resources, River Development & Ganga Rejuvenation was organized on 22nd March 2016 at YASHADA, Pune to address the State specific ground water related issues and management options thereof. During the course of Conference, 14 technical papers on various theme related topics were presented by experts dealing with ground water like GSDA, Jal Swaraj, CGWB, Agriculture and Soil Conservation Department, ACWADAM, Jal-Biradari, WOTR, Pune University, Tata Institute of Social Science, Mumbai. About 150 participants from various departments like GSDA, Jal Swaraj, CGWB, Agriculture and Soil Conservation Department, CWPRS, NWA, CWC, Faculty & Research scholars of Universities and colleges, ACWADAM, Jal-Biradari, WOTR, Pune University, Tata Institute of Social Science, Mumbai, NGO's like ACWADAM, Sewavardhini, Jalbirdhari, WOTR etc, GSDA etc were present.

D. WATER MANAGEMENT TRAINING PROGRAMME

Training programmes were organized in the States/UTs of Kerala, West Bengal, Andhra Pradesh, Odisha, Jammu & Kashmir, Chattisgarh, Himachal Pradesh, Uttarakhand, Bihar & Jharkhand. The details of few training programmes are as under-

One day training programme on Water Resource Management conducted at Kozhikkode, Kerala State on 11.12.2015

The Training programme was attended by representatives of various organizations dealing with surface water and ground water resources, academic and research

institutions and NGOs. These included Department of Irrigation, Panchayat, Ground Water Department, Centre for Water Resources Development and Management (CWRDM), Soil Conservation Department, Rural development department. & Dept. of Environmental Science, Calicut University &Research scholars of NIT, Calicut.In short, all the field formation of the line department of the State level coordination committee actively participated in the training programme. Total 51 trainees attended the training programme against the target of 50.

District Panchayat President Shri Babu Parasseri delivering inaugural address.

One day Water Management Training Programme at Berhampur, Ganjam District, Odisha

Central Ground Water Board (CGWB), South Eastern Region Bhubaneswar organized a one day “Water Management Training Programme” (under Jal Kranti Abhiyan) at Berhampur, Ganjam District,Odisha on 3rd December 2015, under IEC activities of Ministry of Water Resources, River Development and Ganga Rejuvenation, Govt.of India. Prof. Manmath Padhy, OSD, Khallikote University attended the training programme as the chief guest.

18. TECHNICAL DOCUMENTATION AND PUBLICATION

Results of investigations carried out by the Central Ground Water Board were suitably documented in the form of reports and maps. All the field offices have been provided with report processing sections which are responsible for the scrutiny and issuance of reports of various assignments carried out by its officers.

18.1 Reports

Details of various types of technical reports issued by respective regional offices of the Board are as follows:

State/UT Ground Water Reports

State Reports containing complete details of ground water surveys, exploration and other ground water related information are compiled and prepared to update the status of ground water development in the State. Based upon reports, ground water development perspectives are worked out and future strategies are planned. During 2015-16, total 6 state reports (Gujrat, Madhya Pradesh, Karnataka, Goa, Tamilnadu and Telangana,) have been completed / submitted.

District Brochures

The Central Ground Water Board is compiling and issuing district brochures of each district from time to time containing all the results of ground water surveys, exploration and other related studies. Further, groundwater development perspectives are also worked out for the benefit of State and other user's agencies. The reports have been found very useful for planning their strategies for future ground water development project . During 2015-16, 122 updated district brochures were prepared and submitted/issued.

Ground Water Year Book

The Central Ground Water Board is compiling ground water year books to elucidate the changes in ground water levels and water quality. The accurate monitoring of the ground water levels and its quality both in space and time are the main requisite for assessment, scientific development and planning of this vital resource. During 2015-16, 23 reports were prepared. Region wise status of preparation of ground water year book are presented in Table 18.1

Table 18.1 Status of Ground Water Year Books completed during 2015-16

Sl. No	Region	Ground Water Year Book prepared	
		Nos.	**State**
1	North West Himalayan Region	1	Jammu & Kashmir
2.	North Himalayan Region	1	Himachal Pradesh
3	North Western Region	3	Punjab, Haryana & Chandigarh
4	Western Region	1	Rajasthan
5	West Central Region	1	Gujarat
6.	North Central Region	1	Madhya Pradesh
7.	North central Chhattisgarh Region	1	Chhattisgarh
8.	Central Region	1	Maharashtra
9.	Northern Region	1	Uttar Pradesh
10.	Mid Eastern Region	1	Bihar, Jharkhand
11.	Eastern Region	1	West Bengal
12	North Eastern Region	1	North Eastern States
13	South Eastern region	1	Orissa
14	Southern Region	2	Andhra Pradesh, Telengana
15	South Western Region	2	Karnataka, Goa
16	South Eastern Coastal Region	1	Tamilnadu, Puducherry
17	Kerala Region	1	Kerala
18.	Uttaranchal Region	1	Uttarakhand
19.	SUO, Delhi	1	NCT, Delhi
	Total	23	

19. CONSTRUCTION/ACQUISITION OF OFFICE BUILDINGS

Infrastructure Development Scheme (IDS) viz. Land & Building (CGWB) has been approved with an outlay of **Rs.101.26 Crore** for 12th plan following 10 Offices of CGWB:-

(1) Construction of Regional and Divisional office at Guwahati.
(2) Construction of Store and Workshop buildings at Bangalore.
(3) Construction of Store & Workshop for Division XII at Bhopal.
(4) Construction of Regional and Divisional office at Ahmedabad.
(5) Construction of Building for Office, Workshop & Store at Division II, Ambala.
(6) Construction of Boundary Wall, Building for office, Workshop & Store for Region & Division at Jammu.
(7) Construction of Boundary Wall and Building for NGWT&RI at New Raipur.
(8) Construction of Building for Divisional Workshop & Store at Chennai.
(9) Construction of Boundary wall and Building for Divisional, Workshop & Store at Jodhpur.
(10) Construction of Staff Quarter at Bhubaneswar.

Out of the 10, two projects at Bangalore and Bhopal have been completed and project at Guwahati is likely to be completed in 12th FYP. Some of the work of RGI, Raipur being started in 12th FYP and most of the work of seven project at Ahmedabad, Ambala, Jammu, Raipur, Chennai, Jodhpur at Bhubaneshwar will be floating in continuation of the scheme beyond 12th plan. The objective of the scheme is to provide better working environment in the offices, creation of assets and savings on payment of monthly rent. To achieve this objective, construction of offices, workshop & stores at various locations and construction of RGI at Raipur and staff quarters at Bhubaneswar is being carried out.

During the financial year 2015-16, an amount of Rs.7.00 Crore was provided under BE 2015-16, which has been subsequently reduced to Rs.1.77 Crore in RE 2015-16.

The Adminstrative Approval of three projects at Ahmedabad, Raipur and Bhubaneshwar has been obtained from the Ministry. The estimate and MoA for construction of office building, workshop, store for entire projects at Jammu, Ambala, Chennai, Jodhpur etc. were sent to the Ministry for Administrative Approval. The minor changes in MoA of Ahmedabad is under consideration of CGWB and MoWR. Modified DPR for construction of staff quarter at Bhubaneshwar has been prepared.

20. DISSEMINATION AND SHARING OF TECHNICAL KNOWLEDGE

20.1 Publication of Paper in National/ International Journal.

- Fluoride enrichment in hardrock aquifer systems governed by hydrogeological and climatic environment: A case study from Attapady area of western Ghats in Kerala, India by V.Kunhambu, Dr.Nandakumaran.P et al. in International Journal of Environmental Engineering April 2015, Vol 8 No.2.
- Radon in groundwater in parts of coastal tracts of southern Kerala, India by Dr.Nandakumaran.P, Dr Vinay chandran. Smt T.S Anithashyam, shri Sreehari Sarangan M.S., M. Santhana Subramani in Journal of Radio Analytical and Nuclear Chemistry. Volume 301, No.1, July,2015.
- Use of Geo-electrical Technique for Subsurface Characterization in BasalticTerrain – A Case Study from Nagpur District, Maharashtra by P. Narendra*, V. Arulprakasam, P.K. Jain and R.R. Shende. Published in Special Volume No.14, 2014, pp. 53-56 of Gondwana Geological Magazine.
- The overall assessment of quality and quantity of drinking water with focus on fluoride in the areas of extreme western parts of Jharkhand by Neeta Kumari, GopalPathak, Thakur Brahmanand Singh published in International journal of environmental sciences volume 5, no 4, 2015.
- Inter-aquifer water transfer through combination well for artificial recharging of the deeper aquifer system in Patna urban area by Dwivedi, S. N, Singh, Raj K, published in Current Science, Volume 108 - Issue 07, 2015.
- Determining the Recharging Capacity of an injection well in a semi-confined alluvial aquifer by S. N. Dwivedi, R. R. Shukla, Rakesh Singh, S. K. Adhikari, K. A. Nambi, S. S. Purty and G. K. Roy published in Current Science, v.109(6), 2015.
- Petrographical and geochemical signatures ofJurassic rocks of Chari Formation, Western India: implications for provenance and tectonic setting by Shaista Khan, A. H. M. Ahmad, M. Masroor Alam & M.Adnan Quasim published in International Journal of Acta Geochim DOI 10.1007/s11631- 015-0089-8.
- Impact of industrial waste on ground water in and around Bari Brahmna industrial area, Samba district, Jammu and Kashmir, India by Priya Kanwar published in International Journal of Advanced Biological Research, Vol. 5(2) 2015: 143-149.
- Environmental Earth Sciences Elucidating hydrochemical properties of groundwater for drinking and agriculture in parts of Punjab,India by Tenzin Thakur,Madhuri S.Rishi, Pradeep K. Naik & Prerna Sharma published in InternationalEnvironmental Earth Sciences, Published by Springer.Paper titled “Impact of urbanization on ground water quality in Vijayawada Urban Agglomeration, the new capital region of Andhra Pradesh, India”- A base line study” by Dr P. N. Rao. et.al has been accepted for publication in “Geological Survey of India” Journal.Paper titled “Assessment of zones for Managed Aquifer Recharge in parts of Gadilam, Paravanar, Lower Vellar Water sheds, Cuddalore district, Tam^{il} Nadu” by Ramesh Kumar N, AHG, Gowtham B, Gnanasundar D, Scientist-D published in the International journal of EnviroGeoChimica Acta Journal (EGCA), Volume 3 (Issue 1), March 2016.

- Paper titled “Numerical modeling: an effective tool for Groundwater Management” by Senthil Kumar M, Scientist-C & Gnanasundar D, Scientist-D published in the International journal of EnviroGeoChimica Acta Journal (EGCA), Volume 3 (Issue 1), March 2016.
- Paper titled “Hydrogeology of Tamil Nadu” by Subburaj A, Scientist-D, Piramanayagam S, Scientist-D published in the International journal of EnviroGeoChimica Acta Journal (EGCA), Volume 3 (Issue 1), March 2016.
- Paper titled “Understanding Aquifer characteristics for efficient management of groundwater in hard rock aquifers” by Gnanasundar D, Scientist-D, Senthil Kumar M, Scientist-C published in the International journal of EnviroGeoChimica Acta Journal (EGCA), Volume 3 (Issue 1), March 2016.
- Paper titled “Groundwater Exploration in understanding the Aquifer Dynamics” by Panneer M, AHG, Sakthivel A, AHG published in the International journal of EnviroGeoChimica Acta Journal (EGCA), Volume 3 (Issue 1), March 2016.
- Paper titled “Evaluation of Groundwater Quality in Ennore and Manali Industrial Regions, North of Chennai, Tamil Nadu, India” by Shanmugasundaram A, Sudarson E.R, Giridharan L, Nethaji S, Ravichandran K, Scientist-D & Jayaprakash M published in the International journal of EnviroGeoChimica Acta Journal (EGCA), Volume 3 (Issue 1), March 2016.
- Papers titled “Use of Geoelectrical technique for Subsurface Characterization along Coastal Tract from Koonimedu to Bommiyarpalayam, Villupuram district, Tamil Nadu” and “Application of Borehole well logging for Ground Water Exploration in Coastal Karaikkal Region, UT of Puducherry” authored by Dr. V. Arul Prakasam, Scientist-D, V.S.T. Gopinath, Scientist-B have been published in the book titled “Coastal Groundwater - Modern Observations” authored by T. Ramkumar, G.Ramesh & S. Vasudevan printed by Orchid Books Pvt Limited, Chennai-049 (2016).Estimation of Hydraulic Characteristics from electrical resistivity data in coastal aquifers of southern India by Dr. Somvir Singh, V. S. Singh in Journal of Geological Society of India Published July, 2016.Effect of different nutrient management practices on tomato yield, quality and its influence on soil properties by Punith Raj T.S, STA in National Conference on Global Research Initiatives for Sustainable Agriculture and Allied Sciences(GRISAAS-2015), Dec 12-13, 2015.
- Environmental Earth Sciences Elucidating hydrochemical properties of groundwater for drinking and agriculture in parts of Punjab,India by Tenzin Thakur,Madhuri S.Rishi, Pradeep K. Naik & Prerna Sharma in International Journal of Environmental Earth Sciences, Published by Springer.
- Use of Geo-electrical Technique for Subsurface Characterization in BasalticTerrain – A Case Study from Nagpur District, Maharashtra by P. Narendra*, V. Arulprakasam, P.K. Jain and R.R. Shende. Published in Special Volume No.14, 2014, pp. 53-56 of Gondwana Geological Magazine.

20.2. Delivered lectures/presentations

- The presentation of Draft Report on Mega Recharge Scheme of Ground Water in Tapi Basin submitted by the Task Force was delivered before Special Secretary(WR, RD & GR) in a meeting at MoWR, RD&GR , New Delhi on 5th November 2015. which was also graced by JS(A&GW), Chairman CWC, Chairman CGWB, Member(SAM) CGWB along with the representatives of TIDC, Jalgaon, WRD, Bhopal and Regional Director CGWB . The presentation was delivered by Er. R.D. Singh, Director, NIH & Chairman of the Committee and Dr. P.K. Jain, Superintending Hydrogeologist, CGWB, CR, Nagpur.
- Shri Amlanjyoti Kar, Superintending Hydrogeologist, CHQ office, Faridabad has also attended a workshop on 15.10.2015 on "Water conservation, Water security and water quality" under Jal Kranti Abhiyan 2015-16 at Kolkata and presented a paper titled" Ground Water augmentation through rainwater harvesting and artificial recharge in parts of water scarce Jangal Mahal area, Jhargram Subdivision , West Medinipur District, West Bengal".
- Shri Amlanjyoti Kar, Superintending Hydrogeologist, CHQ office Faridabad has visited Eastern Region, Kolkata office and attended a training programme on Water Management Training under Jal Kranti Abhiyan and delivered a lecture on " Adaptive measures on sustainable water supply and Water security to combat climatic change and its impact on Water Resources" on 14.10.2015. Shri Tejdeep Singh Scientist'D' and Shri S.K Saigal scientist 'D' delivered a Lecturer on 'Need for Rain water Harvesting , Artificial Recharge Techniques respectively at Haryana State Council for Science & Technology on 25.02.2016 at Panchkula.
- Sri S.S Hedge, Sc-D attended the Awareness Programme on "Water Conservation" at Bangarpet on 01.2.2016 which was organized by Directorate of Ground water, Govt. of Karnataka,Kolar districtand delivered lecture on " Ground water condition and management aspects of Kolar district.
- Shri P.K.Parchure, Regional Director, CGWB, WR, Jaipur delivered lecture on "Groundwater Scenario of Rajasthan, Issues & Challenges at Malviya National Institute of Technology (MNIT), Jaipur on 29.10.2015.
- Dr. Arijit Dey, Scientist-D, CGWB, WR, Jaipur delivered lecture on "Climate Change and Groundwater Management Strategies in Rajasthan at Malviya National Institute of Technology (MNIT), Jaipur on 28.10.2015.
- Sh. Amlanjyoti Kar, Supdtg Hydrogeologist from CGWB, Faridabad has delivered K.R. Karanth endowment lecture at Geological Society of India, Banguluru on the topic "Water Resources Management in Andaman and Nicobar Islands" on 28th December, 2015.
- Superintending Hydrogeologist of CGWB, CR, Nagpur delivered a lecture on "Rain Water Harvesting, Water Conservation & Environmental Project" at National Academy of Defence Production (NADP), Ambajhari, Defence, Nagpur on 27th July 2015 as part of the training workshop on "Civil Works and Green Technology" organized from 27-29 July 2015 by NADP, Nagpur.
- Scientist, CGWB, Pune delivered 2 lectures i.e., River Basin Hydrology (Ground Water) and Conjunctive Use of Surface Water and Ground Water at NWA Pune on 17th November 2015.

These lectures were delivered in Core Area Training (CAT) programme on Basin Planning and Management (BPM) for CWC Officers at NWA, Pune.

- Attended the World Water day celebrations organized by the Vakkom Moulavi Foundation at Trivandrum on 22.3.2016 and Smt. Anitha Shyam, Scientist D delivered a lecture on the Ground Water Resources of Kerala- Challenges, Issues & Options.
- Sri S.S.Hegde Sc-D, SWR, Bangalore gave a invited talk on 19.1.2016 on the topic Ground Water Development & Water Conservation in the Awareness Programme organized by Department of Mines and Geology, Government of Karnataka to school children at Gidagallahalli in Madhugiri taluk and at Bukkapatna in Koratagere taluk of Tumkur district.
- A Geophysical Training was imparted to Officers of GSDA at Maharashtra Environmental Engineering Training and Research Academy (MEETRA), Nashik. A lecture was delivered on "Geophysical Surveys for Ground Water" on 13-07-2015. This was followed by field demonstration of VES and data interpretation on 14th and 15th July 2015 respectively.

20.3 Participation in Workshop/Seminars/ Conference/Exibition/ Training Workshop.

- Dr. S.K Jain, Regional Director participated in Jal Manthan on 22-23 Feb, 2016 at Vigyan Bhawan, New Delhi and delivered a presentation on 'Performance Evaluation and Environmental Impact Assessment of Artificial Recharge Structures in Augmenting the Water Availability'.
- The presentation on Artificial Recharge through Participatory Approach was delivered by Dr. P.K. Jain, Superintending Hydrogeologist during the two day Jal Manthan -2 on "Integrated Approach for Sustainable Water Management" organised by Ministry of WR, RD & GR at New Delhi on 23-02-2016.
- Central Ground Water Board participated in the "13th International Conference & Exhibition on Sustainable Habitat & Smart Cities" at Jaipur Exhibition & Convention Centre, Sitapura, Jaipur, Rajasthan during 09-11 December, 2015. Sh.K.B. Biswas, Chairman, CGWB chaired the technical session on 10.12.2015 and highlighted the role of ground water in meeting the looming requirement of agriculture sector, domestic and industrial sectors. Sh. S. K. Sinha, Scientist-D, CGWB, Faridabad presented technical paper entitled *"Ground Water Management under IWRM Framework for Resilient and Smart Cities"* in the forenoon technical session on 10.12.2015. The Hon'ble Chief Minister of Rajasthan visited the CGWB exhibition stall on 09.12.2015 and appreciated efforts being made by CGWB in ground water related domain.
- Fluoride contamination in Ground Water and its prospective mitigation- Focus on State of Odisha by B.B.Sahoo, Sc-C, in National Conference on monitoring and management of drinking water quality, Dehradun,Dec-21-23,2015.
- Effluent irrigation; soil properties, growth and yield of Barley by Punith Raj T.S, STA in National Conference on monitoring and management of drinking water quality, Dehradun,Dec-21-23,2015.
- Fertility status of tomato grown areas of Hassan district,Karnataka,India by Punith Raj T.S, STA in National Conference on Global Research Initiatives for Sustainable Agriculture and Allied Sciences(GRISAAS-2015), Dec 12-13, 2015
- Sporadic occuuence of groundwater arsenic: No longer a mystry by Dr.S.Sahoo et.al communicated to 6th International congress on Arsenic in the environment, to be held at Stockholm, Sweden.

- Dr. V. Arul Prakasam presented a paper titled "Application of Borehole well logging for Ground Water Exploration in Coastal Karaikkal Region, UT of Puducherry" in the National level Seminar on "Lakes, Rivers and Wetlands Climate change Perspective" organized by Department of Earth Sciences, Annamalai University, Chidambaram during 28-29 March, 2016.
- Paper titled Spatial distribution of Fluoride Contamination and Mitigation of Groundwater in Gangavalli Block, Salem District, Tamil Nadu using Remote Sensing and Geographical Information System (GIS)" by K.Rajarajan, AHG, A. Subburaj, Scientist-D & V. Elanchelian, Scientist-D published in the Proceedings of National Seminar on "Environmental Impact on Earth Resources and Future Challenges" organized by Periyar University during March 23-24, 2016 at Salem, Tamil Nadu.
- Paper titled "Geochemical appraisal of Fluoride Contamination in Artificially Recharge Aquifers in Gangavalli Block, Salem District, Tamil Nadu – A case study" by Subburaj, Scientist-D, A, Rajarajan K,AHG & Venkateswaran S published in the Proceedings of National Seminar on "Environmental Impact on Earth Resources and Future Challenges" organized by Periyar University during March 23-24, 2016 at Salem, Tamil Nadu.
- Paper titled "Assessment of Groundwater Quality using Chemometric techniques in a suburban area of Chennai City, India" K.Ravichandran, Scientist-D L.Giridharan and M. Jayaprakash published in the Proceedings of National Seminar on "Environmental Impact on Earth Resources and Future Challenges" organized by Periyar University during March 23-24, 2016 at Salem, Tamil Nadu.
- Paper titled "Delineation of Geoelectrical Characteristics of the Substrata by using Geoelectric Imaging Techniques in parts of Nagapattinam district, Tamil Nadu" by V. Arul Prakasam, Scientist-D, V.S.T.Gopinath, Scientist-B,T.S.N.Murthy, AGP and A. Subburaj, Scientist-D published in the Proceedings of National Seminar on "Environmental Impact on Earth Resources and Future Challenges" organized by Periyar University during March 23-24, 2016 at Salem, Tamil Nadu.
- Paper titled "Hydrogelogical and Hydrogeochemical Environment of Manali Industrial Area, Thiruvallur district, Tamil Nadu" by K. Padmavathi, Scientist-B and B.Umapathi, Scientist-D published in the Proceedings of National Seminar on "Environmental Impact on Earth Resources and Future Challenges" organized by Periyar University during March 23-24, 2016 at Salem, Tamil Nadu.
- Smt Bijimol Jose, Scientist of CGWB, SWR, Bangalore presented a technical paper on "Civil Engineering aspects in Groundwater Management" on Civil Engineering Challenges in Knowledge Era organized by SJBIT Engineering College, Bangalore on 15th Sept/15. Paper compiled by Dr K.R. Sooryanarayana, and Bijimol Jose is published in the proceeding of the seminar.
- Inland Salinity in Purna Alluvial Basin of Central India - Causes And Remedial Measures by Dr. P.K. Jain and D. Subba Rao, CGWB,CR, Nagpur in Bhujal Manthan, Kurukshetra organized by CGWB on 21.08.2015.
- Ground Water Resource Management- Emerging Trends with reference to Current Ground Water Scenario by Dr. P.K. Jain and Rahul R. Shende, CGWB, Central Region, Nagpur in

Foundation Day National Seminar on Geo Potential of Central India organized by Dept. of Applied Geology, Dr. H.S. Gaur Vishwavidyalaya, Sagar, MP. The seminar was held during 3rd to 5th August 2015.

- Dr K.R. Sooryanarayana, Supdt. HG, CGWB, SWR, Bangalore attended the Workshop on Natural Resources of Chitadurga district, Karnataka held on 13th April, 2015 at the GSI training Institute, Chitradurga. A technical paper titled "Groundwater Scenario and management options of Chitradurga district, Karnataka" by Dr K.R. Sooryanarayana, G.Sudarshan et.al was presented .
- The workshop on Water Problems of Vidarbha Region was organized by Institution of Engineers and Sinchan Sahyog on 7th October 2015 at Institution of Engineers, Nagpur. During the workshop, Dr. P.K. Jain, Superintending Hydrogeologist delivered presentation on "Ground Water Management with reference to Current Ground Water Scenario of Vidarbha Region, Maharashtra". The workshop was also attended by Scientists of CGWB, Central Region, Nagpur.
- Regional Director and Scientists of CGWB ,WR , Jaipur attended one day National Workshop on "Latest Rain Water Harvesting Techniques adopted across the Country" on 12.10.2015 at State Institute of Agriculture Management (Govt. of Rajasthan) , Durgapura, Jaipur. The workshop was presided by Shrimati Kiran Maheshwari, Hon'ble Minister of PHED & GWD, Government of Rajasthan and Shri. J.C. Mohanti, Principal Secretary, PHED & GWD. The workshop was organised by Ground Water Department and Water Sanitation Support Organization Govt. of Rajasthan.Scientist of CGWB , WR , Jaipur attended IVth International Convention on "Climate Change and Water 2015" at Suresh Gyan Vihar University, Jaipur on 16.10.2015.
- Scientists of CGWB, NWR, Chandigarh attended a workshop on 12.10.15 on water quality monitoring & mitigation in Punjab under Chairmanship of Shri Ajoy Sharma, IAS Secretary Head DWSS organized by Punjab Rural Water and Sanitation Sector Improvement Project (PRWSSIP).
- Scientists of CGWB, WR, Jaipur attended 37thAnnual Convention and seminar on "Exploration Geophysics" organized by Association of Exploration Geophysicists during 15-17 october,2015 at Jaipur.
- State Level One day workshop on "Water Conservation, Water Security and Water Quality" was conducted at Dindigul, Dindigul district on 29.10.2015. Dr. S. Natarajan, Vice Chancellor, Gandhigram Rural University, Gandhigram, Dindigul inaugurated the workshop. About 164 delegates from State/Central government departments, farmer associations, NGOs and academic institutions attended the workshop.
- Shri. A. Subburaj, Scientist- D& H.O.O, CGWB, SECR, Chennai participated as Chief Guest and delivered a speech in the one day workshop on GIS Applications organised by Dr. M.G.R Educational and Research Institute (Deemed University) at Chennai on 05.10.15. Dr K.R. Sooryanarayana, Supdt. HG and Dr. M.A.Farooqi, Sc-C , CGWB, South Western Region, Bangalore attended the Brainstorming Workshop on "To understand the Pollution Mechanism in Urban Aquifers of BBMP area by Integrated Geophysical , Remote Sensing and GIS Techniques" on 24th April 2015 , organized by Department of Civil Engineering, Dayananda Sagar College of Engineering , Bangalore.

- One-day Workshop on "Ground Water Management in Alluvial terrains of North Western India" was held in Chandigarh on 28.10.2015 in collaboration with the Institution of Engineers (India), Chandigarh. Director, Punjab Remote Sensing Centre, Ludhiana was the Chief Guest, while Chief Engineer, Department of Irrigation, Govt. of Punjab was the Guest of Honour.About 150 delegates from various spectrum such as scientists, engineers, NGOs, academics, students and consultants, from all related fields participated in the Workshop.
- Scientists of CGWB, Southern Region, Hyderabad participated in a Workshop on "Integrated Water Solution to Telengana State through scientific approach" organized by NGRI, Hyderabad on 19.11.2015.
- Scientist of CGWB, UR, Dehradun participated in International workshop on "Changes in Water Resources & Adaptation Options in the Indian Himalayan Basin" held at Roorkee, Haridwar district, Uttarakhand on November 16 -17, 2015.
- Scientists of CGWB, State Unit Office, Belgaum attended workshop convened by Government of Goa on State Water Policy at Panaji, Goa on 24.11.2015.
- CGWB officers attended the workshop on "Conservation and Management of Rivers of Kerala" organized by CWRDM & Pamba River Basin Authority at Thiruvananthapuram on 18th November, 2015. Shri. Oommen Chandy, Hon'ble Chief Minister, Govt. of Kerala inaugurated the valedictory function. Head of the Office made presentation on "Ground Water Scenario of Pamba River Basin, Kerala".
- Scientist of CGWB, Central Region, Nagpur attended the workshop on Aquifers, Participatory Groundwater Management and Groundwater Governance was organized by ACWADAM, Pune on 26th and 27th November 2015 at YASHDA, Pune.
- Sh. Amlanjyoti Kar, Supdtg Hydrogeologist, Dr. S. Shekhar, Scientist D, Dr. B.C. Joshi, Scientist D and A. Mukharjee, Scientist D from CGWB, Faridabad and Sh Y.B.Sharma, EE, participated in International Seminar on " Challenges to Ground Water Management: Vision 2050, organized by Centre for Ground Water Studies, Kolkata during 13-14th November, 2015.
- Officers of CGWB, Eastern Region, Kolkata attended a two day Workshop on "Challenges to Ground Water Management: Vision 2050", organized by CGWS at ITC, Sonar, Kolkata on 13th & 14th November, 2015.
- Sh K B Biswas, Chairman, Central Ground Water Board delivered the key note address as chief guest in the Inaugural Session of the one day National Workshop "Water Conservation and Pollution" on 19th Dec, 2015 at the Manav Rachna International University (MRIU) campus, Faridabad jointly organized by the Indian National Committee of International Association of Hydro geologists (INC-IAH) and the MRIU. Shri K.B. Biswas Chairman CGWB as also patron of INC-IAH has presided over its annual meeting INC- IAH has also announced its prestigious Smt Savitry Chadha Memorial INC-IAH awards for 2015 sponsored by Dr. D.K. Chadha, Former Chairman CGWB. Amongst the awards, the Award of Excellence in Ground Water Investigation and Management 2015 had gone to Dr Arunangshu Mukherjee, Scientist D of Central Ground Water Board, Faridabad. The following papers from CGWB have been presented during the workshop:-
    - Ground Water Pollution in India from Geogenic causes- Dr D.Saha, Member, CGWB
    - Contribution of water resources in India;s development and future challenges- G.C.Pati

- Ground Water Management Plan for the NCR, Haryana' -Dr. S.K.Jain, ,P.K.NAIK, M.L.Angurala, S.K.Saigal,S.Pandey,R.G.Krishnan, Iti Gupta & D.AnanthaRao
- 'Scope of ground water development in Yamuna Flood Plains to augment water supply in depleted aquifer areas of National Capital region by S.K.Jain, M.L. Angurala & R.G.Krishnan
- Sustainable Ground Water Management through Nala Bunds and Check Dams-A case study from Northern Karnataka, India- K.R.Suryanarayana, A.Suesha, M.A.Farooqi
- Significance of vented Dams in sustainable management of lateritic aquifers of cosatla Karnataka, India- M.A.Farooqi ,K.R.Suryanarayana, J.Sivaramkrishna and Afaque Manzar
- Ground Water Contamination assessment of Faridabad-Ballabhgarh area, relevance for drinking water production- Anil Kumar , A.K.Madhukar
- Challenges to combat water scarcity and fluoride hazards in the underlying hilly terraian in West Bengal, India- Anadi Gayen
- Mobile Apps on Ground Water : A Short review- R.K.Ray
- Ground Water Pollution study through surface Geophysical measurements- Subhas.c.Singh
- Sustanability of deep seated aquifers- A case study from over-exploited area in Karnataka- G.Krishnamurthy, S.S.Hegde, J.Benjamin, Vednayagam, Rahul Vashistha
- Groud Water resources of Haryana: An Approaisal- Rumi Mukherjee & Parveen Kaur
- Pilot project design from Conceptual model utilising rainwater harvesting and aratificial recharge in water scarce chowra island, Nicobar district, A&N Islands- Amlanjyoti kar and shilpi Gupta
- Prospects of enhanced ground water recharge in an around Faridabad city, Haryana- A.Mukherjee, S.SShekhar & K.C.Naik
- Effective management options in over-exploited ground water stressed areas-Rural perspective from U.P- u.Srivastava & B.C.Joshi.
- Springs: A potential source for rural and urban water supply in A&N Islands- A.Kar
- Community based water governance –Key to Water security- D.Chakaraborty & K.C.Naik
- Ground water Regulation in India- An appraisal- Y.B.Kaushik

- The Kerala Region organized one day Water Management Training programme at Kozhikode on 11th December 2015 under Jal Kranthi Abhiyan. Total 51 participants attended the training.
- Scientists of CGWB ,WR , Jaipur attended Regional Brain Storming Session titled "36 th IGC' organized by Geological Survey of India, Western Region, during 16-17 December,2015 at Jaipur.Dr K. R. Sooryanarayana, HOO, CGWB, SWR, Bangalore attended the Interactive Workshop on 12.1.2016 at New Delhi regarding" Programme for Ground water Development and Management- Consultation with States". Sri PrabhakarChini, Secretary (MI), Govt.of Karnataka along with Other Officers from Department of Mines and Geology, Govt.of Karnataka also attended the workshop.
- Scientists of CGWB, NWR, Chandigarh attended the Workshop/ Knowledge Sharing meeting with Team of World Bank Under Punjab Rural Water Supply and Sanitation Sector Improvement project at PHD Chamber of Commerce, Chandigarh, on 18.01.2016 organized by DWSS under the Chairmanship of Shri Ajoy Sharma, IAS, Secretary-cum-Head of DWSS.

- Dr. S. K. Jain, Regional Director, attended 'The World Bank Consultant Conference' at Shram Shakti Bhawan, Ministry of Water Resources, River Development & Ganga Rejuvenation on 12.01.2016 organized by Ministry of Water Resources, River Development and Ganga Rejuvenation.
- 6th SLPC conducted at Regional office, Guwahati on 20th January 2016 and at SUO, Agartala on 20/1/2016. at SUO, Naharlagun and SUO , Shillong on 29/01/2016.Besides one day workshop on "water conservation, water security, water quality, climate change & best practices" was organised at Bongaigoan, Assam on 29/01/2016.
- Sh. P. Kalita, Suptg. Hg attended workshop on "Enhancement of Irrigation Water Use Efficiency and Water Productivity" organized by NERIWALM during 21-22nd January at Tezpur under sponsorship of National Water Mission.
- The Regional Director, CGWB, WCR, Ahmedabad attended a Workshop on Improving Delivery Mechanism of Capacity Building Program on Participatory Ground water Management organized by Arid Communities and Technologies, Bhuj on 29-01-2016 at Centre for Studies in Rural Management, Gujarat Vidyapeeth, Randheja, Gandhinagar.
- Shri P.K.Parchure , Regional Director , Sh.S.K.Pareek, Scientist-D, CGWB ,WR , Jaipur attended the workshop on Stakeholders' participation on the World Bank funded project on Strategic Basin Planning for Ganga River Basin in India on 29.01.2016 at New Delhi, the workshop hosted by the World Bank and M/s Deltares, the Nederlands under the aegis of MoWR, RD & GR, Government of India.
- National Seminar on "Recent Trends in the Tectonics of Peninsular India' organized by the Dept .of Geology, University of Kerala at Thruvananthapuram on 05.02.2016. shri V. Kunhambu, Regional Director offered felicitations. Dr. N. Vinayachandran, Sc D delivered a lecture on the behavior of various Aquifer Systems.
- One day Workshop on 'Water security in U.T of Lakshadweep- Challenges and options' was conducted at Kavaratti on 10/02/2016. About 150 persons from various corners participated in the workshop.
- Dr.P.K Naik Supdt.Hg attended a Regional Workshop on Training Needs Assessment & PDS under National Hydrology Project (NHP) held at National Institute of Hydrology (NIH) Roorkee on 15 .02. 2016.
- Dr. S.K Jain, Regional Director and Dr. P.K Naik Supdt. Hg attended a Regional Workshop at Bhakra Beans Management Board Chandigarh on 19.02.2016 on "Training need Assessment & PDS under National Hydrology Project" organized by National Institute of Hydrology (NIH), Roorkee .
- The Regional Director along with 5 officers attended the WaterEX Gujarat World Expo 2016 on Waste Water Management Technologies and Salinity Control organized at Gujarat University Exhibition Hall, Ahmedabad on 11th February. The Regional Director also made presentation on Ground Water Scenario of Gujarat With Special Reference to Rapid Industrialization.
- Shri P.K.Parchure , Regional Director, Dr. Arijit Dey, Shri. I.K. Sharma, Dr. R. Scientist-D and Shri.Ashok Kumar, Artist, CGWB, WR, Jaipur,attended Inaugural session of Geo-science week (29 Feb.-04 March,2016) organised by Geological Survey of India,Western Region,Jaipur on 29.02.2016.

- Regional Director along with other Scientists attended a National Seminar on "Conjunctive Use of surface and Ground water in Major and Medium Irrigation Project Command Area" organized by Ground Water Department< Govt. of Andhra Pradesh on 11th and 12th February, 2016 at Vijayawada. Regional Director chaired two sessions in the seminar. The following Technical Papers were presented in the Seminar;
    - Conjunctive Use of Surface and Ground Water in Nagarjuna Sagar Canal Command area by Sri A.D. Rao and Dr. P.N. Rao.
    - Causes of ground water salinity, its impact and remedial measures in Krishna delta, A.P. by Dr. B. Umamatheswara Rao, Shri A.D. rao & Dr. P.N. Rao.
    - Ground Water quality Assessment for Irrigation and Drinking Water Purpose in parts of Nagarjuna Sagar Canal Command area, Andhra Pradesh and Telengana by S/shri Maruthi Prasad, M. Bhaskar Reddy, G. Praveen Kumar, P. Nageswara Rao and A. Damodar Rao.
    - Integrated Use of four waters for efficient water management in urban environment – A case study by Shri G. Ravi Kumar, scientist C, Dr. P.N. Rao, Supdtg. Hydrogeologist, Shri A.D. Rao, Regional Director.
    - Microlevel Water Resource Management through participatory approach for maximizing benefits – A case study from hirumaladevunipallitank, mahabubnagar district, Telengana State by S/Shri Suhas Raje, Dr. P.N. Rao, a.D. Rao.
- Sh. Rajesh Chandra, Sr. Hydrogeologist and Sh. S.K. Naik, Asstt. Hydrogeologist attended Workshop on RWH and Rehabilitation of Village Ponds held on 12.02.16 at RKGIT, Gaziabad.
- Dr. P.K. Jain, Superintending Hydrogeologist made a presentation on Water Conservation, Augmentation & Management during Exhibition cum Seminar on "Water for Life" at Raman Science Centre on 07-02-2016. The event was jointly organsied by Raman Science Centre, Nagpur, Centre for Rural Welfare and Purti Sinchan Samruddhi Kalyankari Sanstha (NGO). The presentation was appreciated by the participants for its informativeness and technical contents. The event was also attended by Sh. Rahul Shende, Assistant Hydrogeologist.
- Shri. A. Subburaj, Scientist-D & H.O.O, CGWB, SECR, Chennai participated in the Sixth International Ground Water Conference (IGWC 2015) organised by Department of Civil Engineering, SRM University, Tamil Nadu on 11.02.2016.
- Dr. S.K Jain Regional Director and Ms. ITI Gupta Scientist"B", CGWB, NWR, Chandigarh attended a Training Workshop on "An Integrated approach to alluvial aquifer characterization and groundwater data management" at India International Center, New Delhi organized by IIT Kanpur in collaboration with university of Durham,U.K on 18-19 March, 2016.
- Shri S.K Saigal Scientist"D", CGWB, NWR, Chandigarh attended one day Orientation workshop under Jal Kranti Abhiyan at HIRMI, Kurukshetra, Haryana on 19th March, 2016 and delivered a lecture on Status of Ground Water in the state of Haryana.
- One daylong Conference on "Sustainable Development and Management of Ground Water Resources, Its Remedial Measures for Emerging Crisis and Climate Change in West Bengal" has been organized on 28.03.16. Conference Proceedings containing 42 papers has been released. 223 participants from various Universities, Institutions, Colleges, NGOs, officers from various state & central departments attended the conference. The programme has been covered by electronic & print media.

- Mrs R.A.Kujur, Sc D attended review cum training workshop at IIT Kharragpur organized by National Spatial data Infrastucture(NSDI) during 9 – 11 March 2016.
- Dr. S.K Jain Regional Director along with other officers of CGWB attended a One day Workshop on National Groundwater Management Improvement Programme held on 22nd March, 2016 at Haryana Niwas, Sec 3 Chandigarh.
- Shri. A. Subburaj, Scientist-D & H.O.O participated and gave special address during the inaugural function of the Seminar on Water Harvesting Awareness conducted by Government Arts College (Autonomous), Salem on15.03.2016.
- Shri. A. Subburaj, Scientist-D & H.O.O, CGWB, SECR, Chennai inaugurated the UGC-SAP National Seminar on "Groundwater and Coastal Aquifers" organised by Department of Applied Geology, School of Earth & Atmospheric Sciences, University of Madras on 09.03.2016.
- Shri P.K.Parchure , Regional Director , CGWB, WR, Jaipur attended a one day workshop on "National Ground Water Improvement Plan"- a world bank aided programme . In the Workshop Shri Subir Kumar Secretary, PHED & GWD ,Dr.P.Nandkumaran P ,Regional Director, CGWB, Faridabad, Dr.Sumita Mishra, world bank representative, USGS,UNICEF,RACP,WRD, Soil conservation & watershed development etc. officers were present.
- Sri S.S. Hedge, Sc-C and Dr M.A. Farooqi, Sc-C , CGWB, SWR, Bangalore attended workshop on "Participatory Aquifer Mapping" at WIPRO headquarter, Bangalore on 27.6.2015 organized by Biome Environmental Trust and participated in the technical interaction during the panel discussion.
- Regional Director and Scietists of CGWB, NWR, Chandigarh attended Two days Brainstorming Workshop- Sinchan Chintan Shivir (सिंचन चिंतन शिविर) on 13th and 14th august, 2015, organized by Irrigation & Water Resources Department (IWRD) Haryana along with HIRMI, Kurukshetra at CSSRI, Karnal Chaired by Hon'ble Chief Minister of Haryana Sh. Manohar Lal Khattar and Sh. O. P. Dhankar, Hon'ble Minister of Irrigation, Agriculture, Panchayat and Development, Haryana Government.
- Regional Director and Scietists of CGWB, NWR, Chandigarh attended North Regional Convention for Water User Association (WUA) on Participatory Irrigation Management (PIM) held on 25 – 26th August, 2015 at Punjab Agriculture University (PAU), Ludhiana. The convention was inaugurated by Sushri Uma Bharti, Hon'ble Cabinet Minister, WR, RD & GR.
- The following papers were presented in Bhujal Manthon held at Kurukshetra University on 21.08.2015.
  - Soil-Infiltration Test in Hardrocks-Case-Study by Vittala, S.S., Reddy, G.R.C., Sooryanarayana, K.R and Sudarshan, G.
  - Artificial Recharge to Ground water in High rainfall area: A case study from Karnataka by Sivaramkrishna, J, Sooryanarayana, K.R, Farooqi. M.A, Manzar,A.
  - Hydrochemical evaluation of fluoride rich ground water in Cherlapally watershed; a fluorosis endemic area, Nalgonda district, Telengana State by Dr P. Madhnure et.al.
  - "Nitrate contamination in urban areas of A.P and Telengana States with focus on Hyderabad" by Dr P.N. Rao, et.al.

21. PROPAGATION AND PROGRESSIVE USE OF HINDI LANGUAGE during 2015-16

- During the period the provision relating to Section 3(3) of the Official Language Act, 1963 has been complied with.
- Under Rule 5 of the Official Language rule 1976 all the letters received in Hindi were invariably replied in Hindi.
- Hindi Quartely Progress report has been sent regularly to the Ministry of Water Resources, Town Official Language Implementation Committee, Faridabad and Official Language Department (Regional Implementation Office)
- Quarterly meeting of the Departmental O.L. implementation Committee are organised regularly and necessary action is taken as per the decisions taken in the meeting.
- Check points has been set up for the compliance of O.L. Act 1963 & O.L. Rule 1976.
- Incentive for original Noting & drafting in Hindi is being implemented. Fourteen officials were awarded cash prize under this scheme.
- Ten sections of the Office have been specified to work cent-percent in Hindi.
- Hindi Pakhwara was celebrated in CHQ, Faridabad during 14.9.2015 to 28.9.2015. Various competitions relating to official language were organized during the Pakhwara and prizes were awarded to the participants. Hindi Pakhwada was celebrated in all the offices of the board.
- Hindi Workshop is being organized regularly in CGWB.
- The second sub-committee of parliamentary committee on Official Language conducted inspection of Central Ground Water Board, SER, Bhubneshwar, Div-8, Jammu and WCR, Ahmadabad. The committee expressed its satisfaction on the implementation of official Language and propagation of Hindi in these offices.
- Hindi books are being purchased as per prescribed target.
- Advertisements of all India level are being published as per rules in bilingual/trilingual form and inspections of the subordinate offices are being made as per the stipulated target.
- The Board is committed towards the progress and implementation of Hindi and determined for its progressive use as per the Annual Programme issued by Official Language Department.

22. IMPORTANT MEETINGS

The following important meetings were held during the year 2015-16

22.1 Visit of Hon'ble Union Minister of Water Resources, River Development and Ganga Rejuvenation Sushri Uma Bharti:

- A meeting was convened by Hon'ble Union Minister, Sushree Uma Bharatiji, MoWR, RD & GR with Shri Rajeeb Bannerjee, Hon'ble Minister of Irrigation, Govt. of West Bengal along with Dr. B. Rajender, Joint Secretary (PP), MoWR, RD & GR, Secretary and other officers, Irrigation Dept. Govt. of West Bengal at Jalasampad Bhavan, Kolkata on 01.11.2015. Discussion were held regarding progress of various Centrally Sponsored Schemes under Irrigation Dept., Govt. of West Bengal.

- Sushree Uma Bharati, Hon'ble Minister, MoWR, RD & GR visited Ahmedabad on 14th November,2015 and convened a meeting with Regional Director and Senior officers of Central Ground Water Board, Ahmedabad & Divisional office and held discussion regarding the ongoing activities of CGWB in the state of Gujarat.
- Hon'ble Union Minister of Water Resources, RD & GR, GoI Sushri Uma Bharti and Hon'ble Chief Minister of Maharashtra Sh. Devendra Fadnavis visited Jalgaon on 09-01-2016 to see the Tapi Mega Recharge Scheme. In this regard a presentation on Tapi Mega Recharge scheme was delivered before the Hon'ble dignitaries at Jalgaon by Er. R.D. Singh, Director NIH & Chairman of Task Force and Dr. Dipankar Saha, Member, CGWB with active assistance of Regional Director, CR, Nagpur and his team. During the presentation Sh. K.B. Biswas, Chairman, CGWB, Chairman CWC, Chairman NWDA, Shri A.T. Nana Patil, Smt. Raksha Nikhil Khadse, Hon'ble MPs, Smt. Archana Chitnis, MLA, Burhanpur were also present. The Hon'ble Union Minister, WR, RD & GR and Chief Minister appreciated the efforts of the Task Force in pruning the scheme and establishing the scientific feasibility of the scheme for the economic upliftment of the people of the area. On 10-01-2016, the dignitaries made an aerial survey of the Tapi mega recharge scheme area and the proposed canal alignment.
- Honourable Minister MOWR, RD & GR visited Ahmedabad on 27th February 2016, The Regional Director along with Dr. A. K. Jain, Scientist-D had a meeting with Honourable Minister and discussed about activities of NAQUIM and achievements of West Central Region, Ahmedabad

Honb'le Chief Minister of Maharashtra Shri Devendra Fadnavis, addressing the gathering at Jalgaon.

Dr. Dipankar Saha, Member CGWB delivering the presentation on Tapi Mega Recharge Scheme to Honb'le Minister of WR, RD & GR, GoI

Honb'le Minister of WR, RD & GR, GoI and Chief Minister of Maharashtra along with other dignitaries inspecting a dugwell in Tapi Mega Recharge Scheme area, Jalgaon district.

22.2 Visit of Additional Secretary, Joint Secretary (MoWR,RD&GR)

- Dr. Amarjit Singh, IAS, Special Secretary, MoWR, RD&GR, New Delhi visited the Telengana State on 5.09.2015 where works under Mission Kakatiya area being carried out in the State. Regional Director, Central Ground Water Board, Southern Region, Hyderabad and Executive Engineer, CGWB, Div IX Hyderabad received the visiting dignitary and accompanied him during the visit. Regional Director presented NAQUIM implementation plan to the Special Secretary.
- Dr. Amita Prasad, Joint Secretary (A&GW), Ministry of Water Resources, River Development & Ganga Rejuvenation, New Delhi visited Southern Region, Hyderabad on 09.05.2015 and inspected the Southern Region Office and Division IX. A Presentation titled "Regional Chemical Laboratory-Status" and "Implementation of NAQUIM" were delivered by Dr. P.N. Rao, Scientist-D & HOO, CGWB, SR, Hyderabad to apprise the Joint Secretary (A&GW) regarding status of Chemical laboratory and activities of CGWB, Southern Region.
- Regional Director and Scientists of CGWB, NWR, Chandigarh attended meeting on 16.09.2015 held under Chairmanship of Dr. Amita Prasad, IAS, Joint Secretary, MoWR, RD&GR regarding discussion on MIS, Management Plan, problems etc in implementation of NAQUIM in State of Punjab and Haryana at CGWB, New Delhi.

22.3 Visit of the Chairman, CGWB

- Sh. K.B. Biswas, Chairman CGWB visited Kolkata for meeting with Officers of PHED, Govt. of West Bengal which was held on 01.04.2015 on "Arsenic Remediation and Arsenic free water supply in Arsenic infested area of West Bengal". He also visited at Regional office and Division office on 2nd April, 2015 to review the ongoing activities.
- Sh. K.B. Biswas, Chairman CGWB visited Southern Region and Division IX office on 15.04.2015 at Hyderabad. Shri G.C. Pati, Dir(Admn.) CGWB, Faridabad and Shri S.K. Garg (GW Estt.), Dy. Secretary, MoWR,RD & GR, New Delhi accompanied the Chairman.
- Sh. K.B. Biswas, Chairman, Central Ground Water Board, Faridabad visited Regional and Division offices of Central Ground Water Board, Hyderabad and reviewed the ongoing activities. He also participated in All India Mining Managers Meet & Outstanding Leadership Award Function at Hyderabad on 09.05.2015 & 10.05.2015.
- Sh. K.B. Biswas, Chairman, Central Ground Water Board, Faridabad visited Regional and Division offices of Central Ground Water Board, Guwahati and reviewed the ongoing activities on 24th July, 2015. He has also visited State unit Office, Agartala on 25.07.2015 .
- Sh. K.B. Biswas, Chairman, CGWB visited Kolkata and convened a meeting with the officers of CGWB, Eastern Region , Kolkata, on 13.11.15. Discussion were held regarding submission of Report on Aquifer Mapping & Management Plan and progress of other activities.
- Sh. K.B. Biswas, Chairman, CGWB visited Rishikesh(Uttarakhand) and joined as Chief Guest of the function of State Level Painting Competition 2016 on "Protect Groundwater

and Rivers from Pollution" held at Ganga Resort (Garhwal Mandal Vikas Nigam Limited), Muni Ki Reti, Rishikesh (Uttarakhand) on 23rd January, 2016 organized by CGWB, Uttaranchal Region. He has also reviewed the progress of activities related to NAQUIM.

- Shri K B Biswas, Chairman, CGWB, Faridabad, Col. R.K.Gaur, Director (Admn.), CGWB, Faridabad, Shri K.M.M.Alimalmigothi, Economic Adviser, Ministry of Water Resources, River Development and Ganga Rejuvenation, New Delhi and the Regional Director, CGWB, WCR, Ahmedabad attended the inspection. He has also reviewed the progress of activities related to NAQUIM.

22.4 Visit of the Member, CGWB

- Dr.D.Saha, Member(RGI), Shri A.Nagar, Regional Director, CGWB, West Central Region, Ahmedabad and Shri P.K. Parchure, Regional Director, CGWB, Western Region made field visit to Jaisalmer, Ramgarh, Tanot, Kishangarh, Longewala, and Gamnewala regarding t*he study of "Revival of palaeo channel in Rajasthan"* during 2-4 April,2015. Further, discussions were held with Dr.N.Jacob, Scientist, BARC regarding palaeo channel.

- The Regional Director, WCR, Ahmedabad along with Scientists of CGWB and Geologist from GWRDC Ltd. accompanied Dr. Dipankar Saha , Member (RGI), CGWB for field visit to Sujalam Sufalam Recharge Canal area in Gandhinagar, Mahesana and Patan Districts on 2nd July,2015. Visits were made to study the Recharge Canal Section and a pumping station at Lodra village to know its efficacy and impact on Ground Water. Member also visited drilling rig deployed in Saraswati Basin area at Kot village in Sidhpur Taluka of Patan. A meeting with Secretary Water Resources, Additional Secretary and Chief Engineer North Gujarat from Govt. of Gujarat was also held at Gandhinagar regarding Sujalam Sufalam Recharge canal and its impact.
- Sh. K.C. Naik, **Member(SAM),** Central Ground Water Board, Faridabad visited Hyderabad and attended a Meeting at NRSC, Hyderabad on 20.07.2015 in connection with NAQUIM. Regional Director, SR, Hyderabad and Sh. S.K. Sinha Scientist D also participated in the meeting.
- Dr Dipankar Saha, Member (SAM), CGWB Visisted CGWB, South Western Region, Bangalore on 3rd and 4th of January, 2016 and reviewed the progress of NAQUIM and related works. He also visited field areas of Pilot Project on Aquifer Mapping area in Tumkur district of Karnataka.
- Dr Dipankar Saha, Member (SAM), CGWB Visisted CGWB, Southern Region, Hyderabad on 1st February, 2016 for inaugurate the function of one week training programme on "Water Well Construction Techniques and Equipment" from 1.02.2016 to 5.02.2016 at Hyderabad. He has also reviewed the progress of NAQUIM and related works.
- As per the advice of Special Secretary, Ministry of WR, RD & GR, New Delhi, a meeting was held between GSDA Officers and Sh. G.C. Pati, Member (TT&WQ), CGWB, on 10-03-2016 at GSDA Pune. During the meeting, demonstration of the Ground Water Assessment software developed by GSDA was given, which was followed by discussion on working and sharing of software with Other States. The meeting was also attended by

Shri D. Subba Rao, Regional Director, Dr. P.K. Jain, Suptdg. Hydrogeologist and Shri Rahul Shende, Asstt. Hydrogeologist, CGWB, Nagpur.

22.5 Review Meeting of Regional Directors

A Review meeting for Regional Directors and Executive Engineers was held during 23-24th August, 2015 at Central Ground Water Board, Faridabad under the Chairmanship of Chairman CGWB to review the progress of work during 2015-16, action plan for implementation of Outsourcing Proposal for 2015-16 & 2016-17, Procurement Plan during 2015-16 and discuss the other agenda items. The meeting were attended by the Members, Director (Admn.), FAO, Regional Director(HQ), Regional Directors, Superintending Engineers, Executive Engineers from Divisions and other Senior officers of CGWB.

22.6 Meetings of State Ground Water Co-ordination Committee (SGWCC) for NAQUIM

- The Second Meeting of the State Ground Water Co-ordination Committee (SGWCC) to oversee the progress of NAQUIM was held under the Chairmanship of Principal Secretary, Water Supply and Sanitation Department (WSSD), Govt. of Maharashtra Mumbai on 6th May 2015. The meeting was held at Water Supply & Sanitation Department, Mumbai to oversee the progress of NAQUIM and to remove the bottlenecks in data sharing and constitution of State Ground Water Resource Centre (SGWRC). During the meeting, the work done under NAQUIM was presented before the SGWCC. Further the data sharing issues and constitution of State Ground Water Resource Centre (SGWRC) was also discussed and finalized during the meeting. The meeting was attended by, Regional Director as Member Secretary and Scientists of CGWB.
- 1st State Ground Water Coordination Committee Meeting for implementation of NAQUIM in Telangana State was held under the Chairmanship of Principal Secretary, I&CAD, Govt. of Telangana at Hyderabad on 25.05.2015. The meeting was attended by Regional Director and senior officers of Central Ground Water Board.
- The first meeting of SGWCC on Aquifer Mapping Program for Kerala State was held on 5/5/2015 in the chamber of Additional Chief Secretary, Water Resources Department, Govt of Kerala, Thiruvananthapuram.
- The first meeting of State Groundwater Coordination Committee(SGWCC) for Tamil Nadu was held on 07.05.2015 at the premises of Central Ground Water Board, SECR. Chief Engineer, State Ground & Surface Water Resources Data Centre chaired the meeting. During the meeting, the progress and bottlenecks of aquifer mapping in Tamil Nadu were discussed.
- The first meeting of State Groundwater Coordination Committee(SGWCC) for UT of Puducherry was held on 08.05.2015 at Chief Secretariat, Puducherry. During the meeting, the progress of aquifer mapping along with bottlenecks in UT of Puducherry were discussed.
- First meeting of State Ground Water Coordination Committee(SGWCC) on NAQUIM was held under the chairmanship of Principal Secretary, PHED &GWD, Govt. of Rajasthan Jaipur on 07.05.2015 to discuss regarding effective implementation of

NAQUIM in Rajasthan State. Members of SGWCC/Representatives of Committee Members participated in the meeting.

22.7 Meeting of Task Force for Formulation of Proposal for Mega Recharge Scheme of Ground Water in Tapi Basin and Field Visit

- As per the directive of MoWR, RD & GR the task force on 26-05-2015 visited 4 places of Jalgaon district of Maharashtra and Burhanpur district of Madhya Pradesh to obtain the views of grass root level elected representatives, Farmers and local peoples . Besides, the task force also met i.e. Smt. Archana Chitnis, hon'ble MLA, Burhanpur, MP and Shri Girish Mahajan, Hon'ble Minister of Water Resources and MLA Jamner, Jalgaon district, Maharashtra to obtain their views on mega recharge scheme. 4th meeting of the task force was held on 27/05/2015 at Jalgaon. During the meeting, the members of the Task Force deliberated on various issues such as cost of the various individual components involved in the scheme, draft interim report prepared by the task force, recharge potential of the area etc.

- The task force also held a meeting with 8 elected representatives of the area to record their views/suggestions on the mega recharge scheme. The 8 elected representatives of the areas were Shri Nandkumar Chavan, Hon'ble MP, Khandwa, Madhya Pradesh, Shri A.T. Nana Patil, Hon'ble MP, Jalgaon, Smt. Raksha Nikhil Khadse, Hon'ble MP, Raver, Shri haribhau Jawale, Hon'ble MLA, Raver, Smt Archana Chitnis, Hon'ble MLA, Burhanpur, Madhya Pradesh, Shri Prabhudas Bhilavekar, Hon'ble MLA, Melghat, Shri Chandrakant Sonawane, Hon'ble MLA, Chopda, Shri Rajendra Dadu, Hon'ble MLA, Nepa Nagar, Madhya Pradesh. Regional Director, CR and Supdtg. Hydrogeologist of Central Region,Nagpur attended the meeting and field visit.

- The fifth meeting of Task Force was held on 23/07/2015 at Pune under the Chairmanship of Director, National Institute of Hydrology, Roorke. During the meeting, discussions were held on Interlinking of surface water and its availability and utilization of water from existing reservoirs in the area. This was followed by the presentation on Draft Feasibility Report as per TOR of the Task Force. The Draft Feasibility Report was discussed and finalised by the members of the task force. Regional Director & Member Secretary of Task Force attended the meeting.

- Shri Parvinder Singh, Regional Director & Shri P.K.Jain, Sr HG, CGWB, North Central Region, Bhopal have attended meeting on "Tapi Mega Recharge Project" at Jalgaon (Maharashtra) on 26th & 27th May'2015. The meeting was organized by Tapi Irrigation Development Corporation, Maharashtra.

22.8 Parliamentary Standing Committee on Water Resources undertook an on-the spot Study visit at Kolkata

Parliamentary Standing Committee on Water Resources undertook an on-the spot Study visit at Kolkata from 3rd to 6th October, 2015. All the arrangements in respect of accommodation, transport, conference hall, Durgapur tour etc. has been made by the Head of the Eastern Region Office of CGWB, as Chief Liaison Officer, along with officers of CGWB, CWC, NWDA and State Govt. Departments of WRID, Irrigation & Water ways .

22.9 ISO/TC Meeting at Tokyo, Japan

Dr.R.Murali Krishna, Scientist-C as a member of ISO/TC 113 sub-committee WRD 3:1 SC 8 and developer of base document ISO/DTR 21414"Surface Geophysical Surveys for hydrogeological studies" participated in group meetings (TC/113) at Japan Society of Civil Engineers HQ in Tokyo, Japan from 24-29 May, 2015. Working Group 4 resolved that the document (surface geophysical surveys for hydrogeological studies DTR 21414) will be submitted to ISO CS by SC8 secretariat for final publication after figure revision.

22.10 Other Important Meetings

- The meeting of GSDA, World Bank, Ministry of Water Resources, River Development and Ganga Rejuvenation, CGWB Faridabad & Nagpur was held on 14.03.16 at Bhujal Bhavan, GSDA, Pune to discuss the proposed World Bank assisted National Ground Water Management Improvement Programme (NGWMIP) project. During the meeting, presentation was made by USGS expert on the studies being carried out by USGS for ground water management. This was followed by presentation of CGWB on linkage of NAQUIM with NGWMIP which included the Aquifer Maps and Aquifer Management Plans prepared so far by CGWB, CR. The presentation was delivered by Shri Rahul R. Shende, Scientist. The meeting was attended by Sh. D. Subba Rao, Regional Director, P. Nandkumaran, Regional Director, CGWB, HQ, Faridabad, Sh. Sourabh Gupta, SHG & OIC, Pune and Shri Rahul Shende, Asstt. Hydrogeologist, CGWB, Nagpur.

- World Bank team visited Gujarat and held discussions with various State Govt. Departments at Gandhinagar. The team also visited WCR office and held discussion with Regional Director and Other Officers on 27th February, 2016.
- A group of Scientists of CGWB, Central Region, Nagpur attended the joint meeting on 12.08.2015 to discuss the proposed remedial plan for contaminated ground water and soil in MIDC, Waluj, Aurangabad district, Maharashtra at MPCB, Mumbai. In the meeting, CGWB has indicated that proper demarcation of polluted area and quantification of polluted water resources in the area needs to be studied in detail to device the remedial action plan. During the meeting it was decided to form the core group for further advise in the study and district level implementation committee by MPCB.
- The Second Meeting of the State Level Committee (SLC) for finalization and approval of Ground Water Resource Estimation as on March 2013 was held under the Chairmanship of Principal Secretary, Water Supply and Sanitation Department (WSSD), Govt. of Maharashtra, Mumbai on 6th May 2015. The resource estimation has been jointly carried out by Ground Water Surveys & Development Agency (GSDA), Pune and Central Groundwater Board (CGWB), Nagpur. After elaborate deliberations by various Members, the Ground Water Resource Estimation of Maharashtra as on March 2013 was finally approved by the SLC. Regional Director, Central Region and the Member Secretary and the Senior Scientists of CR Nagpur attended the meeting.
- Fifth Meeting of Project Management Group (PMG) was held on 9th April, 2015 under the Chairmanship of Secretary(MoWR,RD&GR). During the meeting, various items like Implementation of Aquifer Mapping, Progress of Scheme of ground water management & regulation and Procurement under Technological Up-gradation etc. were

discussed. Members of CGWB, Officers of the Ministry, Director (Admn.) and Senior Officers of the Board had attended the Meeting.

- Regional Director, CGWB, Kerala Region attended 25th Meeting of State Ground Water Authority at Thiruvananthapuram on 27/04/2015 and participated in the deliberations.
- Regional Director, CGWB, Western Region attended and participated in the meeting regarding "*Formulation of Ground Water Extraction Policy"* held under the chairmanship of Pr. Secretary, PHED & GWD, Govt., of Rajasthan in the compliance of the Hon'ble High Court dated 24.01.2015.
- A meeting between CGWB and PHED, Govt. of West Bengal was held on 15.05.2015 at Kolkata on "Arsenic Remediation and Arsenic free water supply in Arsenic infested block of Pandua, Hooghly district of West Bengal". During the meeting with the Engineer-in Chief, PHED, Govt. of West Bengal, it was decided that the entire project will be completed in three phases. PHED agreed to clear 20 sites in Pandua Block in first phase where they have shown eagerness to take over the wells for water supply schemes.
- Shri. T. Balakrishnan, Scientist-D, CGWB, South East Coastal Region, Chennai attended 83rd meeting of Tamil Nadu State Coastal Zone Management Authority held at Chambers of the Principal Secretary to Government, Environment & Forest Department, Secretariat, Chennai on 19.05.2015.
- Regional Director, CGWB, WR, Jaipur, attended State Level Monitoring Committe(SLMC) meeting under the chairmanship of Secretary, Canal Area Development & Water Utilization(CAD &WU) department, on 22.05.2015 at State Secretariat, Jaipur to accord/sanction for the Revise Proposal for Development of Pressure Irrigation System on Lift Schemes of Indira Gandhi Nahar Pariyojana(IGNP), Stage-II.
- The 2nd meeting on "Water Management Strategies" convened by the Additional Chief Secretary, Water Resources Dept., Govt. of Kerala at Thiruvananthapuram on 10.06.2015 and participated in the deliberations.
- First State Ground Water Coordination Committee Meeting for implementation of NAQUIM in the State of Andhra Pradesh was held on 10.07.2015 at Hyderabad under the Chairmanship of Secretary Water Resources, Govt. of Andhra Pradesh.
- A Meeting was held on 27th July,2015 with Secretary, Minor Irrigation, Govt. of Karnataka and Additional Director (GW), Department of Mines and Geology at Bangalore. Finalized the report of Pilot project on Aquifer Mapping Studies in Ankasandra watershed, parts of Tiptur and CH halli taluks of Tumkur district, Karnataka and its submission to CHQ for approval.
- Scientists of CGWB, Uttaranchal Region, Dehradun attended a meeting with Secretary (MI), Government of Uttarakhand, Dehradun on 21st July, 2015 and formulated strategy for National Water Mission and National Action Plan for Climate Change under which a State Specific Actional Plan (SSAP) for Water Resources Development pertaining to Uttarakhand.
- Scientist from CGWB, WR, Jaipur attended the meeting on 30.07.2015 at Conference hall, IGNP office, Jaipur to review the progress of study for rejuvenation of Saraswati paleochannel network & exploration of groundwater resources in north western Rajasthan under the chairmanship of Sh.Sriram Vedire,Chairperson,River Basin & Water Resources Planning Authority, Rajasthan.

- Regional Director, CGWB, SR, Hyderabad held discussions with Director, Ground Water Department, Govt. of Andhra Pradesh on proposed manage artificial recharge in Polavaram Project area and Artificial Recharge Plans for OE blocks in the State in a meeing held on 4.08.2015 at Hyderabad.
- Regional Director and Scientists of CGWB, NWR, Chandigarh attended meeting on 10.09.2015 held under Chairmanship of Shri A.K. Gupta, Engineer-in-Chief, Irrigation Department, Govt. of Haryana regarding Artificial Recharge Plan in OE blocks of the State also along the Canal and Drainage network of Haryana.
- Regional Director and Scientists of CGWB, NWR, Chandigarh attended meeting held on 18.09.2015 under the Chairmanship of Dr. Amarjeet Singh, IAS, Additional Secretary, MoWR, RD&GR regarding proposal for drilling of exploratory wells through outsourcing in Punjab and Haryana States.
- Regional Director and Scientists of CGWB, NWR, Chandigarh attended meeting held on 22.09.2015 under the Chairmanship of Dr. Amarjeet Singh, IAS, Special Secretary, MoWR, RD&GR in his chamber regarding presentation on Aquifer Mapping & Management plan in Haryana which was delivered by Dr. J.K. Rai, Head Ground Water M/s WAPCOS Ltd, Gurgaon.
- The 23rd SLSSC meeting was held on 22.09.2015 under the Chairmanship of Principal Secretary, Water Supply & Sanitation Department (WSSD), Government of Maharashtra at Mumbai. The meeting was called to review the progress, approval of AAP for sustainability and coverage (solar dual pumps) and support & WQMSP for 2015-16, review of progress of pilot project on installation of RO plant. Shri Sourabh Gupta, Scientist-D and OIC, CGWB, Pune attended the meeting.
- Scientists of CGWB, CR, Nagpur attended the Sub-group meeting of Water Quality Review Committee was held on 9.09.2015 in the Conference Hall, Maharashtra Pollution Control Board under the Chairmanship of Joint Director (WPC) at Mumbai. During the meeting it was decided that information about protocol being followed for water sampling and analysis along with methodologies will be submitted to MPCB.
- Scientists of CGWB, SECR, Chennai attended meeting with NLC at Neyveli on 22-9-2015 & 23-9-2015 for finalisation of report on Optimisation of groundwater development in Neyveli basin.
- Regional Director and Scientist 'D', CGWB ,WR , Jaipur attended II meeting of State Level Committee (SLC) under Jal Kranti Abhiyan 2015-16 held on 28.09.2015 under the Chairmanship of Secretary WRD , Govt. of Rajasthan.
- Regional Director and Scientist 'D' CGWB ,WR , Jaipur attended meeting held on 22.09.2015 with Chief Engineer , GWD and appraised him about the action plan of National Aquifer Mapping in the State of Rajasthan and shared the implementation of the plan.
- Scientists of CGWB, WR, Jaipur attended meeting held on 30.09.2015 under the Chairmanship of Chief Secretary , Govt. of Rajasthan at Secretariate Jaipur to review the status of Small Scale Textile Processing Units Cluster situated at Balotra , Bithuja and Jasol as per the directions of Hon'ble N.G.T Dated 01/09/29015 in the matter of Digvijay Singh V/S State of Rajasthan.

- A meeting was held On 14.10.15 with the team of officers including Mr. Albert Tulnhof founder of Acacia Water, Netherland, Ms. Charu Jain Consultant World Bank and Atul Thakur, Engineer DWSS , Government of Punjab by the officers of NWR Chandigarh regarding the project which has been taken up by the DWSS with the aid of world Bank for re-mediation of GW Contamination for sustainable water supply in the state of Punjab.
- Scientists of CGWB, NWR, Chandigarh attended meeting held on 19.10.15 under Chairmanship of Shri Sarvesh Kaushal, IAS, Chief Secretary, Punjab in his office, Chandigarh regarding implementation of short term and long term measures for improving ground water quality as submitted before Hon'ble National Green Tribunal, New Delhi in application no. 19 of 2013, Court on its own motion V/s state of Punjab.
- Scientist 'D' of CGWB, WR, Jaipur attended IInd meeting of the State Level Nodal Agency held on 12.10.2015 under the Chairmanship of Additional Secretary cum Chief Engineer, Water Resources Department, Govt. of Rajasthan at Jaipur to scrutinize the project proposal submitted by District Level Implementation & Monitoring Committee (DLI & MC) to put up before Technical Advisory Committee for approval. A total nos of 19 projects (DPRs) were discussed and approved.
- Regional Director, CGWB, WCR, Ahmedabad along with Scientists attended meeting/demonstration of self recharge aquifers at GWS and S.B., Gandhinagar on 9.10.2015. Water Quest demonstration their techniques and case studies regarding exploration of deep seated aquifers in overseas.
- Regional Director ,CGWB ,WR , Jaipur attended the meeting on 14.10.2015 under the Chairmanship of Special Secretary (WR,RD & GR),Government of India in his chamber on "Implementation of NAQUIM in Rajasthan".
- Scientist-D,CGWB,WR, Jaipur attended meeting on "Performance evalu^{a}tion of consultants of Water Sanitation Support Organization (WSSO),"on 16.10.2015 under the chairmanship of Principal Secretary, PHED & GWD at State Secretariat, Jaipur.
- Scientist-D of CGWB, SECR, Chennai attended the 86th meeting of Tamil Nadu State Coastal Zone Management Authority held at Chambers of the Principal Secretary to Government, Environment & Forest Department, Secretariat, Chennai on 30-09-2015.
- Regional Director attended the meeting of the General Body of Haryana Saraswati Development Board (HSHDB) as member of Board which was held on 24.11.2015. The meeting was chaired by Hon'ble Chief Minister, Haryana and Chairman, HSHDB.
- Regional Director of CGWB, Southern Region, Hyderabad participated in a meeting on "Evaluation of R&D projects under TEQUI – PP project " as expert member at JNTU, Hyderabad on 13.11.2015.
- Regional Director and Executive Engineer of CGWB, Southern Region, Hyderabad participated in a 13th Meeting of Scientific Council of Indo French Centre for Ground Water Research (FCGR)" organized by NGRI, Hyderabad on 20.11.2015.
- Scientist of CGWB, UR, Dehradun had participated in the Empowered Committee Meeting held in the Chamber of Superintending Surveyor, Survey of India, Dehradun regarding the review of the progress of the Re- Engineered Digital Topo sheets of India under NAQUIM project along with Scientists of CHQ Faridabad on November 20, 2015.
- Officers of CGWB, NWR, Chandigarh accompanied the team members as consitituted by the Hon'ble NGT during 16.11.2015 to 21.11.2015 for collection of water samples etc

from the above said 6 towns of Punjab, as decided by the PPCB in the meeting conducted on 10.11.2015 in reference to Hon'ble NGT application no. 19 of 2013, titled as Court on its own motion V/s state of Punjab & others.

- Regional Director ,CGWB ,WR , Jaipur attended the meeting on 04.11.2015 of Technical Advisory Committee(TAC) constituted by Administrative reform (Gr.3) Department, for approval of DPRs under Repair, Renovation and Restoration (RRR) Scheme under the Chairmanship of Secretary (WRD), Government of Rajasthan, at Secretariat, Jaipur.
- Regional Director & Scientist of CGWB ,WR , Jaipur attended first meeting of Task Force to discuss strategy for formulation and execution of Rain water harvesting and Artificial Recharge Programme in the Rajasthan State including IEC activities & sustainable groundwater management under CSR on 20.11.2015 under the Chairmanship of Principal Secretary (PHED & GWD), Government of Rajasthan, at Secretariat, Jaipur.
- Scientists of CGWB, NWR, Chandigarh attended meeting held on 10.11.2015 called by the Member Secretary, PPCB in reference to Hon'ble National Green Tribunal, application no. 19 of 2013, titled as Court on its own motion V/s state of Punjab & others. During the meeting it was informed that the NGT vide its letter dated 06.08.2015 has constituted a team consisting of MoEF, CPCB, Directorate of Industries Punjab & PPCB to collect the ground water samples from six towns namely Amritsar, Ludhiana, Gurdaspur, Jalandhar Mohali & Bathinda.
- The Regional Director, CGWB, WCR, Ahmedabad along with other officers attended First Meeting of the State Ground Water Coordination Committee (SGWCC) held on 06/11/2015 at Committee Room, Block No 9/2, Narmada, Water Resources, Water Supply and Kalpsar Department, Govt. of Gujarat, Gandhinagar in connection with the Implementation of Aquifer Mapping in the State of Gujarat.
- Scientists of CGWB, Western Region, Jaipur participated in exhibition organised by Press Information bureau, Government of India, during 27 November,2015 to 29 November,2015 at Jaipur. In the exhibition exhibits/displays on groundwater related issues were displayed.
- The Additional Chief Secretary, Agriculture Dept., Govt. of Maharashtra convened the meeting to discuss the Problems and Solutions for Inland salinity affected area of Vidarbha. The meeting was attended by Scientists of CGWB, CR, Nagpur. During the meeting, Dr. P.K. Jain, Supdtg Hydrogeologist informed about the detailed isotope and hydrogeological studies done by CGWB in Purna Alluvial Basin and the remedial measures needs to be taken up to mitigate the situation.
- Regional Director and Scientists of CGWB, NCR, Bhopal have attended meeting of "State Level Ground Water Resource Estimation Committee" on 15.12.2015 under the Chairmanship of Additional Chief Secretary, Water Resources Department, Govt of M.P. for the approval of Dynamic Ground Water Resource (As on March' 2013).
- Regional Director and Scientists of CGWB, NWR, Chandigarh participated during the visit of World Bank Team for discussions with Haryana State Government officers on 15.12.2015 which was held under the chairmanship of Shri Ram Niwas, IAS, Additional Chief Secretary (Irrigation & Water Resources), Government of Haryana, along with Sh. K.C.Naik, Member (SAM) and Dr. P. Nandakumaran, Regional Director, Faridabad. The Team of World Bank also visited the CGWB Exploratory drilling site Kanipala, District

Kurukshetra, Haryana & Regional Office, Bhujal Bhawan, Chandigarh and appreciated the activities and office ambience.

- Regional Director and Scientists of CGWB, NWR, Chandigarh attended meeting of State Level Committee of Estimation of Ground Water Resources Potentials (as on 31st March 2013) held on 16.12.2015 under the Chairmanship of Shri V.S. Kundu, IAS, Additional Chief Secretary (Agriculture), Government of Haryana to discuss various issues and activities of GWRE 2013 and NAQUIM. Also, handed over modified phase-wise implementation Plan of Aquifer Mapping for Haryana State and report on 'Aquifer mapping & Formulation of Aquifer Management Plan for NCR, Haryana' for sharing of outcome of the work.
- A meeting was held on 03.12.15 with Sh. Satya Dev Bhattacharya, Chief Engineer, HQ, PHED, Sh. G.K.Roy Choudhury, Chief Engineer, Western Zone, PHED & Sh. Daipayan Ghosh, Ex. Engineert, Hugli, PHED, Govt. of West regarding project for arsenic free water supply in Pandua block, Hugli district. The meeting was attended by the H.O.O. wioth officers of CGWB.
- Dr. P.N. Rao, Superintending Hydrogeologist of CGWB, Southern Region, Hyderabad attended TAC (State Level) Repair, Renovation and Restoration of Tanks(RRR) meeting of Andhra Pradesh chaired by Secretary, Government of Andhra Pradesh at Jaisoudha, Hyderabad on 11th January, 2016.
- Scientists of CGWB, NWR, Chandigarh attended discussions held with the World Bank Team constituting Dr. Albert Tuinhof & Others on 25.01.2016 at Bhujal Bhawan, Chandigarh regarding Study to be taken by the DWSS in Punjab State in project mode.
- Scientists of CGWB, SWR, Bangalore attended meeting convened by Rural Development and Panchayt Raj Department, Govt.of Karnataka on 21.1.2016 regarding impact assessment and implementation status of Borewell recharge structures taken by the State Government in Karnataka.
- Shri P.K.Parchure, Regional Director, Dr. Arijit Dey, Scientist-D, CGWB,WR , Jaipur attended Task force meeting held on 25.01.2016 held at Secretariat under the chairmanship of Principal Secretary, PHED & GWD .The mandate of the task force is to identify and develop recommendation strategies to achieve sustainable groundwater resources and management in the Rajasthan State.
- Regional Director of CGWB, Southern Region, Hyderabad attended TAC (State Level) meeting for approval of schemes under Repair, Renovation and Restoration of Tanks(RRR) on 25th February, 2016 held in the chamber of Principal Secretary, I&CAD, Govt. of Telengana.
- Attended the State Level Evaluation Committee meeting (SLEC) Chaired by the Secretary, Water resources Dept. Govt. of Kerala conducted by the State Ground Water Dept at Thiruvananthapuram on 15.02.2016 for giving clearance to drinking water industries.
- Smt. Balinder P.Singh Scientist 'D' attended the meeting regarding Occurrence of High Arsenic content in Ground Water and Soils of the State on 03.02.2016 at Krishi Bhawan, Sec 21, Panchkula under the Chairmanship of Director , Agricultrure, Haryana.
- A Meeting to discuss the Modalities and Outcome of the Aquifer Mapping & Management in the state of Punjab was held by Central Ground Water Board on

11.02.2016 in the Presence of Sh. K.S. Takshi Chief Engineer Water Resources, Shri Goyel Executive Engineer Irrigation Department and Sh.Rajesh Vashist JDA and Officers of CGWB NWR were present.

- 38th meeting of CGWA on 'Formulation of CGWA Guidelines/Criteria of Evaluation for Ground Water Abstraction for Agriculture, drinking and domestic use'. Was held at New Delhi on 25.02.2016
- The Regional Director along with Officers of NAQUIM had a meeting with MD, GWRDC Ltd. At Gandhinagar on 21st February in which activities under NAQUIM and future actions were discussed. Management Plan for Mahesana and Porbandar district was submitted for their comment. Discussion was also made regarding visit of World Bank team for National Ground Water Management Improvement Plan (NGWMIP)
- State Level Committee meeting on Ground Water Resource Estimationas on March 2013 for Goa was held on 9.2.2016 at Panjim, Goa. Dr K.R.SooryanarayanaSuptd.HG, Dr J.Davithuraj Scientist-B and Sri Sivaramakrishnan AHG attended the meeting.
- A meeting was held in the Chamber of Director SWID, Member secretary & Convenor-Member of State Ground Water Coordination Committee on 11.02.2016 which was attended by the officers of CGWB and SWID. A power point presentation was made on Aquifer Mapping and Management Plan in parts of Murshidabad district byCGWB. During presentation helpful interaction was made among the scientific officers. The matter has been forwarded to the Chairman, State Ground Water Coordination Committee for further meeting and approval.
- Sh. S. Bhattacharya, Suptg. Hydrogeologist & OIC, Sh. D. Chakraborty, Sr. Hydrogeologist, Sh. Rajesh Chandra, Sr. Hydrogeologist and Mrs. Sonia Kapur, Asstt. GP attended meeting of State Ground Water Co-ordination Committee for re-estimation of Ground Water Resource as on March, 2013 held under the chairmanship of Secretary, Urban Development Department, Govt. of NCT Delhi on 16.02.16 at Delhi Secretariat.
- Shri Parvinder Singh, Regional Director, CGWB, NCR, Bhopal attended meeting on the subject "Perparation of Vulnerability Map for various districts of Bundelkhand region" with the Secretary (WR, RD & GR) on 15.03.2016 in the Conference Hall of Ministry of Water Resources, RD & GR, at Shram Shakti Bhawan, New Delhi.
- Shri P.K.Parchure , Regional Director , Dr. Arijit Dey , Scientist-D, CGWB ,WR , Jaipur attended a meeting chaired by the Principal Secretary, PHED & GWD on 04.03.2016 to ascertain appropriate measures to ensure the compliance of condition laid down by Central Ground Water Authority under EPA,1986 meant to regulate and control the abstraction & Management of ground water resources of the State while granting permission/refusal for groundwater abstraction structures to Rajasthan based Industries.
- Shri P.K.Parchure , Regional Director,and Shri Wasim Ahmad , Scientist-D, CGWB, WR , Jaipur attended the State Level Committee (SLC) meeting for approval of draft report of Dynamic Ground Water Resources as on 31.03.2013 in the chairmanship of Secretary, PHED & GWD on 10.03.2016 in his chamber at Secretariat,Jaipur.
- Dr. S.K Jain Regional Director along with other officers of NWR,Chandigarh attended a State level Committee Meeting on 29th March, 2016 for Estimation of Ground Water Resource Potential w.r.t Haryana GWRE 2013 at additional Chief secretariat Agriculture, Govt. of Haryana Sec 17 Chandigarh.

- 2nd meeting of SGWCC was held on 6.3.2016 under the chairmanship of Secretary, Water Resources Dept., Govt. of Kerala for finalisation of the report on Aquifer mapping studies in Chittoor and Malampuzha blocks of Palakkad district. The Report was approved after discussions.

23. VIGILANCE ACTIVITIES

During the year 2015-16, 26 complaints cases were brought forward w.e.f 1.4.2015 and 10 new complaint cases were received during the year 2015-16. Out of these 36 complaints, 14 were closed and 1 complaints cases were taken up as disciplinary proceedings. Therefore, 21 complaint cases were carried forward to next year.

DISCIPLINARY PROCEEDINGS

14 cases of disciplinary proceeding were brought forward up to 31.03.2015 and 1 case of disciplinary proceeding were received during the year 2015-16 and and 3 case was disposed off. Thus total 12 cases of disciplinary proceeding were carried forward to next year.

24. RTI INFORMATION

The opening balance of RTI applications as on 01.04.2015 were 205 and 236 RTI applications were received during the year 2015-16. Out of 236, 97 numbers of cases were transferred to other public authorities. 139 applications have been disposed off. An amount of Rs.2058 was received towards application fee. Details are given below in table 23.1

Table 23.1: RTI Information for year 2015-2016

Opening balance as on 01.04.2015	Received during the year (including cases transferred from other public authorities)	No. of cases transferred to other public authorities	Decisions where Requests/ Appeals Rejected	Decisions where Requests/ Appeals Accepted	Amount of Charges collected (in Rs.)
205	236	97	0	3	2058

25. PERSONAL MANAGEMENT

The sanctioned strength, filled up, vacancy position and category-wise personnel deployed in the Board are presented in table 24.1.

Table 25.1 Personnel Deployment in Central Ground Water Board during 2015-2016 (Up to 31st March, 2016)

GROUP "A"							
Section	**Sanctioned**	**Filled**	**Vacant**	**OBC**	**Handicapped**	**SC**	**ST**
Scientific	403	318	85	30	0	48	13
Ministrial	8	6	2	0	0	0	0
Engineering	56	41	15	10	0	08	06
Total	**467**	**365**	**102**	**40**	**0**	**56**	**19**
GROUP "B"(Gazetted)							
Section	**Sanctioned**	**Filled**	**Vacant**	**OBC**	**Handicapped**	**SC**	**ST**
Scientific	219	122	97	20	01	24	09
Ministrial	36	21	15	0	0	0	0
Engineering	110	31	79	04	0	09	04
Total	**365**	**174**	**191**	**24**	**1**	**33**	**13**
GROUP "B"(Non-Gazetted)							
Section	**Sanctioned**	**Filled**	**Vacant**	**OBC**	**Handicapped**	**SC**	**ST**
Scientific	179	110	69	24	0	20	08
Ministrial	203	166	37	07	04	38	14
Engineering	265	205	60	13	1	63	37
Total	**647**	**481**	**166**	**44**	**5**	**121**	**59**
GROUP "C"							
Section	**Sanctioned**	**Filled**	**Vacant**	**OBC**	**Handicapped**	**SC**	**ST**
Scientific	83	38	45	04	0	09	05
Ministrial	1136	778	358	158	10	178	81
Engineering	1462	1157	305	155	4	231	90
Total	**2681**	**1973**	**708**	**317**	14	**418**	**176**
GRAND TOTAL							
Groups	**Sanctioned**	**Filled**	**Vacant**	**OBC**	**Handicapped**	**SC**	**ST**
GROUP "A"	**467**	**365**	**102**	**40**	**0**	**56**	**19**
GROUP "B"(Gazetted)	**365**	**174**	**191**	**24**	**1**	**33**	**13**
GROUP "B"(Non-Gazetted)	**647**	**481**	**166**	**44**	**5**	**121**	**59**
GROUP "C"	**2681**	**1973**	**708**	**317**	14	**418**	**176**
TOTAL	**4160**	**2993**	**1167**	**425**	**20**	**628**	**267**

.

26. BUDGET AND EXPENDITURE

State ment showing actual expenditure incurred by the Board during 2015-16 has been shown in Table 25a

Table 26a: Budget Estimates and Expenditure during the Year 2015-16					
		PLAN (Rs. In Lakhs)		NON- PLAN (Rs. In Lakhs)	
Unit Code	**Unit name**	**Budget**	**Expenditure**	**Budget**	**Expenditure**
16.02.01	Salary	3600.00	2331.52	14987.80	14524.32
16.02.02	Wages	50.00	90.82	0.40	0.26
16.02.03	O.T.A.	9.00	6.58	4.00	2.22
16.02.06	M/Treatment	100.00	98.11	114.00	109.15
16.02.11	D.T.E	1500.00	1184.27	90.00	72.23
16.02.12	F.T.E.	20.00	3.34	0.20	0.00
16.02.13	O.E.	1610.00	1732.57	5.00	4.57
16.02.14	R.R.T.	230.00	176.81	1.00	0.00
16.02.16	Publications	220.00	99.47	1.00	0.61
16.02.17	Advert/ Publi.	0.00	0.00	0.20	0.00
16.02.20	O.A.E.	200.00	1.52	0.10	0.06
16.02.24	P.O.L.	1940.00	1421.90	1.00	0.00
16.02.27	Minor Works	275.00	257.89	0.00	0.00
16.02.28	P.S.	534.90	185.81	0.20	0.00
16.02.33	Subsidies	0.10	0.01	0.00	0.00
16.02.43	S/Stock	1520.00	1645.41	0.00	0.00
16.02.50	Other Charges	91.00	0.00	0.10	0.00
16.02.51	Motor Vehicle	790.00	453.24	1.00	0.00
16.02.52	M & E	1770.00	2147.69	0.00	0.00
16.02.53	M/Works	4340.00	3599.27	0.00	0.00
16.02.64	W.O.L.	0.00	0.00	0.00	0.00
Total:		18800.00	15436.23	15206.00	14713.42

Table 26b: Rajiv Gandhi National Training & Research Institute for Ground Water

Unit Code	Unit name	Budget (Rs. In Lakhs)	Expenditure (Rs. In Lakhs)
06.01.01	Salary	300.00	253.61
06.01.02	Wages	0.00	0.00
06.01.06	M/Treatment	5.00	1.69
06.01.11	D.T.E	85.00	76.19
06.01.12	F.T.E.	50.00	0.00
06.01.13	O.E.	48.00	47.92
06.01.14	R.R.T.	40.00	48.61
06.01.16	Publications	2.00	2.00
06.01.24	P.O.L.	5.00	3.14
06.01.28	P.S.	125.00	150.72

06.01.51	Motor Vehicle	10.00	0.00
06.01.52	M & E	30.00	2.96
Total		700.00	586.84

Table 26c: Hydrology Project Phase- II (PLAN)

Unit Code	Unit name	Budget (Rs. In Lakhs)	Expenditure (Rs. In Lakhs)
08.01.01	Salary	0.00	0.00
08.01.06	M/Treatment	0.00	0.00
08.01.11	D.T.E	0.00	0.00
08.01.12	F.T.E.	0.00	0.00
08.01.13	O.E.	0.00	0.00
08.01.20	O.A.E.	0.00	0.00
08.01.28	P.S.	0.00	0.00
08.01.51	Motor Vehicle	0.00	0.00
08.01.52	M & E	0.00	0.00
08.01.53	Major Works	0.00	0.00
08.02.01	Salary	0.00	0.00
08.02.06	M/Treatment	0.00	0.00
08.02.11	D.T.E	0.00	0.00
08.02.12	F.T.E.	0.00	0.00
08.02.13	O.E.	0.00	0.00
08.02.20	O.A.E.	0.00	0.00
08.02.28	P.S.	0.00	0.00
08.02.51	Motor Vehicle	0.00	0.00
08.02.52	M & E	0.00	0.00
08.02.53	Major Works	0.00	0.00
Total 01 Ext. Supp. & 02 Dom. Supp.		0.00	0.00

Table 26d: Central Ground Water Board building for offices

Unit Code	Unit name	Budget(Rs. In Lakhs)	Expenditure (Rs. In Lakhs)
03.0051	Motor Vehicle	0.00	0.00
03.00.52	M & E	200.00	56.81
03.00.53	Major Works	700.00	0.00
Total		900.00	56.81

Table 26e: Deduct Recoveries

Unit Code	Unit name	Budget(Rs. In Lakhs)	Expenditure (Rs. In Lakhs)
17.01.70	Issue to Work	2500.00	1351.84
17.02.70	Oth. Sus/ Char.	0.00	0.00
Total		2500.00	1351.84

Annexure -1

LOCATION AND JURISDICTION OF REGIONAL AND OTHER OFFICES OF CENTRAL GROUND WATER BOARD

REGIONS	HEADQUARTERS	JURISDICTION
i) NORTH WESTERN HIMALAYAN REGION		
Regional Office	Jammu	J&K
Division Office	Div. VIII, Jammu	
ii) NORTH HIMALAYAN REGION		
Regional Office	Dharamshala	Himachal Pradesh
Division Office	Div. XVII, Dharamshala	
iii) NORTH WESTERN REGION		
Regional Office	Chandigarh	Punjab, Haryana & UT of Chandigarh
Division Office	Div. II, Ambala	
iv) WESTERN REGION		
Regional Office	Jaipur	Rajasthan
State Unit Office	Jodhpur	Western Rajasthan
Division Office	Div. XI, Jodhpur	Rajasthan
v) WEST CENTRAL REGION		
Regional Office	Ahmedabad	Gujarat, UT of Daman & Diu
Division Office	Div.I, Ahmedabad	
vi) NORTH CENTRAL REGION		
Regional Office	Bhopal	Madhya Pradesh
Division Office	Div.XII, Bhopal	
vii) NORTH CENTRAL CHHATTISGARH		
Regional Office	Raipur	Chhattisgarh
Division Office	Div.XIII, Raipur	
viii) CENTRAL REGION		
Regional Office	Nagpur	Maharashtra, UT of D & N. Haveli
State Unit Office	Pune	West Maharashtra
Division Office	Div. VI, Nagpur	Maharashtra, UT of D & N. Haveli
ix) NOTHERN REGION		
Regional Office	Lucknow	Uttar Pradesh
State Unit Office	Allahabad Div.III,	
Division Office	Varanasi	
x) UTTARAKHAND REGION		
Regional Office	Dehradun	Uttarakhand
Division Office	Div.XVI, Bareilly	
xi) MID EASTERN REGION		
Regional Office	Patna	Bihar, Jharkhand
State Unit Office	Ranchi	Jharkhand
Division Office	Div. V, Ranchi	Bihar, Jharkhand

xii) EASTERN REGION		
Regional Office	Kolkata	West Bengal, Sikkim, UT of A & Nicobar Islands
Division Office	Div. XV, Kolkata	
xiii) NORTH EASTERN REGION		
Regional Office	Guwahati	Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura
State Unit Office	Naharlugan	Arunachal Pradesh
	Shillong	Meghalaya
	Agartala	Tripura
Division Office	Div.VII, Guwahati	Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Tripura
xiv) SOUTH EASTERN REGION		
Regional Office	Bhubaneshwar	Orissa
Division Office	Div. X, Bhubaneshwar	
xv) SOUTHERN REGION		
Regional Office	Hyderabad	Andhra Pradesh &Telangana
State Unit Office	Vishakhapatanam	N-Coastal Andhra Pradesh
Division Office	Div. IX, Hyderabad	Andhra Pradesh & Telangana
xvi) SOUTH WESTERN REGION		
Regional Office	Bangalore	Karnataka & Goa
State Unit Office	Belgaum	NW. Karnataka & Goa
Division Office	Div. XIV, Bangalore	Karnataka & Goa
xvii) SOUTH EASTERN COASTAL REGION		
Regional Office	Chennai	Tamil Nadu, UT of Pondicherry
Division Office	Div. IV, Chennai	
xviii) KERALA REGION		
Regional Office	Trivendrum	Kerala & UT of Lakshadweep
Division Office	Div. IV, Chennai	Kerala & UT of Lakshadweep
State Unit Office	NCT, Delhi	NCT, Delhi

ANNUAL REPORT

2015 - 2016

Prepared under the Guidance of

Shri K.B.Biswas, Chairman- I/C, CGWB
Dr Dipankar Saha, Member(SAM), CGWB

Contributors

Principal Contributor

Shri M. K. Garg, Scientist-D, CGWB,CHQ, Faridabad
Shri T.Madhav, Scientist-B, CGWB, CHQ, Faridabad

Other Contributors

Dr. Sudhanshu Shekhar, Scientist-D, CGWB, CHQ, Faridabad.
Dr. Rakesh Singh, Scientist-B, CGWB, CHQ-Faridabad
Sh. S.N. Diwedi, Scientist-C, CGWB, Faridabad
Shri S. C. Gupta, Sr Hydrologist, CGWB, CHQ, Faridabad