ANNUAL REPORT **2012-2013**

CENTRAL GROUND WATER BOARD

MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION

GOVERNMENT OF INDIA

FARIDABAD

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EXECUTIVE SUMMARY

Central Ground Water Board (CGWB), a subordinate office of 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. Central Ground Water Board was established in 1970 by renaming the Exploratory Tube wells Organization under the Ministry of Agriculture, Government of India. It was merged with the Ground Water Wing of the Geological Survey of India during 1972.

VISION OF CGWB:

- Sustainable Development and Management of Ground Water Resources of the Country.

MISSION OF CGWB

- To develop ground water policies, programmes and practices to monitor and enable effective use of the country's ground water resources in a sustainable manner with active involvement of all stakeholders.
- To put into place scientific system and practices, which would result in sustained increase in ground water use efficiency.
- To disseminate information, skills and knowledge, which would help in capacity building and mass awareness in ground water sector.

The Central Ground Water Board is headed by the Chairman and has five main wings namely 1) Exploratory Drilling & Material Management 2) Sustainable Management & Liaison 3) Survey, Assessment & Monitoring 4) Technology Transfer & Water Quality and 5) Rajiv Gandhi Institute (RGI). Each wing is headed by a Member. The administrative and financial matters of the Board are being dealt with by the Director (Administration) and Finance & Accounts Officer (FAO) respectively.

For undertaking the activities in field, 18 Regional Offices, each headed by a Regional Director, have been established in the country. 11 State Unit Offices have also been established in those states having large geographical area for better management of field activities. 17 Divisional offices handle the exploratory drilling and related activities, each headed by an Executive Engineer. Both the State Unit offices and Divisional Offices work under the overall administrative control of the respective Regional offices. The details of Regional office wise field formations and their jurisdiction are given in Annexure- 1. The Board has about 1095 post in Scientific, 4157 post in Engineering sections; and about 2072 staff in ministerial supporting staff.

The main activities of the Board include: Aquifer Mapping through Data collection, compilation, and data gap analysis, Data generation through hydrogeological investigation, exploration, geophysical and hydro chemical studies in priority areas, Monitoring of ground water levels and water quality analysis, Regulation and control of ground water development and management, R & D studies in ground water sector, Capacity building of ground water professionals & stake holder, Programmes for awareness of ground water conservation for all stake holders including school children, Preparation of Reports, Maps, Brochures for information and dissemination and Periodic assessment of country's dynamic ground water resources in 2 years.

ACTIVITIES & ACHIEVEMENTS

National Project on Aquifer Management (NAQUIM)

Is is a flagship programme of Ministry of Water Resources, River Development and Ganga rejuvenation being implemented by Central Ground Water Board.

The primary objective of the Aquifer Mapping Exercise can be summed up as "Know your Aquifer, Manage your Aquifer". Demystification of Science and thereby involvement of stake holders is the essence of the entire project. The involvement and participation of the community will infuse a sense of ownership amongst the stakeholders. This is an activity where the Government and the Community may work in tandem. Greater the harmony between the two, greater will be the chances of successful implementation and achievement of the goals of the Project. As per the Report of the Working Group on Sustainable Ground Water Management, "It is imperative to design an aquifer mapping programme with a clear-cut groundwater management purpose. This will ensure that aquifer mapping does not remain an academic exercise and that it will seamlessly flow into a participatory groundwater management programme. The aquifer mapping approach can help to integrate ground water availability with ground water accessibility and quality aspects as per EFc Proposal. An annual target of 0.54 Lakh sq.km. has been earmarked under this item of study. During the year 2012-13, data generation through in-house activities an area of 0.54 Lakh Sq.km. has been initiated by the Board under National Aquifer Mapping.

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. The entire exercise is aimed at quantitative & qualitative evaluation of ground water in the area. It is being carried out by the Board through a fleet of 87 drilling rigs (33 Direct Rotary, 41 Down the Hole and 13 Percussion Combination types). During the year 2012- 13 (till 31st March, 2013), the Central Ground Water Board under their Ground water Exploration programme, constructed 664 wells {Exploratory Wells(EW) -446, Observatory Wells (OW) -140, Peizometers (PZ) -77, Slim Holes (SH)-1} including 41 high yielding wells to assess the ground water potential in different hydrogeological set up. Priority was accorded to tribal areas, drought affected areas, hard rock areas, areas affected with ground water pollution etc. Out of 664 bore wells constructed, 492 wells, 160 wells and 12 wells were constructed in hard rock, alluvium and boundary formation respectively. 163 wells and 124 wells were constructed to explore the tribal and drought prone areas respectively. The Board so far has drilled a total number of 32231 (including 3023 bore holes through outsourcing) bore holes to identify areas worthy for ground water development in the country till March, 2013. The study will help in identifying ground water sources and in guiding the states to adopt follow up action in respect of ground water development for drinking water supply and other demands.

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 15653 Ground Water Observation Wells. The ground water samples collected during the pre- monsoon monitoring are analysed for the purpose of ascertaining the changes in chemical quality of ground water. Monitoring of Ground Water Observation Wells for May, August, November 2012 & January 2013 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

The Board undertakes geophysical studies as an integral part of its activities to support and supplement ground water management studies, ground water exploration and short-term water supply investigations to demarcate bedrock configuration and thickness of overburden, saline fresh water interface etc. During 2012-13 till 31st March,2013, 1839 Vertical Electrical Soundings, 67.305 line kilometre resistively profiling and 83 nos of geophysical logging of bore holes have been conducted in various parts of the country.

Water Quality Analysis

During 2012-2013, 21132 No. of water samples have been analyzed for determination of basic constituents. Analysis of 15421 No. of water samples including the determination of 1619 No. of organic parameters was carried out under specific studies while analysis 3721 No. of water samples for the Trace elements studies like As, Cd, Co, Cr, Cu Fe, Mn, Ni, Pb and Zn has been completed.

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 under five main heads viz. Ground Water Year Books, district reports, state reports , District Brochures and basic data reports. During 2012-13 up to 31st March, 2013, 15 State Reports (3-Issued, 12- submitted), 3 State Chemical Quality Reports, 217 District Brochures, 12 Ground Water Exploration Reports and 23 Ground Water Year Books are issued. Bhujal News is a quarterly journal being published by Central Ground Water Board highlighting the latest advances in ground water research. Besides scientific papers, the journal also contains technical notes, news items and regular columns. The journal has more than 1500 readers from all over the country. During the year 2012-13 up to 31st March 2013, the Vol. No 26, Vol. 26, 1-4 and 3 & 4 , Combined issues silver jubilee publication Special issue on Application on Remote sensing, GIS & Mathematical modelling in Ground water have been published.

Water Supply Investigations

The Board carries out short-term water supply investigations for Government Agencies and helps them in augmenting their water supply. The Board has carried out a sum total of 120 investigations during this year.

Dissemination and Sharing of Technical Know-how

Central Ground Water Board has organized as also the officers of CGWB were 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 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 Resource

The Total Annual Replenishable Ground Water Resources as on March 2009 of the Country have been reassessed as 431 Billion Cubic Metres (bcm) and the Net Annual Ground Water Availability has been estimated as 396 bcm. Annual Ground Water Draft as on March, 2009 for all uses is 243 bcm. The Stage of Ground Water Development has been worked out as 61%.

Artificial Recharge Studies

During 2012-13, 133 demonstrative recharge projects on "Artificial Recharge to Ground Water and Rain Water Harvesting" have been approved. The approved cost of 133 projects comprising construction of 586 recharge structure of State Government is Rs. 99.87 crores for implementation by the departments under overall technical guidance of Central Ground Water Board.

Technical Examination of Major/Medium Irrigation Project proposals

As per the directives of the Planning Commission, the Board scrutinizes the major and medium irrigation project reports/proposals from State Govt. , Central Water Commission, Command Area Development and Water Management to adjudge their impact on ground water regime and specific recommendations are being made to protect quality and quantity of groundwater. During 2012-13 (upto 31st March, 2013), 5 major and minor irrigation project proposals of Central Water Commission were examined.

Human Resources Development

It has been the earnest endeavor 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 2012-13 (upto 31.03.2013), 168 (32- tier I, 36-tier II and 100 tier-III training programmes were conducted by RGI and total 17365 (565- tier I, 1160-tier II and 15640 tier-III trainees were trained including 3451 female participants.

Hydrology Project II

In order to upscale the studies of hydrology with the latest technology, the World Bank aided Hydrology Project- II was proposed initially for duration of 6 years staring from May 2006 to 2012. The project has further been extended for a period of 2 years from June, 2012 to May, 2014. CGWB is participating agency in HP-II and has projected a revised cost provision of Rs 66.32 Crore. The Budget provision for the year 2012-13 is Rs 28.95 Crore and revised estimate is Rs 13.60 Crore. The expenditure incurred on the project in the FY 2012-13 is Rs 12.23 Crore.

H-P-II has three major components i.e. (A) Institutional Strengthening in the form (i) consolidation of HP-I activities in the existing States; (ii) awareness raising, dissemination and knowledge sharing; and (iii) implementation support; (B) Horizontal Expansion in three new States covering Goa, Himachal Pradesh and Punjab and (C) Vertical Extension in the HP-I to peninsular States.

Under Institutional Strengthening, project aims to upgrade the Infrastructure, hardware and software and training to use the existing software; awareness raising activities and implementation support in the form of procurement of vehicles and equipments. Under this component, following progress have been made during 2012-13. For "Development of e-GEMS"- Web based solution for GEMS software, contract has been awarded for consultancy services to Tata Consultancy Services. Procurement of the hardware (7 Servers & 59 Workstations) for upgradation of data centre has been completed. Six awareness raising programs and six domain specific training have been conducted.

Under Horizontal Expansion, HP-I type of activities and facilities will be extended to new states. In 2012-13, procurement of DWLR (92 nos- for Punjab, 52 nos for Himachal Pradesh. and for 40 nos.for Goa) is under progress as the proposals for expenditure sanction is under approval of MoWR.

However, under Vertical Extension special knowledge enhancement type of activities such as Decision Support

System and Purpose Driven Studies has been taken up. In this year of the project, the implementation of Pilot Project on Aquifer Mapping under Purpose Driven Study component is under progress in six different Hydrogeological terrains of the country covering states of Bihar, Rajasthan, Tamil Nadu, Karnataka and Maharashtra.

Publicity and Public Awareness

With a view to generate awareness among the masses, "Water Resources Day" is celebrated every year since 1986. The Board has played a very active role in organizing Water Resources Day functions jointly 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

Central Ground Water Authority has been entrusted with the responsibility of regulating and controlling ground water development and management in the country and issuing necessary directives for the purpose. CGWA has notified 39 additional areas for regulation of ground water development. The CGWA has issued directions to all concerned to adopt rain-water harvesting systems. The CGWA has issued directions to all the Chief Secretaries of States having over-exploited blocks to take all necessary measures to promote/ adopt artificial recharge to ground water/rain-water harvesting.

IEC Activities

At the instance of Ministry of Water Resources, Central Ground Water Board organized the third State level Painting Competition in the country and workshops in all regional offices of CGWB to create awareness on water conservation. The school level competition 2012 for the students of 4^{th}, 5^{th}, and 6^{th} standards was launched in all the States/UT's. The competition is held in three stages – the School Level competition, followed by the State Level competition and finally culminating with the National Level competition held at New Delhi.

Fifty winners from the school level competition are selected in each state for participation in the state level painting competition which was held on 21st November,2012 coinciding with water conservation week. Winner students are awarded cash prizes worth Rs. 33,000/- The first prize winner is awarded Rs 10,000/-, 2^{nd} Prize Rs 8,000/-, 3^{rd} Prize RS 5,000/- and ten consolation prizes of Rs 1,000/- each are also presented to 10 ten Successful candidates. Each winner student is also awarded a certificate of merit and all participating students are issued participation certificate.

The first, second and third prize winners from the State level painting competition was invited to participate in the National Painting competition held at New Delhi on the 21st January 2013. In the National Painting Competition, one first prize of` 1,00,000/-, four second prizes of` 50,000/- each and eight third prizes of` 25,000/- each are awarded to the winners. In addition, consolation prizes of` 5,000/- each were awarded to all remaining participants.

More than 21 lakh students from 41,421 school participated in the school level competition.
The Topic of painting competition at school level were as under

1. Water and climate Changes **2.** Save Water from Pollution Water Scarcity-Food Security
The theme of painting for State level Competition in the year 2012-13 was "**Replete Water before it Depletes**" and number of Participants at State Level was 1352 from 35 States/ UTs.

Budget

During 2012-2013, Expenditure of 33000.00 lakhs under Plan and 10597.50 lakhs of rupees was incurred by the Board under Non-plan to carry out various activities mentioned above.

1. INTRODUCTION

1.1 HISTORY OF CGWB

The Central Ground Water Board, as the National apex organization under the Ministry of Water Resources, 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. A brief history of the organization is as follows;

An Exploratory Tube wells Organisation (ETO) was created in 1954 as a subordinate office under the Ministry of Food, Agriculture, Community Development and Cooperation (Department of Agriculture) to carry out ground water exploration in the alluvial areas of the country to delineate the regional aquifer systems and Evaluate their yield potential. On 3rd October 1970 the ETO was renamed as Central Ground Water Board. At that time, it was felt that there was need to have a national unified organization for all works related to ground water surveys, exploration, assessment and management in the country. On the recommendations of the Committee on Science and Technology, the Standing Group of Ministers on Science and Technology chaired by Prime Minister Smt. Indira Gandhi, in its meeting on Sept 9, 1971 approved the merger of Ground Water Wing of the Geological Survey of India (GSI) with the Central Ground Water Board. The merger was effected on August 1, 1972 which gave all the administrative and financial powers and flexibility of operation necessary for CGWB's effective functioning. With this, Central Ground Water Board was constituted as an apex organization at the national level with a full time Chairman and two full time Members namely the Chief Hydrogeologist and the Chief Engineer.

In order to streamline staffing pattern, SIU carried out detailed study (1980) and gave its report on staffing pattern of Headquarters, Regional, Divisional and District Unit Office.

A High Level Multi-disciplinary Committee (HLMC) was set up in 1989 to review the role, functions and responsibilities of CGWB in terms of achievements and developments over the past three decades. The HLMC report (1990) highlighted the importance of ground water development and indicated the measures to be taken for achievement of tasks and mandate assigned to CGWB. The Committee reviewed the functions and gave the revised mandate.

In order to provide scientific and technical support to the mandate, Central Ground Water Board conduct training programmes for various levels of ground water professionals/ sub-professionals from CGWB, States, Universities and NGOs. The courses include induction level courses for newly recruited scientists, engineers and drilling professionals; refresher courses for scientists on advanced techniques of ground water investigation, development and management; and training of trainers. The Board had established Rajiv Gandhi National Ground Water Training & Research Institute in 1997 at Raipur. Infrastructure facilities were created by redeploying officers and staff from Central Ground Water Board. The building of the Institute has since been taken over by the Chhattisgarh State to house Legislative Assembly in 2000. It is proposed to relaunch the institute at Raipur in the newly allotted land by the Government of Chhattisgarh, SFC Memorandum in this regard is under submission. Presently the training courses are being conducted at RGI, Raipur.

Central Ground Water Authority has been constituted under Section 3 (3) of the Environment (Protection) Act, 1986 to regulate and control development and management of ground water resources in the country.

The Authority has been conferred with the following powers: (i) Exercise of powers under section 5 of the Environment (Protection) Act, 1986 for issuing directions and taking 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 for the appointment of officers.

1.2 MANDATE AND OBJECTIVES

The future of our national food security system as well as the quality of life and livelihood of millions of our people will, to a large extent depend on our ability to conserve and utilize ground water resources in an environment friendly, economically efficient and socially equitable manner. On the basis of the principles of ecology, efficiency, economics and equity, mandate of the Board has been postulated below:

"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 data base 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 four full time Members namely, Member (Exploratory Drilling & Material Management), Member (Sustainable Management & Liaison), Member (Survey Assessment & Monitoring), Member (RGI) and Member (Training & Technology Transfer). 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.
2. The Joint Secretary & Financial Adviser, Ministry of Water Resources
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 post.

The Exploratory Drilling & Materials Management Wing broadly looks after the drilling and construction of Exploratory Tube wells and other types of bore holes required for assessment of aquifer parameters during ground water exploration. Other activities of this wing include monitoring of Stores, consumption and inventory for efficient and economic machine utilization, Procurement of drilling equipment, vehicles, instruments etc. This wing also looks for the need of improvement in drilling technology, design of abstraction structures, improvement of efficiency of pumps and other water lifting devices, maintenance and up keeping of drilling machinery and related equipment in the Board.

The Sustainable Management and Liaison Wing looks Aquifer Mapping for delineation & disposition of Aquifer Systems to develop aquifer management plan, augmentation of ground water resources including artificial recharge and monitoring of artificial recharge studies, It also undertakes studies related to recycling and reuse of ground water, urban ground water management, Drought management, Regulation of ground water development and model legislation, National Information System for ground water data collection, storage and retrieval, Planning and Programme formulation for ground water development including techno-economic studies, analysis and associated aspects of ground water development and technical examination of major, medium and minor Irrigation Projects.

The Survey, Assessment & Monitoring Wing has the responsibility of monitoring the works being done in ground water management studies, works related to monitoring of ground water regime and development and conjunctive use of surface and ground water for the entire country, aquifer mapping and assessment of aquifer characteristics based on exploration and surveys, hydrochemical analysis and studies, pollution studies, short

term water supply investigations, special ground water studies, preparation of hydrogeological maps, Atlases, Master plans, State reports, District reports, etc

The other activities of this wing include ground water balance studies, periodic assessment of ground water resources and potential, ground water zoning for guiding economic activity areas, rationalization of water rates, forecasting manpower, energy and financial requirements for ground water sector, site selection for Rajiv Gandhi National Drinking Water Mission, dissemination of data & information to various user agencies and publication of quarterly magazine "Bhujal News" by the Board.

The Training and Technology Transfer Wing of the Board is vested with the responsibility for laying the overall training policy, assessment of training needs, conceptualization of the training modules and the programme implementation strategy, identification of thrust area needing technology import from advanced sources, maintenance of effective liaison and interaction with voluntary agencies and Non Governmental Organisations and the other renowned national and international bodies for training and research purposes. The Member heading this wing also functions as the Principal of Rajiv Gandhi National Ground Water Training and Research Institute of the Board.

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

In order to achieve better results in the Water Resources Sector and have better coordination with the State Government departments, Central Ground Water Board had undertaken various studies in the above mentioned fields being monitored by four wings of the Board through
18 Regional Directorates, supported by 17 engineering divisions, 11 State Unit Offices for carrying out different investigations. The Board had a fleet of 87 rigs for taking up drilling operations during 2011-2012.

1.4 ACTIVITIES OF THE BOARD DURING 2012-13

National Project on aquifer management (NAQUIM) is the major activity of CGWB during 2012-2013 in XIIth Plan. CGWB has taken up National Project on Aquifer Management to formulate sustainable aquifer management plans with an objective of Delineation of Aquifer disposition in 3-D along with their characterization on 1:50,000 scale falling in the Over-Exploited, Critical and Semi-critical categories of assessment units as well as water quality and other problem/ vulnerable areas. The project also aims to formulate Aquifer Management Plan for facilitating sustainable management of ground water resources at regional and local level through participatory management approach with involvement of community and stakeholders.

Participatory ground water management is envisaged to take a significant step in ground water management at grass root level to enable the community and stake holders to monitor and manage the ground water as common pool resources themselves. This would require a coordinated effort involving state government departments, research institutes, PRIs, civil society organizations and the stakeholders at the village level who would guide collective sharing and use of groundwater based on a careful understanding of the storage and transmission characteristics of different aquifer units. Two levels of Programme implementation are envisaged, Programme facilitation and Participatory Outreach Programme for project delivery to the End User

The project is proposed to span over XII & XIII Plan periods. It is proposed to cover around 23.25 Lakh Km^2 mappable areas distributed over several States and Union Territories of the country. During the XII Plan an area of 8.89 lakh Km^2 is proposed to be covered under this project and remaining will be taken up during XIII Plan period.

In addition to National Aquifer Mapping Project other activities of CGWB during 2012-2013 period encompasses:

- Pilot Project on aquifer mapping
- Water Supply Investigations.
- Ground Water Regime Monitoring
- Rajiv Gandhi National Ground Water Training and Research Institute.
- Drilling of High Yielding Wells.
- Hydrology Project II (HP-II).
- Artificial Recharge studies.

- Regulation of Ground Water Development (Central Ground Water Authority)
- Ground water Studies in Drought Prone area.
- Ground water Studies in Tribal area.
- Estimation of Ground Water Resource.
- Technical Examination of Major /Medium Irrigation Schemes
- Organizing training of Central and State Government personnel.
- Technical Documentation and Publication of Maps & Reports
- Organizing Exhibitions, Seminars, Workshops etc.

2. NATIONAL PROJECT ON AQUIFER MANAGEMENT (NAQUIM)

Aquifer mapping is a process wherein a combination of geologic, geophysical, hydrologic and chemical field and laboratory analyses are applied to characterize the quantity, quality and sustainability of ground water in aquifers. There has been a paradigm shift from "groundwater development" to "groundwater management". An accurate and comprehensive micro-level picture of groundwater in India through aquifer mapping in different hydrogeological settings will enable robust groundwater management plans at the appropriate scale to be devised and implemented for this common-pool resource. This will help achieving drinking water security, improved irrigation facility and sustainability in water resources development in large parts of rural and urban India.

The aquifer mapping program is important for planning suitable adaptation strategies to meet climate change also. Thus the crux of NAQUIM is not merely mapping, but reaching the goal – that of ground water management through community participation. In this regards an EFC proposal for taking up National Aquifer Mapping is finalized for submission to MoWR,RD& GR.

The project is being implemented by Central Ground Water Board which is a subordinate office of Ministry of Water Resources, River Development and Ganga Rejuvenation Govt. of India.

A National Inter-Departmental Steering Committee (NISC) has been constituted as the apex body for overall guidance for the implementation of the Project at National level. Secretary, MoWR is the Chairman, with representatives from related Ministries like Science & Technology, Earth Sciences, Rural Development, Drinking Water & Sanitation, etc. The Principal Secretaries of the Nine States where ground water is substantially extracted are members of the NISC.

A Project Management Group (PMG) has been constituted to monitor and resolve implementation issues of NAQUIM within the Ministry under the Chairmanship of the Secretary (WR) which will be responsible for monitoring and guidance of the activities related to the Project implementation. The other members will be Special /Additional Secretary (WR), Joint Secretary (A), Joint Secretary & FA, MOWR and Chairman, CGWB. CGWB national program coordinator and project task manager will be supported by the Regional Offices.

The following sub-activities are performed to under the aquifer mapping project

1.1 Data compilation from CGWB and other agencies

2.2 Data gap analysis

2.3 Generation of additional data

2.3.1 Ground water exploration

2.3.2 Geophysical studies

2.3.3 Water quality studies

Objective

Broad objectives of the scheme are:

- Aquifer Mapping for Delineation of Aquifer disposition in 3-D along with their characterization on1:50,000 scale in 8.89 lakh sq.km. and further detailing up to 1:10,000 scale in limited areas falling in the Over-Exploited, Critical and Semi-critical categories of Assessment units as well as water quality and other problem/ vulnerable areas.
- Quantify water availability and water quality parameters to formulate Aquifer Management Plan for facilitating sustainable management of ground water resources at regional and local level through participatory management approach with involvement of community and stakeholders.
- Regulate and control the development and management of ground water resources.

Areas identified for aquifer mapping for delineation and disposition of 3-D along with their characterization on 1:50000 scale are given in table2.1 that include areas falling in over exploited, critical and semi critical categories of Assessment units as well as water quality and other vulnerable areas.

Table 2.1: AREA IDENTIFIED FOR AQUIFER MAPPING DURING XIITH PLAN									
S.No	State	Year wise Area (Sq. Km)						Area to be covered during XII plan	Concurrence of State Government (Y/N)
		2012-13*	2013-14*	2014-15	2015-16	2016-17	Total **		
1	ANDAMAN AND NICOBAR	1348	0	0	0	0	1348	1500	N
2	ANDHRA PRADESH	2369	1923	10129	18813	28616	61850	100000	Y
3	ARUNACHAL PRADESH	1000	100	0	927	0	2027	2027	Y
4	ASSAM	1550	3900	185	0	0	5635	5600	Y
5	BIHAR	128	1236	2351	2046	1843	7604	7400	Y
6	CHANDIGARH	0	0	115	0	0	115	114	Y
7	CHHATTISGARH	1252	1740	1604	3159	3968	11723	11500	Y
8	DADRA AND NAGAR HAVELI	0	0	0	490	0	490	491	Y
9	DAMAN AND DIU	0	0	112	0	0	112	112	Y
10	DELHI	0	1483	0	0	0	1483	1483	NR
11	GOA	0	0	516	507	427	1450	1500	Y
12	GUJARAT	3000	4500	11948	18122	44024	81594	83000	Y
13	HARYANA	1640	16224	6347	3235	14444	41890	42000	Y
14	HIMACHAL PRADESH	1952	1008	1517	1695	1488	7660	7600	Y
15	JAMMU AND KASHMIR	6058	4000	100	249	83	10490	9656	Y
16	JHARKHAND	1419	1473	1403	1369	701	6365	6300	Y
17	KARNATAKA	3635	4249	16195	21747	47483	93309	93000	Y
18	KERALA	1420	1547	827	1406	0	5200	5200	Y
19	LAKSHADWEEP	0	0	32	0	0	32	32	Y
20	MADHYA PRADESH	4200	4813	6714	21289	32892	69908	69200	Y
21	MAHARASHTRA	1359	3850	5967	9172	22219	42567	43000	Y
22	MANIPUR	0	0	155	0	539	694	700	Y
23	MEGHALAYA	600	1000	0	0	200	1800	1800	Y
24	MIZORAM	0	0	700	0	0	700	700	Y
25	NAGALAND	400	0	0	394	0	794	700	Y
26	ORISSA	238	1643	2411	3751	8457	16500	16500	Y
27	PUDDUCHERY	139	0	293	0	0	432	479	Y
28	PUNJAB	2160	2160	7292	12270	24647	48529	49000	Y
29	RAJASTHAN	6405	4000	20925	34929	75386	141645	142400	Y
30	SIKKIM	750	0	0	0	0	750	800	NR
31	TAMIL NADU	2195	4640	10576	15956	36303	69670	68206	Y
32	TELANGANA	2967	3082	4974	8647	18571	38241		Y
33	TRIPURA	0	0	559	0	2975	3534	3500	Y
34	UTTAR PRADESH	2700	16425	13080	13087	45482	90774	90800	Y
35	UTTRAKHAND	4000	3000	811	0	0	7811	7700	N
36	WEST BENGAL	1399	2551	2282	2293	5853	14378	15000	Y
	Grand Total (Sq. Km)	**56283**	**90547**	**130120**	**195553**	**416601**	**889104**	**889000**	
	Area Proposed for Aquifer Mapping as per EFC (Lakh sq km)	0.54	0.54	1.3	1.95	4.56	8.89		
	* Area already taken up for aquifer mapping								
	** Area covered during 2012-13 and 2013-14 included								

d

f

existing data, Data Gap Analysis, Generation of additional data and Preparation of Aquifer Plan. Each activity has numbers of sub-activities and tasks and is carried out as per detail protocol for implementation.

Each activity has numbers of sub-activities and tasks and is carried out as per detail protocol for implementation.

2.1 Data compilation

The procurement of hard copy of toposheets from Survey of India have been done for Togographical, geological, soil, geomorphologic and other maps for an area of 146908 lakhsq. Km. during the year 2012-13.

In respect of data compilation, against a target of Data base on Exploration wells – 160307 Sq.km, Analysis of Geological data, Geophysical Data, Hydrological Data, Geochemical Data , Hydrogeological Data, Preparation of composite Lithologs - 168307Sq.Km., Delineation of principal aquifers-(Vertical and Lateral) – 128007 Sq.Km., Aquifer Wise Water Level Data- 117912 Sq.Km., Aquifer Wise Draft Data – 36206 Sq.Km. have been completed. The details are shown in table 2.2.

Table 2.2: Compilation of existing data

TASK	Units	Target (2012-13)	Achievement (2012-13)
Procurement of Digital Toposheets (1:50,000 scale) from SOI	Area in lakh sq.km	-	-
Procurement of Hard copy (Topographical, Geological, Soil, Geomorphological and other maps)	Area in lakh sq.km	1.4	1.4
Data base on Exploration wells	Area in lakh sq.km	1.6	1.6
Compilation of information of Geology, Geophysics, Hydrogeology, Geochemical, Hydrology	Area in lakh sq.km	1.7	1.7
Delineation of principal aquifers (Vertical & Lateral)	Area in lakh sq.km	1.3	1.3
Compilation of Aquifer wise Water Level data	Area in lakh sq.km	1.2	1.2
Compilation of Aquifer wise Draft Data	Area in lakh sq.km	0.36	0.36

2.2 Data gap Analysis:

Data Gap Analysis, in respect of Geology, Geophysics, Hydrogeology, Geochemical Data and Hydrology is 118492 sq km has been identified. Delineation of Principal Aquifers by exploration-118492 Sq.Km. Aquifer Wise Water Level Data – 137392 Sq.Km. and Aquifer Wise Draft Data – 126212 Sq.Km. has been identified as shown in table 2.3

Table 2.3: Identification of Data Gap

Sl. No	SUB ACTIVITY	Units	Target (2012-13)	Achievement (2012-13)
1	Data gap in information on Geology, Geophysics, Hydrogeology, Geochemical, Hydrology	Area inlakh sq.km	1.1	1.1
	Data gap in delineation aquifers by Exploration (Vertical & Lateral)	Area inlakh sq.km	1.23	1.23
2	Gap in Aquifer wise Water Level data	Area in lakh sq.km	1.4	1.4
3	Data gap in Aquifer wise Draft Data	Area in lakh sq.km	1.3	1.3

2.3 Generation of additional data:

For generation of additional data, fieldwork is initiated in 54,000 Sq.Km through in-house resources of CGWB in year 2012-13. Activities of ground water management studies viz; exploratory drilling, geophysical surveys, chemical quality studies and micro-level hydrogeological surveys are taken up during the year for value addition to aquifer maps The achievement for additional data generation are given in table 2.4

Table2.4: Generation of Data

SUBACTIVITY	TASK	Units	Target (2012-13)	Achievement (2012-13)
II A. Generation of Geological & Geomorphological layers in1: 50,000 scale	Preparation of Geological Map	Area in lakh sq.km	0.3	0.3
	Preparation of Sub-surface Geology	Area in lakh sq.km	0	0
	Geomorphological Analysis	Area in lakh sq.km	0	0
	Analysis of Land use pattern	Area in lakh sq.km	0	0
II.B. Surface and sub-surface geoelectrical and gravity data generation	Vertical Electrical Sounding (VES)	Nos	2217	2217
	Bore Hole Logging	Nos	55	55
	2-D Imaging	Line Km	-	-
	Ground TEM	Nos	-	-
	Heliborne TEM & Gravity	Line Km	-	-
II.C. Hydrological information & Parameters on Ground water recharge	Preparation of Drainage Map	Area in lakh sq.km	0.54	0.54
	Demarcation of water bodies	Area in lakh sq.km	0.54	0.54
	Soil Infiltration studies	Nos	73	73
	Rainfall data analysis for estimation of recharge to ground water	Area in lakh sq.km	0.54	0.54
	Canal flow, impact of recharge structures analysis, rainfall analysis, surface water – ground water interaction studies etc.	Area in lakh sq.km	0.54	0.54

II-D Generation of Hydrogeological data for Preparation of Hydrogeological maps in 1: 50,000 scale	Water Level Monitoring(No of stations* frequency)	Nos	10000	10000
	Exploratory drilling including Pumping test	Nos	842	842
	Slug Test	Nos	71	71
	Specific Yield test	Nos	21	21
	Micro level sub-surface hydrogeological data from existing wells	Nos	4571	4571
II.E. Generation of additional water quality parameters	Analysis of Groundwater for major anion & cat ions, heavy metals & general parameters, industrial pollutions studies etc.	Nos	11046	11046
	Analysis of Groundwater for pesticides, Bacteriological contamination and As, F in Groundwater	Nos	1993	1993
	Carbon dating		-	-
	Isotopic Studies	Nos	167	167
	Core Drilling for geochemical studies	Nos	-	-

2.3.1 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 conditions 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 capabilities in various hydrogeological settings. These studies have helped in identifying areas worthy for further ground water development. Ground Water Exploration contributes to a large extent in guiding the States to implement ground water development schemes.

Ground Water Exploration is being carried out to study the sub-surface hydrogeological setup and to evaluate various aquifer parameters of different aquifer systems. The entire exercise is aimed at quantitative & qualitative evaluation of ground water in the area. It is being carried out by the Board through a fleet of 87 drilling rigs (33 Direct Rotary, 41 Down the Hole and 13 Percussion Combination types).

During the year 2012- 13 (up to 31st March, 2013), the Central Ground Water Board under their Ground water Exploration programme, constructed 664 wells (EW-446, OW-140, PZ-77, SH-1). Priority was accorded to tribal areas, drought affected areas, hard rock areas, pollution affected areas etc. Out of 664 bore wells constructed, 492 wells, 160 wells and 12 wells were constricted in hard rock, alluvium and boundary formation respectively. 163 wells and 124 wells were constructed for exploration in tribal and drought prone areas respectively. The statement showing State and Division wise distribution of boreholes drilled/completed during 2012-2013 in the country is presented in Table 2.5 & Table 2.6. Ground water development work carried out pilot project area is shown in Fig 2.4 & 2.5. Region wise & Division wise status of bore holes drilled during 2012-2013 is shown as graph in fig. 2.3.

The Board has drilled a total of 32231 bore holes (including 3023 bore holes through outsourcing) as on 31.03.2013 to identify areas for ground water development in the country. The statement showing State-wise distribution of boreholes drilled/completed till March, 2013 in the country is presented in Table 2.5 and 2.6.

Fig 2.1 Well development at Ayekuppam site, Cuddalore dist (Exploratory Drilling at Pilot Project site – lower velar water shed)

Fig 2.2 Ground Water Exploration at Pilot Project in Chandrabhaga Watershed, Nagpur District

(AQMAH) District

Table 2.5: State-wise wells constructed by Central Ground Water Board during the year 2012 -2013

S.No.	STATE/ UT	NORMAL					
		EW	OW	PZ	SH	DW	Total
1	Gujarat	28	3	3	1	0	**35**
2	Haryana	1	2	5	0	0	**8**
3	Punjab	6	5	3	0	0	**14**
4	Delhi	0	0	0	0	0	**0**
5	Uttar Pradesh	21	9	0	0	0	**30**
6	Tamil Nadu	22	3	19	0	0	**44**
7	Kerala	12	4	0	0	0	**16**
8	Bihar	4	8	0	0	0	**12**
9	Jharkhand	17	4	0	0	0	**21**
10	Maharashtra	57	18	0	0	0	**75**
11	Assam	7	5	0	0	0	**12**
12	Arunachal Pradesh	2	0	0	0	0	**2**
13	Meghalaya	8	0	0	0	0	**8**
14	Nagaland	2	0	0	0	0	**2**
15	Jammu & Kashmir	5	1	5	0	0	**11**
16	Andhra Pradesh	32	12	0	0	0	**44**
17	Orissa	47	12	12	0	0	**71**
18	Rajasthan	32	8	20	0	0	**60**
19	Madhya Pradesh	43	22	0	0	0	**65**
20	Chattisgarh	21	6	9	0	0	**36**
21	Karnataka	45	5	0	0	0	**50**
22	Kerala	6	2	0	0	0	**8**
23	West Bengal	14	3	0	0	0	**17**
24	Uttarkhand	0	0	1	0	0	**1**
25	Uttar Pradesh	7	7	0	0	0	**14**
26	Himachal Pradesh	7	1	0	0	0	**8**
TOTAL		**446**	**140**	**77**	**1**	**0**	**664**

Table 2.6: Division wise wells constructed by central ground water board during the year 2012-2013

S. No.	DIVISION	EW	OW	PZ	SH	DW	Total
1	I- AHMEDABAD	28	3	3	1	0	35
2	II- AMBALA	7	7	8	0	0	22
3	III- VARANASI	21	9	0	0	0	30
4	IV- CHENNAI	34	7	19	0	0	60
5	V- RANCHI	21	12	0	0	0	33
6	VI-NAGPUR	57	18	0	0	0	75
7	VII-GUWAHATI	19	5	0	0	0	24
8	VIII- JAMMU	5	1	5	0	0	11
9	IX-HYDERABAD	32	12	0	0	0	44
10	X- BHUWANESWAR	47	12	12	0	0	71
11	XI- JODHPUR	32	8	20	0	0	60
12	XII BHOPAL	43	22	0	0	0	65
13	XIII- RAIPUR	21	6	9	0	0	36

14	XIV- BANGALORE	51	7	0	0	0	58
15	XV- KOLKATA	14	3	0	0	0	17
16	XVI- BAREILLY	7	7	1	0	0	15
17	XVII- DHARAMSALA	7	1	0	0	0	8
TOTAL		**446**	**140**	**77**	**1**	**0**	**664**

Table 2.7 STATUS OF BORE HOLES DRILLED BY C.G.W.B AS ON 31.03.2013.

S No.	STATE/UT	EW	OW	PZ	EW	OW	PZ	SH	DW	Total	TOTAL (I + II)
		(I) Through Outsourcing (Contractual)			(II) Through Departmental Rigs						
A.	**STATES**										
1	Andhra Pradesh	90			1310	813	665	14	31	2833	**2923**
2	Arunachal Pradesh				34	5		1	1	41	**41**
3	Assam				376	170	58	16	42	662	**662**
4	Bihar				292	180	74	10	514	1070	**1070**
5	Chhattisgarh	300		105	638	193	152		28	1011	**1416**
6	Goa				58	18	14		31	121	**121**
7	Gujarat	165			962	452	498	25	255	2192	**2357**
8	Haryana	21	2	80	379	257	217	23	170	1046	**1149**
9	Himachal Pradesh				198	12	3	1		214	**214**
10	Jammu & Kashmir	21			343	70	36	8	114	571	**592**
11	Jharkhand	82	8		326	159	35	4	71	595	**685**
12	Karnataka	120			1298	623	353	7	5	2286	**2406**
13	Kerala	10			465	163	231	16	13	888	**898**
14	Madhya Pradesh	364	8	80	1009	650	176	8	149	1992	**2444**
15	Maharashtra	80		88	1243	462	160	2	166	2033	**2201**
16	Manipur				25	11			2	38	**38**
17	Meghalaya				92	24	2	2	8	128	**128**
18	Mizoram				3	3				6	**6**
19	Nagaland				12	4			3	19	**19**
20	Orissa	439		67	1403	329	130	21	191	2074	**2580**
21	Punjab	19	3		182	196	85	20	14	497	**519**
22	Rajasthan	225			1156	412	523	93	591	2775	**3000**
23	Sikkim	0			31	9				40	**40**
24	Tamil Nadu	110		179	964	369	248	13	93	1687	**1976**
25	Tripura				60	26		4	22	112	**112**
26	Uttarakhand				59	6	1	1	129	196	**196**
27	Uttar Pradesh	245	12		871	583	169	40	501	2164	**2421**
28	West Bengal			100	457	218	170	12	82	939	**1039**
TOTAL(A)		**2291**	**33**	**699**	**14246**	**6417**	**4000**	**341**	**3226**	**28230**	**31253**
B.	**UNION TERRITORIES**										
1	Andaman & Nicobar				46	13		1		60	**60**
2	Chandigarh				7	17	14	2	15	55	**55**
3	Dadra & NagarHaveli				12	1				13	**13**
4	Delhi				149	64	160	13	380	766	**766**
5	Daman & Diu						7			7	**7**
6	Pondicherry				30	20	8	5	14	77	**77**
TOTAL(B)		**0**		**0**	**244**	**115**	**189**	**21**	**409**	**978**	**978**
GRAND TOTAL(A+B)		**2291**	**33**	**699**	**14490**	**6532**	**4189**	**362**	**3635**	**29208**	**32231**

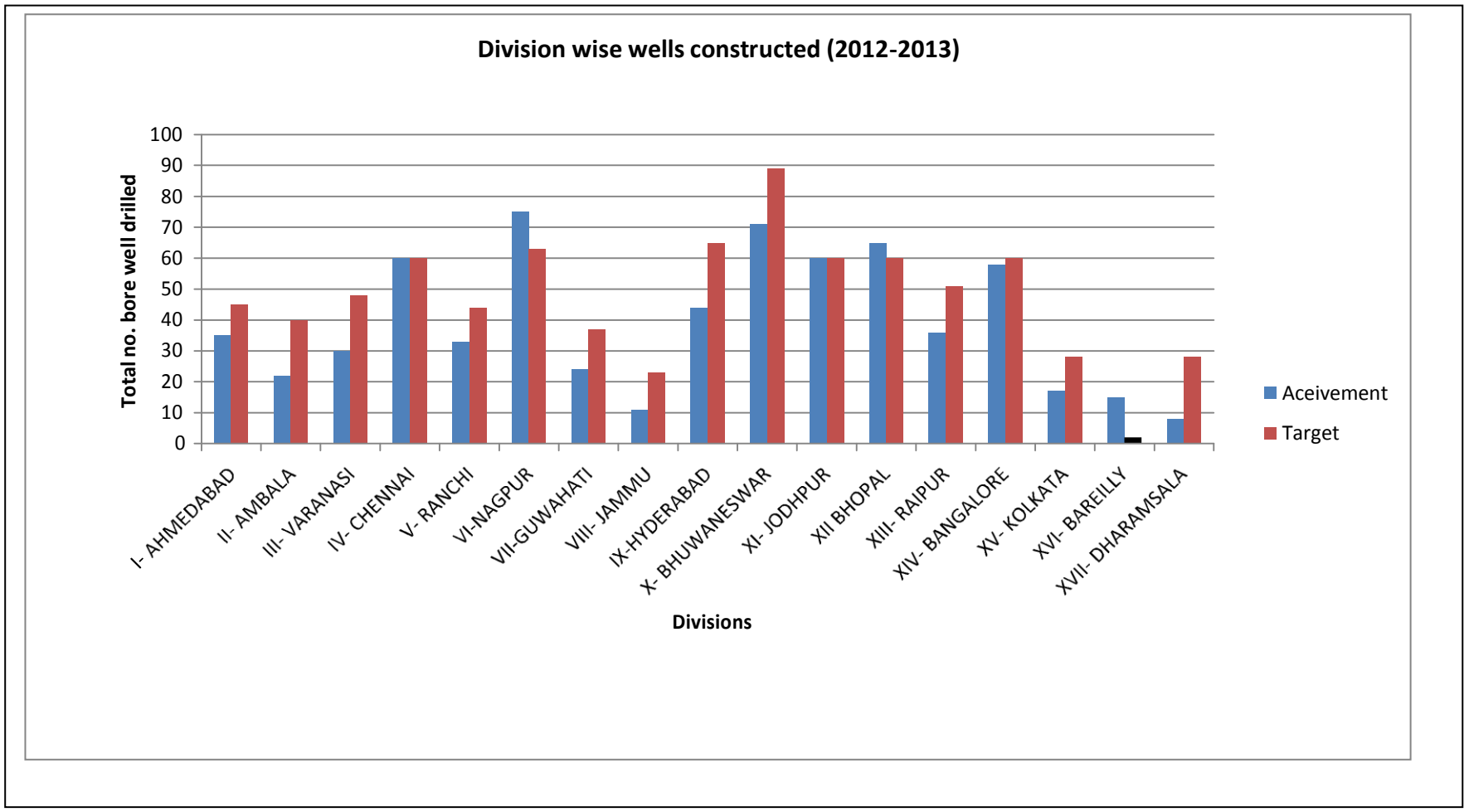

Fig 2.3 Showing Division wise status of Ground Water Exploration during 2012-13

2.3.1.1. DEVELOPMENTS 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 characteristics i.e. Transmitivity, storage co-efficient and well characteristics 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. The Board has got the capacity of conducting 175 to 200 pumping tests per annum with the existing infrastructure facilities. With the increasing drilling activities, the Board is conducting, on an average, about 400 pumping wells every year, which have resulted in backlog of pumping tests. Procurement action has been initiated in the Board to equip each rig unit with adequate pumping test units. However, in spite of constraints faced by the Board in this aspect, a total of 251 wells were developed and tested during the year 2012-2013. Region wise achievement has been presented in Table 2.8

Table 2.8: Region wise/State wise Pumping Tests Conducted in the Year 2012 – 2013

Sr. No.	Regions	State/ Union Territories	No of wells tested during 2011--12 Upto March,2012		
			No. of E. wells constructed during 2011-12 and tested	No. of E. wells constructed in earlier Year and tested	Total No. of wells tested
1	NWHR, Jammu	Jammu & Kashmir	1	3	4
2	NWR,Chandigarh	Haryana	0	0	0
		Punjab	0	2	2
		Delhi	0	0	0
3	WR, Jaipur	Rajasthan	33	2	11
4	WCR, Ahmedabad	Gujrat	0	2	2
5	NCR, Bhopal	Madhya Pradesh	1	9	10
6	NCCR, Raipur	Chhattisgarh	19	28/5	4
7	CR, Nagpur	Maharashtra	8/47	03	58
8	NR, Lucknow	Uttar Pradesh	0	0	0
9	MER, Patna	Bihar	2	9	9
		Jharkhand	0	0	0
10	ER,Kolkata	West Bengal	8	18	26
11	NER, Guwahati	Assam	0	9	9
		Arunachal Pradesh	0	0	0
		Meghalaya	0	0	0
		Tripura	0	0	0
12	SER ,Bhubneswar	Orissa	17	5	0
13	SR, Hyderabad	Andhra Pradesh	5	10	15
14	SWR, Bangalore	Karnataka	2	3	5
15	SECR, Chennai	Tamilnadu	46	25/7	7
16	KR, Kerala	Kerala	18	4	
17	NHR, Dharamshala	Himachal Pradesh	3	3	6
18	UR, Dehradun	Uttarakhand	0	0	0
TOTAL			**163**	**94**	**251**

2.3.1.2 TAKING OVER OF WELLS BY STATES

Exploratory Wells

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 2013, a total of 14490 wells have been drilled, out of which 11488 successful exploratory wells were offered for handed over and only 5909 wells have so far been accepted /taken over by State Governments while 4324 successful wells are yet to be accepted/ taken over by them and only 1255 successful wells to be offered. The status of handing over of exploratory wells drilled by Central Ground Water Board to the State Government as on 31-03-2013 is presented in table 2.9.

Table 2.9: Handing over of wells drilled by CGWB (As On 31.03.2013)

S.No.	States/Union Territories	Total 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	1310	949	740	140	68
2	Arunachal Pradesh	34	30	14	3	13
3	Assam	376	323	124	88	110
4	Bihar	292	235	89	144	4
5	Chhattisgarh	638	574	199	311	51
6	Goa	58	49	0	49	0
7	Gujarat	962	639	431	104	96
8	Haryana	379	212	145	55	12
9	Himachal Pradesh	198	184	85	70	27
10	Jammu & Kashmir	343	274	169	77	28
11	Jharkhand	326	271	100	155	16
12	Karnataka	1298	1137	471	489	172
13	Kerala	465	343	262	53	28
14	Madhya Pradesh	1009	681	492	144	45
15	Maharashtra	1243	1039	794	189	55
16	Manipur	25	15	14	0	1
17	Meghalaya	92	83	15	26	43
18	Mizoram	3	3	3	0	0
19	Nagaland	12	8	5	1	2
20	Orissa	1403	1338	405	844	79
21	Punjab	182	156	79	71	6
22	Rajasthan	1156	852	258	544	50
23	Sikkim	31	10	6	0	4
24	Tamil Nadu	964	711	511	162	51
25	Tripura	60	54	36	12	6
26	Uttarakhand	59	46	24	10	16

27	Uttar Pradesh	871	697	194	344	181
28	West Bengal	457	404	153	190	61
TOTAL(A)		**14246**	**11317**	**5818**	**4275**	**1225**
B. UNION TERRITORIES						
1	Andaman & Nicobar	46	12	0	10	2
2	Chandigarh	7	7	6	0	1
3	Dadra & NagarHaveli	12	8	8	0	0
4	Delhi	149	131	64	39	27
5	Pondicherry	30	13	13	0	0
Total(B)		**244**	**171**	**91**	**49**	**30**
GRAND TOTAL(A+B)		**14490**	**11488**	**5909**	**4324**	**1255**

2.3.2. GEOPHYSICAL STUDIES

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 as a practice are combined with the hydro geological and geomorphologic investigations to place them on firm footing. The techniques have become an integral part of the ground water exploration programme.

The geophysical techniques in vogue have been used under all types of geological and geographical settings that the country is bestowed with, i.e., Archaean to Recent formation containing aquifers in the hilly terrain, piedmont areas, sprawling plains and plateau, deserts and coastal tracts. The techniques have been used to assess the disposition of capable aquifers under vulnerable conditions as interspersed with saline zones and the encroachment of saline and polluted water.

An effective and wide application has been made of the conventional surface electrical resistivity technique for source finding and of borehole geophysics for well construction. These surveys were undertaken to support, supplement and corroborate the hydrogeological surveys, ground water exploration and short-term water supply investigations as an integral manually and computer software like 'SCHLUM and IPI2WIN etc., The field VES data along with the interpreted results were also entered in GEMS.These surveys were mostly carried out with an objective of selecting, pinpointing the sites and delineating the depth to potential water bearing zones in ground water exploration and short-term water supply investigations.

Besides, geophysical surveys were also undertaken for demarcating saline-fresh water interface, Coastal aquifer management studies, estimation of overburden thickness and bedrock configuration, identifying favourable sites for artificial recharge structures as well as snow harvesting sites in Himachal Pradesh, flood plain studies and in farmer distress villages etc. The resistivity survey results were analyzed and interpreted for delineating the depth and thickness of ground water potential zones. The interpreted results of the Vertical Electrical Sounding (VES) conducted near the exploratory wells were correlated with the lithologs to establish the resistivity ranges for different formations. The field VES data has been entered in computer software for easy analysis, retrieval, presentation and dissemination and was analysed both

Central Geophysical Cell

The Main functions of the Central Geophysical Cell are Planning & Programming of Geophysical surveys in CGWB, finalization of AAP of different Regions for geophysical investigation and monitoring of progress of geophysical work. Work was carried by the geophysical cell in the current year involved:

- Acquisition of geophysical equipments, drawing of Specifications and organizing performance testing of Geophysical equipments. Several meetings of the Technical Committee with the committee members from NGRI, GSI to formulate the specifications for the geophysical equipment Southern Region, and Hyderabad were convened.
- Repairs/servicing of logger stationed at Central Region, Nagpur was under taken and the calibration of the equipment was demonstrated to the local Geophysicists.
- Discussions with the ONGC officials at Rajahmundry and collected data pertaining to oil well logs so as to decipher the deep water bearing formations for the future exploration.

GEOPHYSICAL SURVEYS AT A GLANCE

Geophysical studies are undertaken as an integral part of aquifer mapping and short-term water supply investigations. During 2012-13 up to 31st March, 2014, 1839 Vertical Electrical Soundings, 67.07 line kilometre resistively profiling and geophysical logging of 83 bore holes have been conducted in various parts of the country (Figure 2.4,2.5 2.6 2.7 and 2.8) Details of Geophysical surveys & bore hole logging as carried out in different regional offices are given in Table 2.10.

Table 2.10: Geophysical Surveys & Bore Hole Logging During 2012-2013

Region	No. of VES	Resistivity Profiles (line km)	No. of boreholes logged
NWHR, Jammu	75	-	5
NWR, Chandigarh	108	-	14
WR, Jaipur	48	-	-
WCR, Ahmedabad	17	-	6
NCR, Bhopal	150	0.60	32
NCCR, Raipur	152	0.30	-
CR, Nagpur	150	-	-
NR, Lucknow	15	-	3
MER, Patna	141	52.97	4
ER, Kolkata	164	-	-
NER, Guwahati	78	-	1
SER, Bhubaneswar	66	-	4
SR, Hyderabad	347	7.2	2
SWR, Bangalore	189	6.0	2
SECR, Chennai	139	-	10
KR, Trivendrum	-	-	-
Total	**1839**	**67.07**	**83**

Fig 2.4 Geophysical survey carried out in Nalanda district, Patna

Fig 2.5 Resistivity Surveys at SM Pur, District: Jammu (J&K).

Fig 2.6 Geophysical survey (VES) at Pilot Project study site (Lower velar water

Fig 2.7 Resistivity Surveys at SKUAST, Kargil district (J&K)

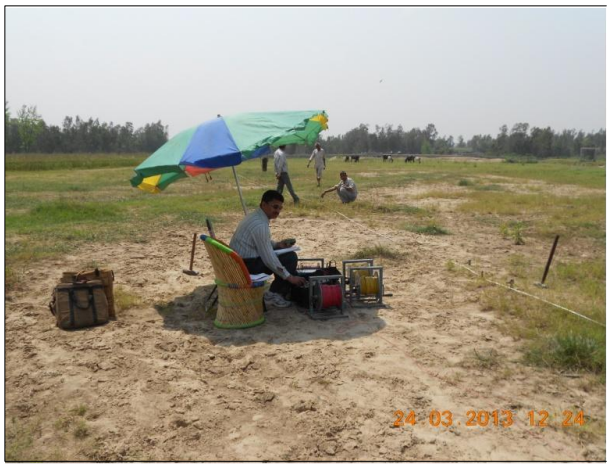

Fig 2.8 Resistivity Surveys at Ibrahimpur, District: Haridwar (UK)

2.3.3 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 2012-2013, a total number of 21132 water samples have been analyzed for determination of basic constituents. Analysis of 1572 organic parameters was carried out in 131 number of samples under specific studies.3721 water samples were analysed for the determination of Trace elements like As, Cd, Co, Cr, Cu Fe, Mn, Ni, Pb and Zn (10510 Constituents). 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. The details of water samples analyzed by different Chemical Laboratories during 2012-2013 are presented in table 2.11

In general groundwater quality is good in hard rock areas occupying hilly part. In soft rock and unconsolidated formations ground water quality is variable. The quality of groundwater deteriorates in discharge area. The deterioration in groundwater quality in the coastal areas is mainly due to overdrawals causing seawater ingress which needs to be arrested. The chemical weathering of rock-forming minerals are influencing the groundwater quality by dissolution. Natural levels of nitrate in some location of State's ground waters are quite high as compared to desirable BIS limit (45 mg/l). High nitrate concentration recorded at many places may be attributed to agricultural & domestic pollution.

Radon analysis was carried out during AAP 2012-13 at SWR Bangalore Region office. During April 2012, totally 11 water samples were collected from Mysore (04no.) and Chamarajnagar (07no.) districts of Karnataka. 10 water samples were showing the radon content within its permissible limit of 11.1 Bq/l, except one sample at Arasthodi, (28.7 bq/l) of Chamarajnagar district. During May 2012, 22 samples were collected in Tumkur district from bore wells with value ranging from 4.86 Bq/l to 253 Bq/l. The highest value of 253 Bq/l was observed at Thumpadi. 20 samples were above maximum concentration level of 11.1 Bq/l. Though, presence of Radon in ground water is above permissible limit, this is not a cause of concern as the half life of radon is 3.8 days, and the usage of ground water subsequent to storage will not have serious health implications.

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 trained man power on chemical analysis, interpretation and validation of data on water chemistry.

Table 2.11: Region-wise Water Samples Analysis during 2012-2013

Regions	Basic analysis		Specific analysis		Trace metal		Total
	Samples	Constituents	Samples/Organic	Constituents	Samples	Constituents	
NWHR*	641	8333	377	377	11		1029
NWR*	1155	12404	72	-	102	409	1334
WCR	879	14064	-	-	485	835	1364
WR	1271	21270	-	-	60	470	1331
NCR	1410	15796	62	806	249	833	1721
NCCR	880	11440	-	-	-	-	880
CR	493	5485	-	-	-	-	493
NR	1708	20250	220	2365	1397	2628	3325
ER	607	8685	378	741	93	837	1078
MER	891	9149	-	-	406	712	1297
NER	112	1438	-	-	118	118	330
SER	1238	6898	-	-	-	-	1238
SR	1441	18113	28	84	44	331	1513
SWR	589	7657	482	2410	367	797	1675
SECR	988	12844	-	-	66	528	1054
KR	646	8143	-	-	48	432	694
UR**(Analysed at NWR Lab)	435	4830	-	-	138	758	573
NHR**	37	518	-	-	-	-	31
SUO Delhi** (Analysed at NWR Lab)	35	455	-	-	137	822	172
TOTAL	15421	187772	1619	6783	3721	10510	21132

* The samples of UR & SUO Delhi analysed by NWR Lab and samples of NHR analysed at NWHR Lab. ** Regions don't have their own chemical laboratory, samples analyzed at other Regional chemical laboratories.

Other activities of CGWB during 2012-13 period encompasses

3. PILOT PROJECT ON AQUIFER MAPPING

CGWB has undertaken Pilot Project on Aquifer Mapping under World Bank funded Hydrology Project-II in six different hydrogeological terrains covering parts of states of Bihar, Rajasthan, Maharashtra, Karnataka and Tamil Nadu. The project is under progress and being implemented in six different hydrogeological environments of the country as given below.

1. Alluvium overlying hard rocks in Baswa-Bandikui, Dausa District, Rajasthan (AQRAJ)
2. Part of Thar Desert Terrain in Jaisalmer District, Rajasthan (AQDRT)
3. Alluvial plains of Ganga basin in Watershed GNDK013, Patna District, Bihar (AQBHR)
4. Basaltic traps underlain by Gondwanas in Watershed WGKKC-2, Nagpur District, Maharashtra (AQMAH)
5. Crystalline rocks in Parts of Tumkur District, Karnataka (AQKAR)
6. Coastal sediments in Lower Vellar Watershed, Cuddalore District, Tamil Nadu (AQTND).

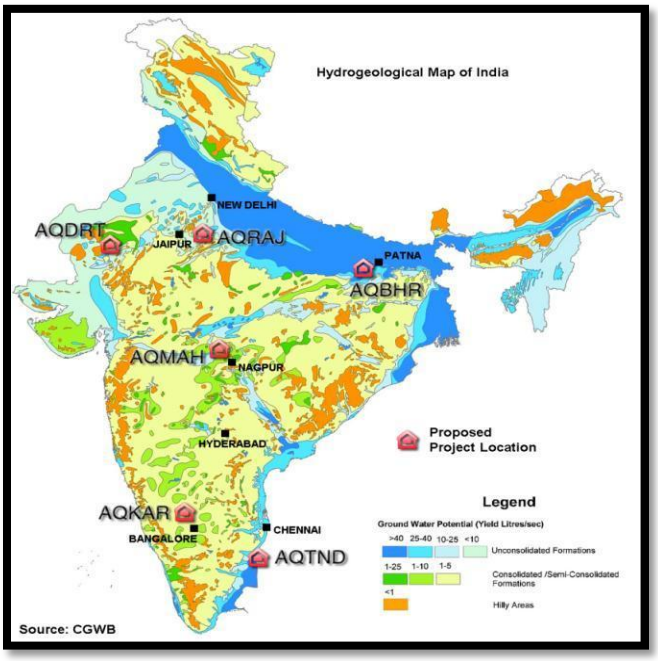

Fig 3.1: Project Location of Pilot Project of Aquifer Mapping

In this year of the project, contract agreement between CGWB and NGRI has been signed on 21-05-12 for Aquifer Characterization using advanced geophysical techniques and to establish the efficacy of various geophysical techniques for different Hydrogeological terrains with a cost provision of Rs 2740.54 Lakhs. NGRI will apply 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.

The activities can be 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. Compilation of existing data and identification of data gap completed and comprehensive background report prepared. Various thematic layers have been prepared. Infiltration test has been conducted. Conceptualization of aquifer system with existing data has been completed.

Data generation is under progress. Additional monitoring wells have been established in the pilot areas and monthly monitoring of water level in these wells has been completed up to March, 13. NGRI has completed first phase (50%) of Surface Geophysical investigations including VES, TEM and ERT. NGRI has signed a MoU with Aarhus University, Denmark on 15.10.12 for Heliborne TEM survey using SkyTEM. Regarding Hiring of Helicopter for Heliborne survey, contract has been awarded by NGRI.

During 2012-13, 15 Exploratory Wells have been completed through departmental rigs in pilot project areas of Bihar & Tamil Nadu and for construction of 60 nos. of wells through outsourcing in pilot project areas of Maharashtra, Karnataka & Rajasthan; work order has been issued to firms.

4. WATER SUPPLY INVESTIGATIONS

The Board provides assistance to defence and Govt. agencies establishments to solve their immediate water supply problems by selecting suitable sites for construction of ground water abstraction structures. During 2012-13, 120 Water Supply Investigations were carried out and region wise/state wise status is given in table 4.1 and fig. 4.1.

Table 4.1: Region/State wise Water Supply Investigations taken up during 2012-2013

Sl. No	Regions	States	Number of Water Supply Investigations
1	**NORTHERN WESTERN HIMALAYAN REGION**	Jammu & Kashmir	7
2	**NORTHERN HIMALAYAN REGION**	Himachal Pradesh	1
3	**NORTH WESTERN REGION**	Punjab	10
		Haryana	7
		Chandigarh	1
4	**WESTERN REGION**	Rajasthan	6
5	**NORTHERN REGION**	Uttar Pradesh	5
6	**UTTARANCHAL REGION**	Uttaranchal	4
7	**EASTERN REGION**	West Bengal	7
8	**NORTH CENTRAL REGION**	Madhya Pradesh	1
9	**MID EASTERN REGION**	Bihar	1
		Jharkhand	4
10	**NORTH EASTERN REGION**	Assam	35
		Arunachal Pradesh	1
		Mizoram	1
		Meghalaya	1
11	**SOUTERN REGION**	Andhra Pradesh	5
12	**SOUTH WESTERN REGION**	Karnataka	11
13	**SOUTH EASTERN COASTAL REGION**	Chennai	2
14	**KERALA REGION**	Kerala	3
15	**DELHI**	Delhi	4
16	**CENTRAL REGION**	Maharashtra	3
		Total	**120**

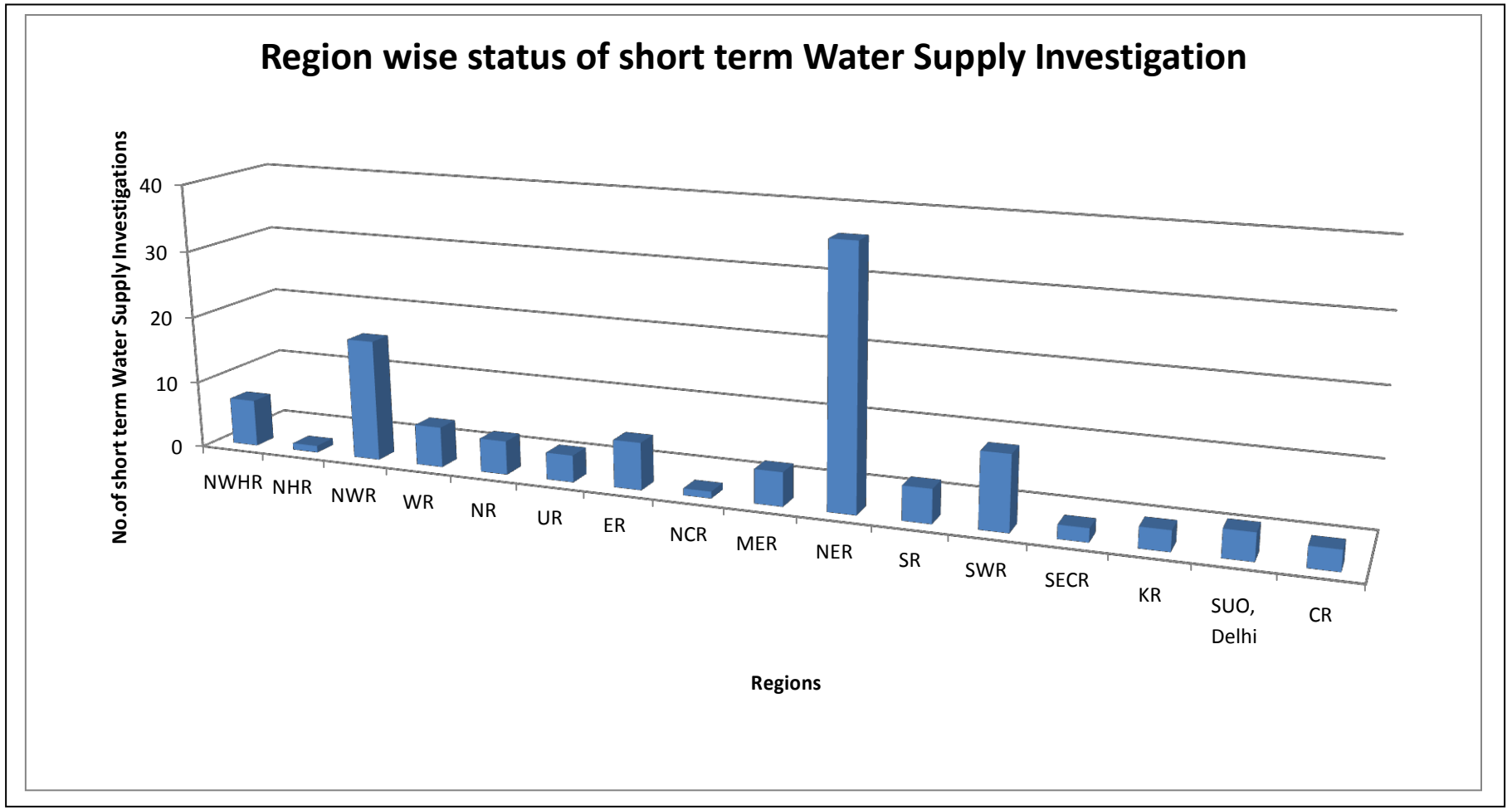

Fig 4.1 Showing Short term Water Supply Investigations during 2011-2012

5. GROUND WATER REGIME MONITORING

5.1 INTRODUCTION

Monitoring of ground water regime is an effort to obtain information on ground water levels 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 involve 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 15653 observation wells located all over the country is being monitored. Ground water samples are collected from these 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. The ground water level and quality monitoring is of particular importance in coastal as well inland saline environment to assess the changes in salt water/fresh water interface as also the gradual quality changes in the fresh ground water regime. 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 5.1.

Table 5.1: The State-wise distribution of the Ground Water Observation Wells is given below.

Sl. No.	Name of the State	Total No. of Ground Water Monitoring Wells (as on 31.03.2012)		
	States	**DW**	**PZ**	**Total**
1	Andhra Pradesh	580	402	982
2	Arunachal Pradesh	12	0	12
3	Assam	292	10	302
4	Bihar	329	12	341
5	Chhattisgarh	461	248	709
6	Delhi	25	137	162
7	Goa	43	59	102
8	Gujarat	637	376	1013
9	Haryana	198	266	464
10	Himachal Pradesh	89	0	89
11	Jammu & Kashmir	178	19	197
12	Jharkhand	215	12	227
13	Karnataka	1134	373	1507
14	Kerala	658	267	925
15	Madhya Pradesh	870	376	1246
16	Maharashtra	1075	227	1302
17	Manipur	13	10	23
18	Meghalaya	31	5	36
19	Nagaland	12	7	19
20	Orissa	973	137	1110
21	Punjab	159	202	361
22	Rajasthan	722	396	1118
23	Tamil Nadu	566	589	1155
24	Tripura	32	9	41
25	Uttar Pradesh	818	247	1065
26	Uttarakhand	39	94	133
27	West Bengal	468	420	888
	UTs			
1	Andaman & Nicobar	64	0	64
2	Chandigarh	1	27	28
3	Dadra & Nagar Haveli	7	0	7
4	Daman & Diu	9	5	14
5	Pondicherry	4	7	11
	Total	**10714**	**4939**	**15653**

5.2 Ground Water Level Scenario
Depth to Water Level – Pre Monsoon 2012

Perusal of the ground water level data for the Pre Monsoon 2012 indicates (fig.5.1) that in Sub-Himalayan area, north of river Ganges and in the north eastern part of the country in the Brahmaputra valley, eastern coast of Orissa, Andhra Pradesh and Tamil Nadu states the depth to water level generally varies from 2-5 meter below ground level. Isolated pockets of shallow water level less than 2 m bgl have been observed in west Maharashtra and coastal area of Orissa and Andhra Pradesh state. In major parts of north-western states depth to water level generally ranges from 10-20 m bgl. In the western parts of the country deeper water level is recorded in the depth range of 20-40 m bgl. In North Gujarat, part of Haryana and western Rajasthan water level more than 40 m bgl is recorded. In the west coast water level is generally less than 10 m. In eastern states, water level in general ranges from 2-5 m bgl and 5-50 m bgl. North-South central part of West Bengal state recorded water level in the range of 10-20 m bgl. In north central India water level generally varies between 10-20 m bgl, except in isolated pockets where water level less than 10 m bgl has been observed. The peninsular part of country generally recorded a water level in the range 5-10 m bgl and 10-20 m bgl depth range.

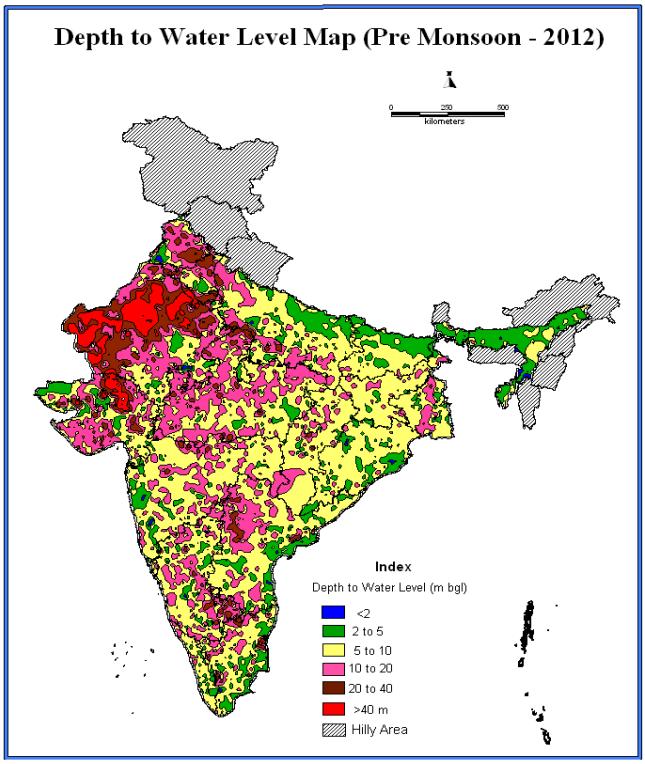

Figure:5.1 Depth to Water level Map (Premonsoon 2012)

5.3 Ground water level scenario Depth to Water Level – August 2012

Perusal of the ground water level data for the August 2012 indicates (Figure 5.2) that in Sub-Himalayan area, north of river Ganges and, Orissa, Andhra Pradesh, Kerala, Gujarat, Madhya Pradesh and Coastal Tamil Nadu generally the depth to water level varies from 2-5 meter below ground level. Shallow water level less than 2 m bgl have also been observed in west Maharashtra, Assam, Northern Uttar Pradesh, Jharkhand and Orissa. In major parts of north-western states depth to water level generally ranges from 10-20 m bgl. In the western parts of the country deeper water level is recorded in the depth range of 20-40 m bgl and more than 40 m. In Delhi and Rajasthan water level more than 40 m bgl is recorded. In the west coast water level is generally less than 5 m and in western parts of Maharashtra State isolated pockets of water level less than 2 m has also been observed. In the east coast i.e. coastal Andhra Pradesh, shallow water level of less than 2 m have been recorded. In eastern states, water level in general ranges from 2-5 m bgl. However South-eastern part of West Bengal recorded water level in the range of 10-20 m bgl. In south India water level generally varies between 5-10 m bgl, except in isolated pockets where water level more than 10 m bgl has been observed.

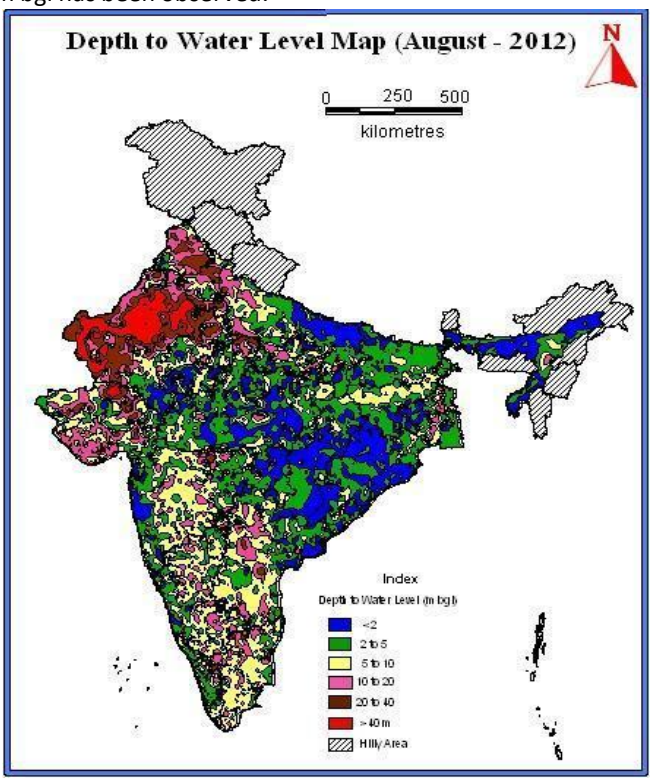

Figure:5.2 Depth to Water level Map (August 2012)

5.4 Ground water level scenario – Depth to Water Level – Post Monsoon 2012

Perusal of the ground water level data for the November 2012 indicates (Figure 5.3) that in Sub-Himalayan area, north of river Ganges, eastern coast of Orissa, Andhra Pradesh, Kerala, Gujarat, Maharashtra, Chhattisgarh, Madhya Pradesh, Bihar, Jharkhand, entire northeast and Coastal Tamil Nadu states generally the depth to water level varies from 2-5 meter below ground level. About 37 % wells are showing water in the depth range of 2-5 m bgl. Shallow water level less than 2 m bgl have also been observed in west Maharashtra, Assam, North Bihar, Orissa and coastal area of Andhra Pradesh and Tamil Nadu states. In major parts of north-western states depth to water level generally ranges from 10-20 m bgl. In the western parts of the country deeper water level is recorded in the depth range of 20-40 m bgl and more than 40 m bgl. In North Gujarat, part of Haryana and western Rajasthan water level more than 40 m bgl is recorded. In the west coast water level is generally less than 5 m and in western parts of Maharashtra State isolated pockets of water level less than 2 m has also been observed. In the east coast i.e. coastal Andhra Pradesh, shallow water level of less than 2 m have been recorded. In eastern states, water level in general ranges from 2-5 m bgl. However south-eastern part of West Bengal recorded water level in the range of 10-20 m bgl and 5-10 m bgl. In south India water level generally varies between 5-10 m bgl, except in isolated pockets where water level more than 10 m bgl has been observed.

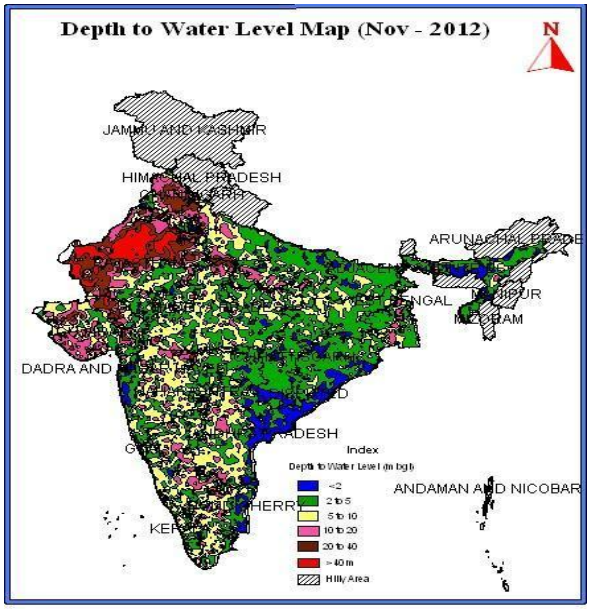

Figure:5.3 Depth to Water level Map (Nov- 2012)

5.5 Ground Water Level Scenario - Depth to Water Level – January 2013

Perusal of the depth to water level map for the January 2012 indicates (Figure 5.4) that in Sub-Himalayan area, north of river Ganges, Orissa, eastern coast of Andhra Pradesh, Tamil Nadu, north west Gujarat, western coast of Maharastra, entire northeast states generally the depth to water level varies from 2-5 meter below ground level. About 41.67 % wells are showing water in the depth range of 2-5 m bgl. Shallow water level less than 2 m bgl have been observed mainly in coastal area of Andhra Pradesh and Tamil Nadu states. In major parts of the country especially in central India, Madhya Pradesh, Maharastra, Karnataka, northern Andhra Pradesh, depth to water level generally ranges from 5-10 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 North Gujarat, part of Haryana and western Rajasthan water level more than 40 m bgl is recorded. In the west coast water level is generally less 10 m bgl and in western parts of Maharashtra State isolated pockets of water level less than 2 m has also been observed. In the east coast i.e. coastal Andhra Pradesh and coastal Tamil Nadu shallow water level of less than 2 m have been recorded. In north-eastern states, water level in general ranges from 2-5 m bgl. However south-eastern part of West Bengal recorded water level in the range of 10-20 m bgl and 5-10 m bgl.

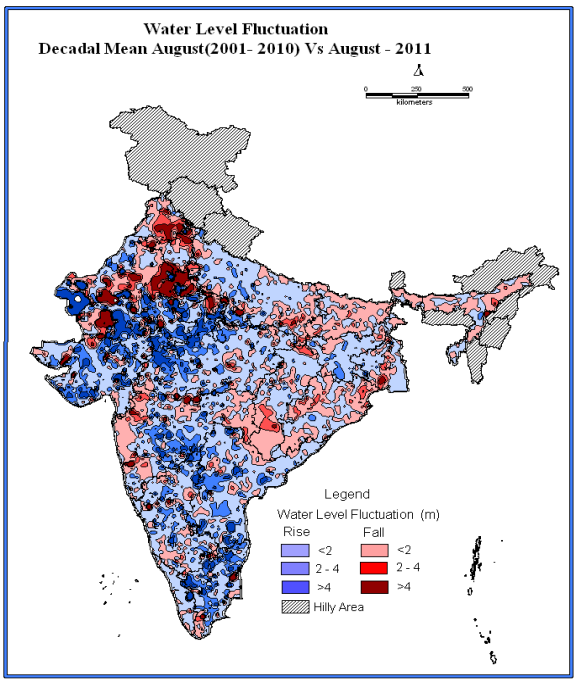

Figure:5.4 Water level flucctuation map

6. 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 for many 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 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. Total outlay for RGNGWTRI component for XII Plan is Rs 90.00 Crores.

As a part of this three tier training programmes, 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 programmes, 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 programmes are proposed in which NGOs, PRIs, Progressive Farmers and other stakeholders at grassroots level are to be trained.

During 2012-13, RGNGWTRI had target of conducting 168 training programmes including 32 tier I, 36 tier II and 100 tier III training programmes (Figure 6.1). A total of 17365 persons were trained as part of these trainings. 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. Summary details of the training programmes are given in table 6.1

Fig 6.1: Field photo graph during training

Table 6.1: Summary of training programmes conducted and persons trained in RGNGWTRI

Training Programme	Target (Nos.)	Achievement	Total No. of persons Trained	Participants from CGWB	Women participants
TIER – I (National Level)	32	32	565	254	29
TIER – II (State Level)	36	36	1160	0	181
TIER – III (Block Level)	100	100	15,640	0	3522
Total	**168**	**168**	**17365**	**254**	**3732**

Out of a total 565 professionals trained as a part of tier I training programmes, 254 were from CGWB and the remaining 311 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.

Participation of women in the training prgrammes of CGWB during 2012-13 has been noteworthy (Figure 6.2). Nearly 22 % of all the persons imparted training through RGNGWTRI were women. Training category wise breakup is given in table 6.1. Total expenditure incurred during 2012-13 was Rs.6.09 crores.

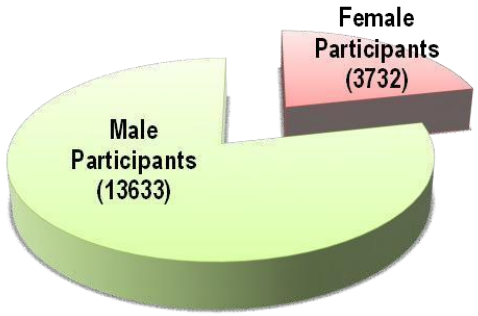

Fig 6.2: Diagrammatic depiction of participants in training programme

7. HIGH YIELDING WELS DRILLED

During 2012-13, Board under its scientific exploratory drilling programme has explored high yielding aquifers in the various States of the Country based on hydrogeological studies coupled with remote sensing and geophysical techniques. High yielding wells with discharge ranging from 90 litres per minute to 2336 litre per minute have been constructed in the states of Chhattisgarh, Jharkhand, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Rajasthan, Tamilnadu and west Bengal. The study will help in identifying ground water sources 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 constructed during 2012-13 are presented in Table 7.1.

Table 7 .1: High Yielding Wells Constructed During 2012- 2013

Sl. No.	Name of States	Description
1.	Chhattisgarh	• An exploratory well drilled at Pali block, Korba District down to a depth of 202.00m bgl has yielde a high discharge of 200 Liter per minute in the Gondwana formation. This well can cater to drinkin water requirements of a population of about 2000 (@ 60 lpcd for ten hours of pumping a day) in th area. • An exploratory well drilled at Dharamjaygarh block, Raigarh district down to a depth of 200.00m b has yielded a high discharge of 190 Liter per minute in the formation of Gondwana. This well c cater to drinking water requirements of a population of about 1900 (@ 60 lpcd for ten hours pumping a day) in the area. • A high yielding well constructed at Kerwa village, Korba Block, Korba district has yielded a hig h discharge of 360 lpm. The site was pin pointed by using integrated approaches. This well can cater t o drinking water requirements of a population of about 3600 (@ 60 lpcd for ten hours of pumping a day) in the area.
2.	Jharkhand	• A well was drilled at Jamchuan, Ranchi down to a depth of 165 m.bgl has yielded a high discharg of 300 LPM. This well can cater to drinking water requirements of a population of about 300 (@ 60 lpcd for ten hours of pumping a day) in the area.
3.	Kerala	• An exploratory well drilled at Nellikatteri, Palghat district down to a depth of 111.00m bgl ha yielded a high discharge of 660 Liter per minute in the formation encountered in Biotite gneiss. This well can cater to drinking water requirements of a population of about 6600 (@ 60 lpcd for ten hours of pumping a day) in the area. • An exploratory well drilled at Kombanakallu, Palakkad district down to a depth of 123.00m bgl ha yielded a high discharge of 840 Liter per minute in the formation encountered in Biotite gneiss. This will serve to mitigate the drinking water needs of a population of 6720 in the area. • An exploratory well drllied at Valancheri, Malappuram district down to a depth of 135.0m bgl ha yielded a high discharge of 840 LPM. This well can cater to drinking water requirements of population of about 8400 (@ 60 lpcd for ten hours of pumping a day) in the area. • An exploratory well drllied at Valapuzha, Palakkad district down to a depth of 150.0m bgl ha yielded a high discharge of 840 LPM water during drilling in the depth range of 86 to 87m. Th formation encountered is Biotite gneiss. This well can cater to drinking water requirements of population of about 8400 (@ 60 lpcd for ten hours of pumping a day) in the area.

Sl. No.	Name of States	Description
4.	Karnataka	• An exploratory well drilled at Chamarajanagar town at Chamarajanagar district down to a depth of 137.25m bgl with casing lowered upto 35mbgl has yielded a high discharge of 660 LPM. This well can cater to drinking water requirements of a population of about 7000 (@ 60 lpcd for ten hours of pumping a day) in the area. • An exploratory well drilled at Krishnavarm in Bangarpet taluk , Kolar district in Aquifer mapping area down to a depth of 300m bgl has yielded a high discharge of 405 Liter per minute. This well can cater to drinking water requirements of a population of about 4000 (@ 60 lpcd for ten hours of pumping a day) in the area. • An exploratory well drllied at Urigampet Bangarpet taluk , Kolar district –Aquifer mapping area dov to a depth of 202.00m bgl has yielded a high discharge of 450 LPM. Casing lowered up to 40.0 mbg Potential zones are encountered between 41.6 and 110.8 mbgl within fractured schistose formation Quality is potable. This well can cater to drinking water requirements of a population of about 45((@ 60 lpcd for ten hours of pumping a day) in the area. • An exploratory well drllied at at Koganur, Afzalpur taluk , Gulbarga district –Aquifer mapping are down to a depth of 201.00m bgl has yielded a high discharge of 180 LPM. Casing lowered up to 6.09 mbgl. Potential zones are encountered between 14.5 and 118.0 mbgl . This well can cater to drinkin water requirements of a population of about 1800 (@ 60 lpcd for ten hours of pumping a day) in th area. • An observation well drllied at at Koganur, Afzalpur taluk, Gulbarga district –Aquifer mapping are down to a depth of 201.00m bgl has yielded a high discharge of 180 LPM. Casing lowered up to 6.80 mbgl. Potential zones are encountered between 14.5 and 118.0 mbgl. This well can cater to drinkin water requirements of a population of about 1800 (@ 60 lpcd for ten hours of pumping a day) in th area. • Under National Aquifer mapping programme a high yielding exploratory well was drilled at Gudpalli in Mulbagal taluk of Kolar district with a discharge of 768 LPM, The total depth drilled 200.20m with casing of 12 m bgl. This well can cater to drinking water requirements of a population of about 760 (@ 60 lpcd for ten hours of pumping a day) in the area. • Under National Aquifer mapping programme a high yielding exploratory well was drilled a Ganjigunte, in Mulbagal taluk of Kolar district with a drilling discharge of 285 LPM. The total dep drilled 200.m with a casing of 6.0 m bgl. Zones tapped 30-40mbgl. Static water level is 24mbgl. Th well can cater to drinking water requirements of a population of about 2800 (@ 60 lpcd for ten hou of pumping a day) in the area.
5.	Madhya Pradesh	• An Observation well drilled at Phanda block, Bhopal district down to a depth of 151.00m bgl ha yielded a high discharge of 1110 Liter per minute in the formation of Deccan Trap Basalt. This well ca cater to drinking water requirements of a population of about 11000 (@ 60 lpcd for ten hours o pumping a day) in the area.
6.	Rajashtan	• A well was drilled at Arid Forest Research Institute Campus(AFRI) at Jodhpur down to a depth of 43.50m bgl has yielded a high discharge of 1800 LPM in the formation of Jodhpur Sandstone (Marwar Super group). This well can cater to drinking water requirements of a population of about 18000 (@ 60 lpcd for ten hours of pumping a day) in the area.

Sl. No.	Name of States	Description
7.	Tanil Nadu	• A well drilled at Sokkanur village of Kinathukadavu block, Pollachi taluka, Coimbatore district down to a depth of 113.00 m bgl, encountered multiple fractures at the depth of 51.40, 63.60, 83.45, 93.65, 99, 104 and 110m has yielded high discharge of 1140 LPM. This well can cater to drinkin water requirements of a population of about 11400 (@ 60 lpcd for ten hours of pumping a day) in th area. • An exploratory well drilled at Arulmozhidevan, Thirumarugal Block, Nagapattinam district down to depth of 401m bgl has yielded a high discharge of 1670 Liter per minute in the formation tappe (Cuddalore sandstone) . This well can cater to drinking water requirements of a population of about 16700 (@ 60 lpcd for ten hours of pumping a day) in the area. • A well was drilled at Pacharapalayam, Cuddalore District in Pilot Project area down to a depth of 364.0m bgl has yielded a high discharge of 1740 LPM in Tertiary Sandstone of Eocene age – IV Aquifer. Zone taped was 338-341, 347-356. This well can cater to drinking water requirements of population of about 17000 (@ 60 lpcd for ten hours of pumping a day) in the area. • A well was drilled at Ayekuppam, Cuddalore District in Pilot Project area down to a depth of 200.0m bgl has yielded a high discharge of 1440 LPM in Tertiary Sandstone of Eocene age – III Aquifer. Zone taped was 175-181, 186-192. This well can cater to drinking water requirements of a population o about 14000 (@ 60 lpcd for ten hours of pumping a day) in the area • An exploratory well drilled at Sengalpalayam, Cuddalore district under Pilot Project down to a dept of 400m bgl has yielded a high discharge of 1440 liter per minute in tertiary formation. This well ca cater to drinking water requirements of a population of about 14000 (@ 60 lpcd for ten hours o pumping a day) in the area.
8.	West Bengal	• A well drilled at Inchura, Block-Balagarh, District Hooghly has yielded a high discharge of 1350 Lite per minute in the formation encountered in Quaternary alluvium. This well can cater to drinkin water requirements of a population of about 13500 (@ 60 lpcd for ten hours of pumping a day) in the area. • Another high yielding well was also constructed at, Chowgachha Krishnanagar-II block in Nadia District. The yield was as high 1470lpm(figure 7.1)
9.	Maharashtra	• An exploratory well drilled at Dahanu Taluka, Thane District down to a depth of 83.60m bgl ha yielded a high discharge of 1075 LPM. This well can cater to drinking water requirements of population of about 10750 (@ 60 lpcd for ten hours of pumping a day) in the area. • An exploratory well drilled at Shirpur Taluka, Dhule District down to a depth of 233.30 m bg encountered multiple fractures at the depth 169.20 to 172.30, 196.70 to 199.70 m bgl has yielded high discharge of 190 Liter per minute in the formation of fractured Basalt. This well can cater t drinking water requirements of a population of about 1900 (@ 60 lpcd for ten hours of pumping a day) in the area. • An exploratory well drilled at Jintur Taluka, Parbhani District down to a depth of 200.0 m bg encountered multiple fractures at the depth 17.00 to 18.00, 78.00 to 79.00, 91.00 to 92.00 & 166.0 to 167.00 m bgl and has yielded a high discharge of 266 Liter per minute in the formation of fractured Basalt. This well can cater to drinking water requirements of a population of about 2600 (@ 60 lpcd for ten hours of pumping a day) in the area.

Sl. No.	Name of States	Description
9.	Maharashtra	• An exploratory well drilled at Man Taluka, Satara District down to a depth of 200.0 m bgl encountere multiple fractures at the depth 14.00 & 119.00m bgl has yielded a high discharge of 180 Liter pe minute in the formation of fractured Basalt. This well can cater to drinking water requirements of population of about 1800 (@ 60 lpcd for ten hours of pumping a day) in the area. • An exploratory well drilled at Vikramgarh Taluka, Thane District down to a depth of 172.10m bg encountered multiple fractures at the depth 114.10-117.20 m bgl,144.60-147.70 m bgl, 162.90- 166.00 m bgl m bgl has yielded a high discharge of 466 Liter per minute in the formation o fractured Basalt. This well can cater to drinking water requirements of a population of about 46((@ 60 lpcd for ten hours of pumping a day) in the area. • An Observation well drilled at Vikramgarh Taluka, Thane District down to a depth of 163.10m bg encountered multiple fractures at the depth 64.00-65.00 m bgl , 152.00-155.00 m bgl , 160.00- 162.00 m bgl has yielded a high discharge of 888 Liter per minute in the formation of fracture Basalt. This well can cater to drinking water requirements of a population of about 8800 (@ 60 lpc for ten hours of pumping a day) in the area. • An exploratory well drilled at Morshi Taluka, Amravati District down to a depth of 194.00m bg encountered multiple fractures at the depth 15.00-18.10 m bgl , 50.30-53.30 m bgl and 181.40- 184.50 m bgl has yielded a high discharge of 466 Liter per minute in the formation of fracture Basalt. This well can cater to drinking water requirements of a population of about 4600 (@ 60 lpc for ten hours of pumping a day) in the area. • An Observation well drilled at Morshi Taluka, Amravati District down to a depth of 185.00m bg encountered multiple fractures at the depth 16.70-19.70 m bgl, 50.20-53.30 m bgl, 117.30-120.40 m bgl and 173.30-178.40 m bgl has yielded a high discharge of 356 Liter per minute in the formation o fractured Basalt. This well can cater to drinking water requirements of a population of about 350 (@ 60 lpcd for ten hours of pumping a day) in the area. • An exploratory well drilled at Narkhed Taluka, Nagpur District down to a depth of 200.00m bg encountered fractures at the depth 40.00-43.00 m bgl and 153.00-156.00 m bgl has yielded a hig discharge of 190 Liter per minute in the formation of fractured Basalt. This well can cater to drinki water requirements of a population of about 1900 (@ 60 lpcd for ten hours of pumping a day) in th area. • An exploratory well drilled at Tiwsa Taluka, Amravati District down to a depth of 178.40m bg encountered multiple fractures at the depth 68.00-71.00 m bgl, 138.00-141.00 m bgl, 147.00-150.00 m bgl and 169.00-170.00 m bgl has yielded a high discharge of 521 Liter per minute in the formatio n of fractured Basalt. This well can cater to drinking water requirements of a population of about 520 (@ 60 lpcd for ten hours of pumping a day) in the area. • An exploratory well drilled at Pusad **Taluka, Yavatmal District** down to a depth of 140.00m bgl at th depth 16.00 – 138m bgl has yielded a high discharge more than 1500 Liter per minute in the formation of fractured Basalt. This well can cater to drinking water requirements of a population o about 15000 (@ 60 lpcd for ten hours of pumping a day) in the area.

<table>
<tr><td>Sl. No.</td><td>Name of States</td><td colspan="6">Description</td></tr>
<tr><td>9.</td><td>Maharashtra</td><td colspan="6">

An exploratory well drilled at Mahagaon Taluka, Yavatmal District down to a depth of 141.60m bg has yielded a high discharge 888 Liter per minute in the formation of fractured Basalt. This well ca cater to drinking water requirements of a population of about 8500 (@ 60 lpcd for ten hours o pumping a day) in the area.
An exploratory well drilled at Morshi Taluka, Amravati District down to a depth of 200.00m bgl ha yielded a high discharge 240 Liter per minute in the formation of fractured Basalt. This well can cate to drinking water requirements of a population of about 2400 (@ 60 lpcd for ten hours of pumping day) in the area.
An exploratory well was drilled at Amravati District down to a depth of 200.0m bgl has yielded a hig h discharge of 600 LPM in the formation of Fractured Basalt. This well can cater to drinking wate requirements of a population of about 6000 (@ 60 lpcd for ten hours of pumping a day) in the area.
An exploratory well was drilled at Warud Taluka, Amravati District down to a depth of 200.0m bgl ha yielded a high discharge of 265 LPM in the formation of Fractured Basalt. This well can cater t drinking water requirements of a population of about 6000 (@ 60 lpcd for ten hours of pumping day) in the area.
An exploratory well was drilled at Bhojla; Yavatmal District down to a depth of 200.0m bgl has yielde a high discharge of 220 LPM in the formation of Fractured Basalt. This well can cater to drinkin water requirements of a population of about 2200 (@ 60 lpcd for ten hours of pumping a day) in th area.
An exploratory well was drilled at Warud Taluka, Amravati District down to a depth of 200.0m bgl ha yielded a high discharge of 265 LPM in the formation of Fractured Vesicular Basalt. This well ca cater to drinking water requirements of a population of about 2650 (@ 60 lpcd for ten hours o pumping a day) in the area.
An observation well was drilled at Ashti Taluka, Wardha district down to a depth of 143.80m bgl ha yielded a high discharge of 266 LPM in the formation of Fractured Basalt. This well can cater t drinking water requirements of a population of about 2600 (@ 60 lpcd for ten hours of pumping day) in the area.

</td></tr>
<tr><td>10.</td><td>North Eastern States</td><td>Location</td><td>District</td><td>Depth Drilled (mbgl)</td><td>Aquifer zone tapped/ Fractures encountered (mbgl)</td><td>Discharge (m^3/hr)</td><td>Formation</td></tr>
<tr><td></td><td></td><td>Litang Valley
25° 19’05”
92 ° 08’ 10”</td><td>Jaintia</td><td>80.30</td><td>10.00-12.00, 20.00-25.00
30.40-31.40, 37.60-38.60</td><td>15.0</td><td>Limestone</td></tr>
<tr><td></td><td></td><td>Mawrang
25° 50’ 13’’
92° 10’00’’</td><td>Ri-Bhoi</td><td>201.70</td><td>30.7-85.40, 91.50-122.0
140.3-189.1</td><td>35.64</td><td>Gneisses</td></tr>
</table>

Sl. No.	Name of States	Description					
		ICAR, Nursery Complex, Badapani 25° 29' 45'' 92°42' 52''	Ri-Bhoi	201.45	45.0-122.0, 122.5-152.15 152.15-201.45	35.64	-do-
		ICAR, Pathology Complex 25° 41' 03''	Ri-Bhoi	180.8	74.1-92.4, 92.4-180.8	66.78	-do-
		Umroi, Airodrome 25° 42' 02'' 91° 58' 04''	Ri-Bhoi	167.04	12.3-87.77, 93.87-124.37 130.47-160.93	56.53	-do-
		Umsiang 26°04' 28'' 92° 10' 26''	Ri-Bhoi	135.10	41.6-42.6, 47.7-48.2 52.8-53.8, 66.0-66.5 93.5-94.5, 132.0-133.0	62.4	-do-
		Naringre	East Garo Hills	113.00		54	-do-

Fig 7.1: High yielding well at Chowgacha, Krishnanagar II block in Nadia district Discharge 1470 lpm

8. HYDROLOGY PROJECT II

The Hydrology Project - Phase –II (HP-II) is a follow up project of HP-I. Its major thrust is to use Hydrological Information System (HIS) data effectively for water resources planning and management. A longer-term aim of the project is to assist the Governments at both Central and State levels to address the issues of intra-sectoral demands and overall resource planning and management through the establishment of core hydrological organizations serving all specialized water agencies.

The Project will further extend and promote the sustained and effective use of the HIS by all potential users concerned with water resources planning and management, including both public and private, thereby contributing to improved productivity and cost-effectiveness of water-related investments in the 13 states and eight Central agencies. The coverage of existing states under the project is to help these agencies from moving over from development of HIS (as in HP-I) towards use of HIS in water resources planning and management. The project objectives will be achieved by:

(a) Strengthening the capacity of hydrology departments to develop and sustain the use of the HIS for hydrological designs and decision tools thus creating enabling environment for improved integrated water resources planning and management;

(b) Improving the capabilities of implementing agencies at state/central level in using HIS for efficient water resource planning and management in reducing vulnerability to droughts and thereby meeting the country's poverty reduction objectives;

(c) Establishing and enhancing user-friendly, demand responsive and easily accessible HIS to improve shared vision and transparency of HIS between all users; and

(d) Improving access to the HIS by public agencies, civil society organizations and the private sector through awareness building supporting outreach services.

Greater use of an improved HIS is expected to have a broad but definite impact on the planning and design of water resources schemes, from which the rural and urban poor will have secure and sustainable access to water for multi-purpose livelihood uses.

The Hydrology Project- II initially has duration of 6 years staring from May 2006 to 2012. Now the project has been extended for a period of 2 years from June, 2012 to May, 2014. CGWB is participating agency in HP-II and has a revised cost provision of Rs 66.32 Crore. The Budget provision for the year 2012-13 is Rs 28.95 Crore and revised estimate is Rs 13.60 Crore. The expenditure incurred on the project in the FY 2012-13 is Rs 12.23 Crore.

H-P-II has three major components i.e. (A) Institutional Strengthening in the form (i) consolidation of HP-I activities in the existing States; (ii) awareness raising, dissemination and knowledge sharing; and (iii) implementation support; (B) Horizontal Expansion in three new States covering Goa, Himachal Pradesh and Punjab and (C) Vertical Extension in the 9HP-I peninsular States.

Under Institutional Strengthening, project aim to upgrade the Infrastructure, hardware and software and training to use the existing software; awareness raising activities and implementation support in the form of procurement of vehicles and equipments. Under this component, following progress have been made during 2012-13. For "Development of e-GEMS"- Web based solution for GEMS software, contract has been awarded for consultancy services to Tata Consultancy Services. Procurement of the hardware (7 Servers & 59 Workstations) for upgradation of data centre has been completed. Six awareness raising programs and six domain specific training have been conducted.

Under Horizontal Expansion, HP-I type of activities and facilities will be extended to new states. In 2012-13, procurement of DWLR (92 nos- for Punjab – 52 nos. and for Goa – 40 nos.) is under progress as the proposal for expenditure sanction is under approval of MoWR.

However, under Vertical Extension special knowledge enhancement type of activities such as Decision Support System and Purpose Driven Studies has been taken up. In this year of the project, the implementation of Pilot Project on Aquifer Mapping under Purpose Driven Study component is under progress in six different Hydrogeological terrains of the country covering states of Bihar, Rajasthan, Tamil Nadu, Karnataka and Maharashtra.

Compilation of existing data and identification of data gap completed and comprehensive background report prepared. Various thematic layers have been prepared. Infiltration test has been conducted. Conceptualization of aquifer system with existing data has been completed.

Data generation is under progress. Additional monitoring wells have been established in the pilot areas and monthly monitoring of water level in these wells has been completed up to March, 13. Contract agreement between CGWB & NGRI signed on 21-05-12 for engaging NGRI as consultant for carrying out Aquifer characterization using advanced geophysical techniques in six representatives

Hydrogeological terrains of India. NGRI has completed first phase (50%) of Surface Geophysical investigations including VES, TEM and ERT. NGRI has signed a MoU with Aarhus University, Denmark on 15.10.12 for Heliborne TEM survey using SkyTEM. Regarding Hiring of Helicopter for Heliborne survey, contract has been awarded by NGRI.

Procurement of Softwares for Pilot Project (ERDAS, Arc GIS, and Aquifer Test Pro & Rockworks) and for GW modeling Centre (Visual Modflow, Hydrogeoanalyst, Modflow Surfact, GMS, FEFLOW and Temporal Analyst) has been completed. Training on various softwares has been completed. Procurement of various equipments and hardware under Pilot Project has been completed. 15 Exploratory Wells have been completed under pilot project and for construction of wells (60 nos.) through outsourcing in pilot project areas of Maharashtra, Karnataka & Rajasthan; after getting approval of MoWR, work order is issued to firms. For procurement of Borehole Camera, Proposal for expenditure sanction is under approval of MoWR.

9. ARTIFICIAL RECHARGE STUDIES

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

133 demonstrative recharge projects costing Rs. 99.87 crore were approved for construction of 1661 artificial recharge structures in the states of Andhra Pradesh, Arunachal Pradesh, Bihar, Chandigarh, Chhattisgarh, Delhi, Gujarat, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Nagaland, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. A sum of Rs. 73.62 crore was released to State implementing agencies as on 31.03.2012.

An amount of Rs. 4.06 Cr was released to State implementing agencies as second instalment (spill over) during 2012-13 as on 31.03.2013.

The statement showing the details of funds released in the scheme as on 31st March, 2013 given in table 11.1.

It is to mention that following Fifteen AR Projects with an approved cost of Rs 299.878 lakes & Seventy Six no of AR structures have been dropped due to different reasons mention against them:-

One Project in Kerala (Approved cost Rs 41.6 lakhs & one AR structures) as the Implementing agency has expressed its inability to execute the Scheme. Funds were not released to IA

Thirteen Project in Rajasthan (Approved Cost Rs 78.825 lakhs & 13 no. AR structures) as the Implementing agency has returned the first installment funds (Rs 47.7142 lakhs) expressing their inability to execute the Schemes

One Project in Punjab (Approved cost Rs 179.453 lakhs & 62 no. AR structures) has been dropped as there was no progress in three years after releasing the first installment and IA has been asked to return the funds(Rs 53.836 lakhs).

9.2 Scheme on "Artificial Recharge to Ground Water Through Dug Wells"

The Scheme "Artificial recharge to ground water through dug wells" was launched in 2007-2008 with the objective to recharge rain runoff through existing dugwells on agricultural lands especially in hard rock terrains where rapid decline in ground water levels and water quality changes were observed in the country. Seven states namely Tamil Nadu, Gujarat, Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka & Rajasthan having majority of Over-exploited, critical and Semi-critical blocks of ground water development were taken under The scheme for implementation of dug well recharge by the farmers having dug wells on their agricultural lands.

The scope and objectives of implementation of scheme was aimed at the following:

- Recharge of existing dugwells through rainfall runoff from the agricultural fields will facilitate improvement in ground water situation in the affected areas.
- The dug well based ground water recharge programme will increase the sustainability of wells during lean period and will improve the overall irrigated agricultural productivity, socio economic conditions and quality of life of the local population in the affected areas.
- The recharge programme will also help improving the quality of ground water especially in the fluoride affected areas of Andhra Pradesh, Rajasthan, Gujarat, Tamil Nadu etc.
- The scheme would facilitate strengthening of the institutional arrangements towards creation of awareness and capacity framework, creation of awareness and capacity building of farmers and overall community involvement in water resource management in the affected areas.
- Replication of similar recharge programmes in other ground water stressed areas in the country.

The total cost of the scheme is Rs.1798.71 Cr. The unit cost of dugwell recharge facility varied from Rs. 3600/- in Maharashtra to Rs. 5700/- in Andhra Pradesh. Under the scheme small and marginal category farmers were provided 100 % subsidy equivalent to unit cost of dug well recharge facility and farmers of other category were provided with 50 % of the cost as subsidy for construction of recharge structures. The scheme was framed for three years implementation commencing from 2007-08.

As per the target of the scheme, 4454656 irrigation dug wells were estimated for implementation of dug wells recharge in seven participating states.

Under the scheme, as on 31-03-2013, funds amounting to

Rs. 277.518 cr. including Rs. 257.641 cr. as subsidy to beneficiaries, Rs. 17 cr. to state for IEC/Capacity Building the scheme and an amount of Rs. 2.6358 cr. to NABARD as operating cost have been incurred.

The state wise progress made by the participating states is given in table 9.2

Table 9.1: Details of funds released in the "Ground Water Management and Regulation" XI Plan as on 31st March, 2013

S No.	State	Approved cost (Rs in lakh)	Amount released (Rs in lakh) upto 31.3.2012	Amount released (Rs in lakh) in 2012-13	Gross Amount released (Rs in lakh) upto 31.3.2012	Number of structures approved	No of structures Constructed during 2012-13	No of structures Completed as on 31.03.2013
1	Andhra Pradesh	573.41	437.698	135.712	573.4100	119	13	**93**
2	Arunachal Pradesh	493.108	409.377	83.730	493.1080	80	38	**64**
3	Bihar	96.01	67.210		67.2100	11	0	**0**
4	Chhatisgarh	268.80	543.221		543.2210	34	40	**0**
5	Chandigarh	776.03	150.400		150.4000	54	0	**40**
6	Delhi	43.44	30.410		30.4100	10	0	**0**
7	Gujarat	316.24	221.368	44.859	266.2290	116	79	**101**
8	Himachal Pradesh	250.017	165.140		165.1400	20	12	**12**
9	Jammu & Kashmir	143.47	91.277		91.2770	5	1	**1**
10	Jharkhand	191.35	133.943		133.9430	69	0	**0**
11	Karnataka	588.093	447.020	33.456	480.4760	192	57	**161**
12	Kerala	94.14	77.604	4.050	81.6500	91	4	**63**
13	Madhya Pradesh	860.91	633.376		633.3760	51	13	**29**
14	Maharashtra	15.15	15.150		15.1500	49	4	**49**
15	Nagaland	224.14	141.340	82.800	224.1400	64	30	**64**
16	Orissa	464.36	325.040		325.0400	66	0	**21**
17	Punjab	260.33	110.456		110.4560	86	0	**0**
18	Rajasthan	404.777	235.055	10.282	245.3420	52	6	**6**
19	Tamil Nadu	526.35	514.350	12.000	526.3500	273	0	**273**
20	Uttar Pradesh	3286.23	2502.430		2502.4300	189	83	**128**
21	West Bengal	111.09	111.090		111.0903	30	2	**22**
	Total	**9987.445**	**7362.956**	**406.889**	**7769.8483**	**1661**	**382**	**1127**

Table9.2: The state wise progress made under the scheme

Sl. No.	State	No. units for which subsidy released	Subsidy released (Rs. in crore)	Fund released under IEC (Rs. in crore)	Fund released to Ministry for awareness (Rs. in crore)	Operating cost availed by NABARD @ 1% of net subsidy released (Rs. In Cr.)	No. of dug well recharge structures completed.
1	Andhra Pradesh #	0	0	0	0.2224065 & 0.0192882	0	0
2	Gujarat	141381	47.175	3.25		0.4841	8974
3	Karnataka	65936	25.205	2.00		0.2668	21340
4	Madhya Pradesh	91883	39.244	2.00		0.4014	29851
5	Maharashtra	59857	14.009	2.00		0.1404	38393
6	Rajasthan	88476	29.702	2.00		0.3048	4619
7	Tamil Nadu	275553	102.306	5.75		1.0383	21496
	Total:	**723086**	**257.641**	**17.00**	**0.2417**	**2.6358**	**124673**

In Andhra Pradesh the scheme has not been implemented since the designated nodal department had expressed inability to take up the scheme

10. 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.

PUBLIC NOTICES:

During this period, the following two Public Notices were issued:

(i) Public Notice No. 1/2012 (issued on 27.11.2012): Sub: Declaration of the areas as "Notified Area" for regulation of ground water abstraction/development.

(ii) Public Notice No. 1/2013 (issued on 16.1.2013): Sub: Ban on Ground Water extraction in compliance of Hon'ble National Green Tribunal Order dated 11th Jan, 2013

TECHNICAL APPRAISAL OF PROJECT PROPOSAL FOR NOC FOR GROUND WATER WITHDRAWAL

(i) CGWA carried out technical appraisal of Industrial, Mining, Power, Infrastructural development and ground water based proposals based on recommendation of concerned Regional Director of Central Ground Water Board for according ground water clearance.

(ii) During the period 164 projects were accorded NOC for ground water withdrawal and 139 projects were issued letter for exemption for ground water withdrawal. In addition 24 projects were accorded renewal of NOC for ground water withdrawal and regret letters were issued to 24 projects.

Guidelines/Criteria for evaluation of proposals/requests for ground water abstraction

CGWA has framed new Guidelines/Criteria for evaluation of proposals/requests for ground water abstraction in Notified & Non-Notified areas. These guidelines are effective from 15.11.2012 and are available on website ww.cgwb.gov.in.

ACTIVITIES CARRIED OUT UNDER IEC, SCHEME OF MINISTRY OF WATER RESOURCES

3rd NATIONAL PAINTING COMPETITION

Since the quantum of water resources is not going to increase, the most important step is to plan use of water in the most judicious manner. Apart from using various scientific and technological advancements in making efficient use of water, it is also important to make everyone aware regarding various issues involved in water management and conservation through various activities like extending information about water, educating the population about it and communicating with the masses regarding conservation of this resource.

The Painting competition is one such activity to create awareness among students for conservation of water and spread the same in School/Society through these children.

The competition is held in three stages – the School Level competition, followed by the State Level competition and finally

culminating with the National Level competition held at New Delhi.

Fifty winners from the school level competition are selected in each state for participation in the state level painting competition which is held on 21st November coinciding with water conservation week. Winner students are awarded cash prizes worth Rs. 33,000/-, the first prize winner is awarded Rs 10,000/-, 2nd Prize Rs 8,000/-, 3rd Prize RS 5,000/- and ten consolation prizes of Rs 1,000/- each are also presented. Each winner student are also awarded a certificate of merit and all participating students are issued participation certificate.

The first, second and third prize winners from the State level painting competition are invited to participate in the National Painting competition held at New Delhi on the 21st January. In the National Painting Competition, one first prize of` 1,00,000/-, four second prizes of` 50,000/- each and eight third prizes of` 25,000/- each are awarded to the winners. In addition, consolation prizes of` 5,000/- each are awarded to all remaining participants (Table-10.1).

More than 21 lakhs students from 41,421 school participated in the school level competition. The theme at the school level painting competition were as under-

1. Water and Climate Changes 2. Save Water from Pollution Water Scarcity-Food Security

The theme of painting for State level Competition in the year 2012-13 was "**Replete Water before it Depletes**" and number of Participants at State Level was 1352 from 35 States/ UTs.

The 3rd National Painting Competition on Water Conservation was organized by Central Ground Water Board, Ministry of Water Resources on 21st January, 2013 at NASC Complex, PUSA, New Delhi in order to create awareness on water conservation among children.

The National Painting competition was organized on 21st January, 2013 at A.P. Shide Symposium Hall, NASC Complex, PUSA, New Delhi, the theme of "**Save Water Save the World**" Hon'ble Minister of Water Resources, Shri Harish Rawat was the chief guest on the occasion and distributed the prizes to the winner students. The function was attended by senior officers of Ministry of Water Resources, other Central Government departments and distinguished guests. The outputs in the form paintings received from children reflect their creativeness and interest in water conservation, ground water recharge, prevention of pollution, and other related aspects. The paintings clearly depict their concern about this vital resource. The interest in water resources that has been generated in these children and their parents, schools and all others associated with them clearly suggests that the objective of the whole exercise has been fully achieved. It was also established that such painting competitions are definitely an effective tool for mass awareness on the water resources sector.

Hon'ble Minster of Water Resources, Shri Harish Rawat in his address emphasized on role of children in conservation and protection of precious water resources. He said that the innovative ideas presented by the children in their paintings will motivate others in society for conservation and judicious utilization of water. He called upon the students, their parents as well as teachers to join hands in creating more awareness to conserve water among the masses. He informed that Ministry will further strengthen the campaign on water conservation by involving all the sections of the society.

Table 10.1: List of winners of 3rd National Level Painting competition.

Prize	Student Name	Location/State	Prize Money (Rs.)
First	SHUBHRANSHU MISHRA	ODISHA	1,00,000
Second	MAHAK KHEMKA	TAMIL NADU	50,000
Second	SOUMALYA DANDAPAT	WEST BENGAL	50,000
Second	CHANDAN HANSDA	JHARKHAND	50,000
Second	YUKTI BHARGAVA	DAMAN & DIU	50,000
Third	UMANG SHARMA	UP	25,000
Third	VISHNU PRASAD T. M.	KERALA	25,000
Third	AARUSHI SINHA	BIHAR	25,000
Third	SHRAVYA MALLYA	KARNATKA	25,000
Third	RENUKA KUMARI	BIHAR	25,000
Third	ESHITA JAIN	DELHI	25,000
Third	KOTHARI AANCHAL SANDEEP KUMAR	GUJARAT	25,000
Third	SHUBH AGARWAL	CHATTISHGARH	25,000

Fig 10.1: Participants at 3rd National Painting Competition, PUSA, New Delhi, 21 Jan, 2013

Fig 10.2: Hon'ble Minister of Water Resources Sh. Harish Rawat presenting First Pize

Fig 10.3: Shri A.K Bhatia Regional Director, North Western Region, Chandigarh receiving Trophy for best performing region from Hon'ble Minister Sh. Harish Rawat

ORGANISATION OF WORKSHOPS

During the year 19 workshops were organized in all the regional offices of CGWB on water conservation issues.

However, CGWB, KR, Trivandrum, organized one more workshop at Vatakara Kerala under the IEC Scheme. (Details given in Table 10.2)

Web site of CGWA: The detailed activities and achievements of CGWA have been put on the website of CGWB at http:// cgwb.gov.in/CGWA. The website is updated for Gazette Notifications, Public Notices; directions issued, guidelines of CGWA, status of project proposals for NOC for ground water withdrawal, current events etc.

Tables 10.2: Details of workshops organized under IEC activity during the year 2012-13

Sl. No.	Region	State	Date/Place	Theme
1	NR, Lucknow	Uttar Pradesh	22.1.2013/Raebareli	Water Conservation for Sustainable Agricultural Uses
2	KR, Trivendrum	Kerala	24/25.1.2013/Vatakara, Kozhikode district	Sustainable Management of Ground Water Resources
3	NER, Guwahati	Assam	8.2.2013/Dispur-Guwahati.	Ground Water Development & Management in North Eastern Region
4	UR, Dehradun	Uttarakhand	15.2.2013/ Dehradun	Ground Water Management in Uttarakhand
5	ER, Kolkata	West Bengal	19.2.2013 / Kolkata	"Ground Water Management & Regulation-Challenges ahead"
6	CR, Nagpur	Maharashtra	21.2.2013 /Amravati	Ground Water Management & Regulation-Challenges ahead
7	SUO-Delhi	Delhi	26.2.2013/ New Delhi	Ground Water Quality and its Importance for Sustainable Ground Water Management in the National Capital Region
8	NWR, Chandigarh	Chandigarh	27.2.2013 /	Roadmap for Sustainable Development of Ground Water Resources in States of Punjab & Haryana
			Punjab University, Chandigarh	
9	WCR, Ahmedabad	Gujarat	5.3.2013 / Ahmedabad	Ground Water Resource Management with emphasis on Artificial Recharge and Rain Water Harvesting
10	WR, Jaipur	Rajasthan	6.3.2013/Jaipur	Ground Water Scenario of Jaipur Urban Area
11	NHR, Dharamshala	Himachal Pradesh	6.3.2013/ Dharamshala	Managed Aquifer Recharge in Hills & Valleys of Himachal Pradesh
12	NCR, Bhopal	Madhya Pradesh	14.3.2013/	Regional workshop on Ground Water Management in Madhya Pradesh-Challenges, Opportunities & Strategies
			Bhopal	
13	SWR, Bangalore	Karnataka	14.3.2013/Bangalore	Innovation & Best Practices in water conservation
14	SECR, Chennai	Tamil Nadu	15.3.2013 / Chennai	Sea Water Intrusion with reference to Coastal aquifer systems of Tamil Nadu & UT Puducherry
15	NCCR, Raipur	Chhattisgarh	15.3.2013/Raipur	Management of Ground Water for Sustenance of Agriculture and Industries in the State of Chhattisgarh
16	KR, Trivendrum	Kerala	19.3.2013/Trivendrum	Analysis of Capacity Building needs for Aquifer Mapping & Water Resources Management in Kerala
17	SER, Bhubaneswar	Odisha	20.3.2013/Bhubaneswar	Ground Water Security & Sustainability in Odisha-Vision-2025
18	SR, Hyderabad	Andhra Pradesh	25.3.2013/ Vishakhapatnam	Management of coastal aquifers
19	NWHR, Jammu	Jammu & Kashmir	26.3.2013/Jammu	Ground water Development & management in J & K State
20	MER, Patna	Bihar/Jharkhand	27.2.2013 /Sahebganj, Jharkhand	Ground water resources/ management/development in Jharkhand state

11. GROUND WATER MANAGEMENT STUDIES IN DROUGHT PRONE AREA

Ground Water Management Studies were under taken in drought prone area of 14159 sq. km. in Rajasthan, Andra Pradesh, Uttar Pradesh and Karnataka States of the country under. In addition to this, 123 bore holes (98 EW, 14 OW & 11 PZ) by departmental rigs were drilled in drought prone areas of Orissa, Rajasthan, Maharashtra, Uttar Pradesh, and Karnataka States.

Details of area covered under ground water management studies and status of exploration in drought prone areas are shown in Table 11.1 and 11.2.

Table 11.1: Area covered under ground water management studies in drought prone areas (2011-2012)

Sl. No.	Regions/ State	Districts	Achievement Sq.Km.
2.	**WESTERN REGION** Rajasthan	Jodhpur	**2100**
		Jaisalmer	**2100**
		Sub Total	**4200**
3.	**SOUTHERN REGION** Hyderabad	Nalgonda	2828
		Kurnool	1493
		Sub Total	**4321**
4.	**NORTHERN REGION** Uttar Pradesh	Jhansi	**865**
		Mahoba	**1116**
		Hamirpur	**22**
		Sub Total	**2003**
5.	**SOUTH WESTERN REGION** Karnataka	Lingasugur Taluk, Raichur District	913
		Afzalpur Taluk, Gulbarga District	1050
		Kolar Mulbagal taluk	824
		Bangarpet taluk, Kolar district	848
		Sub Total	**3635**
GRAND TOTAL			**14159**

Table 11.2: Exploratory wells drilled in "drought prone" area (2011-2012)

(By Departmental Rigs)

DIVISION	STATE/ UT	DROUGHT			
		EW	OW	PZ	T
III.VARANASI	Uttar Pradesh	18			**18**
VI.NAGPUR	Maharashtra	17	4		**21**
X.BHUBANESWAR	Orissa	6	2		**8**
XI.JODHPUR	Rajasthan	13	3	11	**27**
XIV.BANGALORE	Karnataka	44	5		**49**
TOTAL		**98**	**14**	**11**	**123**

12. GROUND WATER MANAGEMENT STUDIES IN TRIBAL AREAS

The Central Ground Water Board, in its 2012-2013 Annual Action Plan gave emphasis to Ground Water Management Studies and exploratory drilling programme in districts falling under tribal areas of the country. An area of 8861sq. km. was covered in Chhattisgarh, Rajasthan, Andra Pradesh, Tamil Nadu under tribal areas and 163 bore hole (EW- 100, OW-28, PZ- 35) were drilled in Tamilnadu, Jharkhand, Maharashtra, Meghalaya, Nagaland, Arunachal Pradesh, Chhattisgarh, Karnataka, Jammu & Kashmir, Andra Pradesh, Orissa and Uttar Pradesh States under tribal areas of the country to explore the possibility of tapping potential aquifers. Status of exploration in Tribal area is shown in Table 12.1, 12.2.

Table 12.1: Areas covered under Ground Water Management Studies in tribal areas during 2011-2012

Regions/state	District	Achievement (Sq.Km.)
NORTH CENTRAL CHHATTISGARH REGION Chhattisgarh	Korba and Raigarh	3000
WESTERN REGION JAIPUR	Banswara & Pratapgarh	2100
SOURTHERN REGION, Hyderabad	Nalgonda	761
SECR, Chennai	Dharmapuri	1000
	Ground Total	**6861**

Table 12.2: Exploratory Wells Drilled in "Tribal" Area during 2011-2012 (by Departmental Rigs)

DIVISION	STATE/ UT	TRIBAL			
		EW	OW	PZ	T
IV.CHENNAI	Tamil Nadu	13	2	19	**34**
V.RANCHI	Jharkhand	17	4		**21**
VI.NAGPUR	Maharashtra	11	5		**16**
VII.GUWAHATI	Arunachal Pradesh	2			**2**
	Meghalaya	8			**8**
	Nagaland	2			**2**
VIII.JAMMU	Jammu & Kashmir				**0**
IX.HYDERABAD	Andhra Pradesh	12	3		**15**
X.BHUBANESWAR	Orissa	11	5	6	**22**
XIII.RAIPUR	Chhattisgarh	21	5	9	**35**
XIV.BANGALORE	Karnataka	1			**1**
XVI.BAREILLY	Uttar Pradesh	2	4	1	**7**
	TOTAL	**100**	**28**	**35**	**163**

13. ESTIMATION OF GROUND WATER RESOURCE BASED ON GEC - 1997 METHODOLOGY

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) .

As per 31.03.2009, the Total Annual Replenishable Ground Water Resources of the Country have been reassessed as 431 Billion Cubic Metres (bcm) and the Net Annual Ground Water Availability is estimated as 396 bcm. Annual Ground Water Draft as on March, 2009 for all uses is 243 bcm. The Stage of Ground Water Development is 61%. The state – wise availability of ground water resources is given in Table 13.2.

The development of ground water in different areas of the Country has not been uniform. Highly intensive development of ground water in certain areas in the country has resulted in over – exploitation.

As per the latest assessment of ground water resources out of 5842 assessment units (Block/Mandals/Talukas) in the country, 802 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 169 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 523 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 and apart from these, there are 71 blocks completely underlain by saline ground water. The state – wise status of over – exploited and critical and semi-critical areas is given in Table 13.1.

Table 13.1: CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKAS IN INDIA AS ON 31st MARCH, 2009

Sl.No.	States / Union Territories	Total No. of Assessed Units	Safe		Semi-critical		Critical		Over-exploited		Remarks
			Nos.	%	Nos.	%	Nos.	%	Nos.	%	
	States										
1	Andhra Pradesh	1108	867	78	93	8	26	2	84	8	38- Salinity Affected
2	Arunachal Pradesh	16	16	100	0	0	0	0	0	0	
3	Assam	23	23	100	0	0	0	0	0	0	
4	Bihar	533	529	99	4	1	0	0	0	0	
5	Chhattisgarh	146	132	90	14	10	0	0	0	0	
6	Delhi	27	2	7	5	19	0	0	20	74	
7	Goa	11	11	100	0	0	0	0	0	0	
8	Gujarat	223	156	70	20	9	6	3	27	12	14 - Salinity Affected
9	Haryana	116	18	16	9	8	21	18	68	59	
10	Himachal Pradesh	8	6	75	0	0	1	13	1	13	
11	Jammu & Kashmir	14	14	100	0	0	0	0	0	0	
12	Jharkhand	208	200	96	2	1	2	1	4	2	
13	Karnataka	270	154	57	34	13	11	4	71	26	
14	Kerala	152	126	83	22	14	3	2	1	1	
15	Madhya Pradesh	313	224	72	61	19	4	1	24	8	
16	Maharashtra	353	324	92	19	5	1	0	9	3	
17	Manipur	8	8	100	0	0	0	0	0	0	
18	Meghalaya	7	7	100	0	0	0	0	0	0	
19	Mizoram	22	22	100	0	0	0	0	0	0	
20	Nagaland	8	8	100	0	0	0	0	0	0	
21	Orissa	314	308	98	0	0	0	0	0	0	6 - Salinity Affected
22	Punjab	138	23	17	2	1	3	2	110	80	
23	Rajasthan	239	31	13	16	7	25	10	166	69	1 - Salinity Affected
24	Sikkim	4	4	100	0	0	0	0	0	0	
25	Tamil Nadu	386	136	35	67	17	33	9	139	36	11 - Salinity Affected
26	Tripura	39	39	100	0	0	0	0	0	0	
27	Uttar Pradesh	820	605	74	107	13	32	4	76	9	
28	Uttarakhand	17	11	65	5	29	1	6	0	0	
29	West Bengal	269	231	86	38	14	0	0	0	0	
	Total States	**5792**	**4235**	73	**518**	9	**169**	3	**800**	14	
Union Territories											
1	Andaman & Nicobar	33	33	100	0	0	0	0	0	0	
2	Chandigarh	1	1	100	0	0	0	0	0	0	
3	Dadra & Nagar Haveli	1	1	100	-	-	-	-	-	-	-
4	Daman & Diu	2	0	0	1	50	0	0	1	50	
5	Lakshdweep	9	5	56	4	44	0	0	0	0	
6	Puducherry	4	2	50	0	0	0	0	1	25	1-Salinity Affected
	Total Uts	**50**	**42**	84	**5**	10	**0**	0	**2**	4	
	Grand Total	**5842**	**4277**	73	**523**	9	**169**	3	**802**	14	71 - Salinity Affected

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

Table 13.2: STATE-WISE GOUND WATER RESOURCES AVAILABILITY, UTILIZATION AND STAGE OF DEVELOPMENT (As on March, 2009)

Sl. No.	States/ UTs	Annual Replenis-hable Ground Water Resource	Natural Discharge during non-Monsoon season	Net Annual Ground Water Availability	Annual Ground Water Draft			
					Irrigation	Domestic and Industrial uses	Total	Stage of Ground Water Developme nt(%)
1	2	3	4	5	6	7	8	9
	States							
1	Andhra Pradesh	33.83	3.07	30.76	12.61	1.54	14.15	46
2	Arunachal Pradesh	4.45	0.45	4.01	0.002	0.001	0.003	0.07
3	Assam	30.35	2.537	27.81	5.333	0.69	6.026	22
4	Bihar	28.63	2.42	26.21	9.79	1.56	11.36	43
5	Chhattisgarh	12.22	0.64	11.58	3.08	0.52	3.60	31
6	Delhi	0.31	0.02	0.29	0.14	0.26	0.40	138
7	Goa	0.221	0.088	0.133	0.014	0.030	0.044	33
8	Gujarat	18.43	1.08	17.35	11.93	1.05	12.99	75
9	Haryana	10.48	0.68	9.80	11.71	0.72	12.43	127
10	Himachal Pradesh	0.59	0.06	0.53	0.23	0.08	0.31	58
11	Jammu & Kashmir	3.70	0.37	3.33	0.15	0.58	0.73	22
12	Jharkhand	5.96	0.55	5.41	1.17	0.44	1.61	30
13	Karnataka	16.81	2.00	14.81	9.01	1.00	10.01	68
14	Kerala	6.62	0.59	6.03	1.30	1.50	2.81	47
15	Madhya Pradesh	33.95	1.70	32.25	16.66	1.33	17.99	56
16	Maharashtra	35.73	1.93	33.81	15.91	1.04	16.95	50
17	Manipur	0.44	0.04	0.40	0.0033	0.0007	0.0040	1
18	Meghalaya	1.2343	0.1234	1.1109	0.0015	0.0002	0.0017	0.15
19	Mizoram	0.044	0.004	0.039	0.000	0.0004	0.0004	1
20	Nagaland	0.42	0.04	0.38	-	0.008	0.008	2.14
21	Orissa	17.78	1.09	16.69	3.47	0.89	4.36	26
22	Punjab	22.56	2.21	20.35	33.97	0.69	34.66	170
23	Rajasthan	11.86	1.07	10.79	12.86	1.65	14.52	135
24	Sikkim	-	-	0.046	0.003	0.007	0.010	21
25	Tamil Nadu	22.94	2.29	20.65	14.71	1.85	16.56	80
26	Tripura	2.97	0.23	2.74	0.09	0.07	0.16	6
27	Uttar Pradesh	75.25	6.68	68.57	46.00	3.49	49.48	72
28	Uttarakhand	2.17	0.10	2.07	1.01	0.03	1.05	51
29	West Bengal	30.50	2.92	27.58	10.11	0.79	10.91	40
	Total States	**430.45**	**34.99**	**395.52**	**221.29**	**21.83**	**243.14**	**61**
	Union Territories							
1	Andaman & Nicobar	0.310	0.012	0.298	0.0006	0.010	0.011	4
2	Chandigarh	0.022	0.002	0.020	0.000	0.000	0.000	0.000
3	Dadara & Nagar Haveli	0.059	0.003	0.056	0.001	0.007	0.009	15
4	Daman & Diu	0.012	0.001	0.011	0.008	0.003	0.011	99
5	Lakshdweep	0.0105	0.0070	0.0035	0.0000	0.0026	0.0026	74
6	Puducherry	0.171	0.017	0.154	0.121	0.029	0.150	98
	Total Uts	**0.59**	**0.04**	**0.54**	**0.13**	**0.05**	**0.18**	**34**
	Grand Total	**431.03**	**35.03**	**396.06**	**221.42**	**21.89**	**243.32**	**61**

14. TECHNICAL SCRUTINY / EXAMINATION OF SCHEMES/PROPOSALS

14.1 MAJOR AND MEDIUM IRRIGATION SCHEME / PROPOSALS

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 Agriculture from the point of view of their impact on groundwater regime and specific recommendations are being made to project of CWC. The projects examined during the year are listed below:

Sr. No	Project
1	Parwan Major Irrigation- Drinking Water Supply Project, Jhalawar district, Rajasthan
2	Lower Terna Project, Osmanabad and Latur Districts, Maharashtra
3	Morand and Ganjal Complex Project, Narmada basin of Harda & Khandwa districts, Madhaya Pradesh
4	ONG Dam Project, Bargarh district of Odisha
5	Chakpi Multipurpose Project in Chandel district, Manipur

All of above listed projects were examined and observations/comments were sent in respect of GW Component to CWC. The observations on 8 Irrigation Projects are under scrutiny at Regional Directorates as on 31.03.2013.

15. HUMAN RESOURCES DEVELOPMENT

It is the earnest endeavor of Central Ground Water Board to keep its technical personnel apprised with the latest development in all aspects related to ground water and drilling techniques. The Board also includes trainees from State Departments and candidates from abroad for different training programmes.

15.1 Training Programmes under Hydrology

♦ **One day awareness raising training programme under Hydrology Project II**

One day awareness raising training programme was conducted under Hydrology Project-II on 'Artificial Recharge to Ground Water & Ground Water Management' at Raipur on dated 7th February, 2013. 24 numbers of trainees from Ravi Shankar University, NIT and Agricultural College attended the training.

- Awareness Raising Training under Hydrology Project II was organized at Rajaji Bhavan, Chennai on 20.03.13. Prof. Mohan, Director, National Institute of Technical Teachers Training and Research (NITTTR) was the Chief Guest and inaugurated the program. Shri. V. Radhakrishnan, Sr. Hydrogeologist, Agriculture Department, U.T of Puducherry was the Guest of Honour. About 120 participants from various state agencies and academic and research institutions attended the program. Training volume was released by the Chief Guest.
- Awareness Raising Training Programme on Hydrological Information System under Hydrology Project was organized by CGWB at Thiruvananthapuram on 25th March 2013.
- Awareness Raising Training Programme on Hydrological Data User Group under Hydrology Project II was held at Bhujal Bawan, Cerntral Ground Water Board, North Western Region, Chandigarh on 20th March, 2013.
- Awareness Raising Training Programme on "Water Conservation and Artificial Recharge to Ground Water" under Hydrology Project II organized successfully at Kangra on 26th March, 2013.

15.2 Rajiv Gandhi National Ground Water Training and Research Institute

It has been the earnest endeavor of the Board to keep its technical personnel abreast with the latest developments in all aspects related to ground water development & management. Trainees from State Departments and candidates from abroad are included in the training programme being organized by the Board.

Rajiv Gandhi National Ground Water Training & Research Institute (RGI) under Central Ground Water Board has been established at Raipur (Chhattisgarh) to conduct training courses for CGWB and other Central / State Government organizations, Universities, Institutes etc. RGI imparts training at the induction, mid-career and senior management levels in all relevant aspects of hydrogeological investigations, exploration, assessment, development and management of ground water. During the year 2012-13 (upto 31.03.2013), 168 (32- teir I, 36-tier II and 100 tier-III training programmes were conducted by RGI and total 17365 (565- teir I, 1160-tier II and 15640 tier-III trainees were trained including 3451 female participants.

- Three days training of Map Info software ver. 11 was conducted by vendor of the software M/s Datacode, Nagpur during 1st to 3rd August, 2012 at Nagpur. The training was attended by 20 trainees from 18 Regions, 1 SUO and CHQ office.
- Three days training of Erdas software was conducted by vendor of the software M/s Intergraph, Gurgaon during 4th to 8th August, 2012 at CGWB, Nagpur. The training was attended by 10 officers from 5 Regions engaged in Micro Level Pilot Project Studies.
- Three days training on Rockworks software was conducted by vendor of the software M/s Datacode, Nagpur on payment basis during 9th to 11th August, 2012 at CGWB, Nagpur. The training was attended by 10 officers of CGWB, Nagpur.
- Scientists of Central Ground Water Board, South Western Region, Bangalore attended a Modeling soft wares training course from 16-18th August, 2012 conducted at Faridabad.
- Three days training on software "**Rockworks 15**" was conducted for technical officers on 23rd August to 25th August, 2012 at Central Ground Water Board, Western Region, Jaipur.

- **Five-day training programme on Village Water Security Planning for National Drinking Water Security in Pilot Project Blocks'**

  Central Ground Water Board, Northen Region organized five-day training programme on 'Village Water Security Planning for National Drinking Water Security in Pilot Project Blocks' from 7-11 January 2013 in collaboration with UP Jal Nigam for capacity building of State Nodal Officers and officials of UP Jal Nigam under Participatory Management Programme of Ministry of Drinking Water and Sanitation.

♦ **Other Training Programmes**

Trainings of Software conducted at CGWB offices

- Three days training of Map Info software ver. 11 was conducted by vendor of the software M/s Datacode, Nagpur during 1st to 3rd August, 2012 at Nagpur. The training was attended by 20 trainees from 18 Regions, 1 SUO and CHQ office.
- Three days training of Erdas software was conducted by vendor of the software M/s Intergraph, Gurgaon during 4th to 8th August, 2012 at CGWB, Nagpur. The training was attended by 10 officers from 5 Regions engaged in Micro Level Pilot Project Studies.
- Three days training on Rockworks software was conducted by vendor of the software M/s Datacode, Nagpur on payment basis during 9th to 11th August, 2012 at CGWB, Nagpur. The training was attended by 10 officers of CGWB, Nagpur.
- Scientists of Central Ground Water Board, South Western Region, Bangalore attended a Modeling soft wares training course from 16-18 th August, 2012 conducted at Faridabad.

Three days training on software "**Rockworks 15**" was conducted for technical officers on 23 rd August to 25th August, 2012 at Central Ground Water Board, Western Region, Jaipur

16. 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.

16.1 Reports

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

16.1 State Reports

State Reports containing complete details of ground water surveys, exploration and other ground water related information are compiled and prepared for 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 2012- 2013, out of 22, 15 reports among these (one could be issued by March 2013 and fourteen others were submitted for issuance) state reports have been completed.

16.1.2 State Chemical Reports

During 2012-13, 3 State Chemical Reports have been completed / submitted of the states of Bihar, Jharkhand, Gujarat and Jammu.

16.1.3 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 their strategies for future. During 2012-13, 217 district brochures were prepared and submitted.

16.1.4 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 2012-13, 23 reports were prepared. Region wise status of preparation of ground water year book are presented in Table 16.1

16.1.5 Ground Water Exploration Reports

During 2012-13, 12 Ground Water Exploration Reports have been completed / submitted of the states of Rajasthan, Karnataka, Andra Pradesh,Jammu, Himachal Pradesh, M.P Kerala, Bihar, Chhattisgarh, North East States, New Delhi, Tamil Nadu.

16.2 Bhujal News

Bhujal News is a quarterly journal being published by Central Ground Water Board highlighting the latest advances in ground water research. Besides scientific papers, the journal also contains technical notes, news items, and regular columns. The journal has more than 1500 readers from all over the country. During the year 2012-13 up to 31st March 2013, the Vol. No 26, 3 & 4 and Vol. 26, 1-4, combined issue of silver jubilee publication has been brought. In this special issue this Application on Remote sensing, GIS & Mathematical modelling in Ground water.

Table 16.1: Status of Ground Water Year Books Completed during 2012-13

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	2	Punjab, Haryana & Chandigarh
4	Western Region	1	Rajasthan
5	West Central Region	1	Gujarat
6.	North Central Region	1	Madhya Pradesh
7.	North Central Chhatisgarh Region	1	Chhattisgarh
8.	Central Region	1	Maharashtra
9.	Northern Region	1	Uttar Pradesh
10.	Mid Eastern Region	2	Bihar, Jharkhand
11.	Eastern Region	2	West Bengal
12	North Eastern Region	1	North Eastern States
13	South Eastern region	1	Orissa
14	Southern Region	1	Andhra Pradesh
15	South Western Region	2	Karnataka, Goa
16	South Eastern Coastal Region	1	Tamilnadu
17	Kerala Region	1	Kerala
18.	Uttaranchal Region	1	Uttarakhand
19.	SUO, Delhi	1	Delhi
	Total	23	

17. CONSTRUCTION/ACQUISITES OF OFFICE BUILDINGS

The details of following construction work for own office building of Central Ground Water Board have been carried during 2012-13 up to 31st March 2013 is given in table 19.1.

Table 17.1: Construction Work for Own office building during 2012-13

S.No.	Name of Project/Scheme	Name of PAO of CPWD to whom funds authorized	Funds Placed/Authorized during 1st April 2012 to 31st March, 2013	Reference & Date of Ministry/Office of the Controller of Accounts by which funds Authorized.
1	Construction of Building for Regional & Divisional Office at Guwahati.	PAO (NZ), CPWD, Malika Point, Raja Villa, Shillong	Rs.4,00,00,000/-	WR/CA/ACs/5(2)(4)(4)/12/13/74 dated 25.04.2012
2.	Construction of Boundary Wall for Regional & Divisional Office at Ahmedabad.	PAO(WZ), CPWD, Ministry of Housing & Urban Poverty, 18th floor, CGO Annexe, 101, M.K. Road, New Marin Line, Mumbai-400020	Rs.16,71,731/-	WR/CA/ACs/5(2)(4)(4)/12/13/65 dated 25.04.2012
3.	Construction of Boundary Wall and Earth Filling work for Divisional Office, Workshop & Store at Ambala.	PAO (NZ), CPWD, East Block, Level-6, R.K. Puram, New Delhi	Rs.50,000/-	WR/CA/A/Cs/5(2)(4)(4)/12/13/55 dated 25.04.2012
4	Construction of Boundary Wall at SER, Bhubaneshwar.	PAO(East Zone), CPWD, Ministry of Urban Development, Nizam Palace, Kolkata-700020	Rs.6,14,000/-	WR/CA/A/Cs/5(2)(4)(4)/12/13/46 dated 25.04.2012
5	Construction of Building for Divisional Workshop & Store on the land of CGWB at Bangalore.	PAO (South Zone), CPWD, Rajaji Bhawan, Besant Nagar, Chennai	Rs.15,00,000/-	WR/CA/A/Cs/5(2)(4)(4)/12/13/223 dated 31.05.2012
6	Construction of Building for Divisional Office Workshop & Store at	PAO (Food Zone), CPWD, 4th Floor, 'A' Wing, I.P. Bhawan, New	Rs.2,00,00,000/-	WR/CA/A/Cs/5(2)(4)(4)/12/13/232 dated 31.05.2012

	Bhopal.	Delhi		
7.	Construction of Building for Divisional Office Workshop & Store at Bhopal (SH: Electric work)	PAO (Food Zone), CPWD, 4th Floor, 'A' Wing, I.P. Bhawan, New Delhi	Rs.20,00,000/-	WR/CA/A/Cs/5(2)(4)(4)/12-13/421dated 12.07.2012
8	Construction of Boundary Wall on the land of CGWB at Jammu.	PAO (NZ), CPWD, East Block, Level-6, R.K. Puram, New Delhi	Rs.5,00,000/-	WR/CA/A/Cs/5(2)(4)(4)/12-13/571dated 17.08.2012
9	Electrical work of Building for Regional & Divisional Office at Guwahati	PAO (NZ), CPWD, Malika Point, Raja Villa, Shillong	Rs.30,00,000/-	WR/CA/A/Cs/5(2)(4)(4)/12-13/561 dated 17.08.2012
10	Construction of Boundary Wall on the land of CGWB for RGNGWTRI at Raipur.	PAO (FZ), CPWD, I.P. Bhawan, New Delhi.	Rs.20,00,000/-	WR/CA/A/Cs/5(2)(4)(4)/12-13/1004 dated 08.11.2012

18. DISSEMINATION AND SHARING OF TECHNICAL KNOW-HOW

18.1 Presentation of Technical Papers and Lectures

- Sh. G. P. Singh, Scientist 'B' Central Ground Water Board, Western Region, North Western Region, Chandigarh delivered a lecture at NITTR, Chandigarh on Rain Water Harvesting Techniques, on 10.05.20111.
- Shri Rana Chatterjee, Sc 'D', Central Ground Water Board, Western Region, Jaipur attended training and hands on session on Visual Modflow and Rockworks software at CHQ, Faridabad.
- Shri S.K.Samnol, System Analyst, Shri R.M.Verma ,Sc-B from Central Ground Water Board, Faridabad and Dr. A.K. Jain, Sc-B from Central Ground Water Board, Western Region have installed GEMS and imparted training on GEMS to the officers of State Ground Water Department, Govt.of Rajasthan, Jaipur during the period of 23rd to 25th May,2012.
- Shri SSP. Mishra, Superintending Hydrogeologist and Dr. AGS. Reddy, Sc-D Central Ground Water Board, SUO, Pune delivered lectures/presentations on "Rain Water Harvesting Techniques" to HSBC bank employees, Shivaji Nagar, Pune on 07/06/2012. The lectures/presentations were delivered as per the instruction of CHQ on request of FORCE, an NGO from Delhi.
- Dr K.Md Najeeb Regional Director and Dr K.R.Sooryanarayana Sc-D delivered technical talk on Rain water harvesting for ground water sustainability to the officials of HSBC in two branches at Bangalore on 8.6.2012. The talk was organized by a Delhi based NGO, FORCE.
- Sh. A. K. Bhatia, Regional Director, Central Ground Water Board, North Western Region, Chandigarh delivered lecture on 'Rain Water Harvesting & Artificial Recharge' on 05.06.12 at workshop organized by Central Soil & Salinity Research Institute.
- Dr. Shailendra Singh, scientist Central Ground Water Board, North Western Region, Chandigarh delivered lecture on 'Water Conservation & Save Water' at BSF Recruitment Centre, Kharak kalan, Hoshiarpur at programme chaired by Sh. Avinash Rai Khanna, Hon'ble Member of Parliament, Rajya Sabha on 10.06.12. Sh. D. C. Sharma, scientist also attended the Awareness raising programme.
- Shri. K. Sivashanmuganathan, AHG Central Ground Water Board, South East Coastal Region made presentations on "Roof Top Rainwater Harvesting Techniques and Water Conservation" in an awareness programme to Bank officials organized by Forum Organiser Conservation and Environment (FORCE) on 07.06.12 and 08.06.12 at Chennai.
- Dr. P.N. Rao, Scientist D & Head of Office delivered a guest lecture on Methods of Artificial Recharge to Ground Water on 13th June, 2012 at Engineering Staff College, Hyderabad.
- Regional Director of Central Ground Water Board, South Western Region, Bangalore delivered Guest lecture on "Water Conservation" at Karnataka Engineering Research Station (KERS), KRS, Mysore during the workshop on "Advanced Techniques on Water Resource Management" which was held on 24.1.2013.
- Scientist of Central Ground Water Board, Central Region, Nagpur presented a Popular Lecture on 'Rainwater Harvesting and Artificial Recharge in Urban and Rural Ares' on 12th January 2013 at Raman Science Centre, Nagpur. The Lecture was attended by about more than 100 students and their teachers of various high schools and engineering students. Officers and Officials of various participating organizations also attended the popular talk.
- Chemist of Central Ground Water Board, SR, and Hyderabad delivered a lecture on "Current Status of Ground Water – Its quality for Irrigation in Andhra Pradesh" on 8th January, 2013 at CRIDA, Hyderabad.
- Scientist D of Central Ground Water Board, SR, Hyderabad delivered lecture on "Ground Water Contamination" on 23rd January, 2013 in NGRI, Hyderabad.

Scientists of Central Ground Water Board, WCR, Ahmedabad made presentation in respect of Aquifer Mapping Studies taken up during AAP 2012-13 in parts of Banaskantha, Gandhinagar, Mahesana, Patan and Porbandar districts during 7th-8th January 2013 at CHQ, Faridabad.

- Sri G. Sudarshan, Head of Office, Central Ground Water Board, Southern Region, Hyderabad delivered a lecture on "Ground Water Recharge Technique and roof Top Rain Water Harvesting – Planning & Design of Structures" at ESCI, Hyderabad on 05.03.2013.
- The Regional Director, Central Ground Water Board, South East Coastal Region, Chennai delivered lectures on "Hydrogeological Condition in Tamil Nadu and Artificial Recharge in Rural and Urban Areas" to the Graduates and Post Graduates Students of Geology, Presidency College, University of Madras, Chennai and on "Water Cooperation" during the World Water Day

celebrations organized by the Institution of Engineers, Neyveli on 22.03.2013.

- Regional Director of Central Ground Water Board, North Central Chattisgarh region Raipur delivered lecture on" Ground Water Scenario of Chhattisgarh State",on National Workshop Water Science and Policy for Sustainable Development,Organised by CCOST,Govt of Chhattisgarh, on 22.03.2013.
- Scientist B of Central Ground Water Board, North Central Chattisgarh region Raipur delivered lecture on "Governance of Ground water and Management- on National Workshop Water Science and Policy for Sustainable Development, Organised by CCOST,Govt of Chhattisgarh on 22.03.2013.
- Regional Director of Central Ground Water Board, North Western Region, Chandigarh gave a lecture on Sustainable Development of Ground Water in Punjab State held by Indian Meteorological Department, Chandigarh on 22nd March, 2013.
- Regional Director of Central Ground Water Board, North Western Region, Chandigarh delivered a lecture on "Rain Water Harvesting and Artificial Recharge Structures" and Shri Dinesh Tiwari, Scientist delivered lecture on "Ground Water Scenario of Haryana State" at a programme held by Indian Town Planner Institute, Haryana in collaboration with Times of India Group on 23rd March, 2013 at Panchkula, Haryana.

Shri G.C.Pati, Regional Director, Eastern Region, Kolkata delivered a lecture on "Water Resource Management with reference to Ground Water Recharge & Rain Water Harvesting" in the National Seminar on "Promoting safe water supply for urban & Rural Community: Problems & Prospects" Organized by All Indian Institute of Hygene & Public Health at Kolkata on 21.03.2013.

18.2 Participation/Organized Workshop, Seminars and Conference

- Regional Director, Central Ground Water Board , South Western Region, Bangalore office participated as Guest of Honor during the Earth Day celebrations on 22.4.2012, which was organised by Geological Society of India.
- Scientists of Central Ground Water Board, South Western Region and Bangalore attended workshop on Forward Modeling of SKYTEM response to the pilot areas under Aquifer Mapping project, which was organized by CGWB & NGRI during April 12-16, 2012 at Hyderabad.
- Ground Water Board, South Western Region, Bangalore is exhibiting working models on Rain Water Harvesting at the office of INTEL, Bangalore on the occasion of Earth Day from 25th to 30th April 2012.
- Dr K.Md.Najeeb, Regional Director, Central Ground Water Board, Bangalore attended meeting on Strategies of National Water Mission implementation chaired by the Additional Secretary, Ministry of Water Resources, Govt. of India .
- Scientists of Central Ground Water Board, North Himalayan Region, Dharamshala attended State Level Workshop on "Water Use Efficiency" at Shimla on 24th May, 2012 organized by Indian Environment Law officers, Gurgaon, Haryana.
- Dr K.Md Najeeb Regional Director and Dr K.R.Sooryanarayana Sc-D of Central Ground Water Board, Bangalore attended "Ground Water Experts Meet" on 18.5.2012, which was organized by Arghyam an NGO and participated in the deliberations.

Appreciation for valuable support towards the Awareness Campaign on "Water Conservation" carried out by Eco-Watch.

- Central Ground Water Board, South Western Region, Bangalore received appreciation letter from Eco-Watch, Centre for Environment and Sustainable Development, Bangalore, an NGO, for the association of CGWB through exhibition of Models on rainwater harvesting and artificial recharge to ground water and distribution of resource material during their awareness campaign on "Water Conservation" in Bangalore which was conducted in the month of April 2012.
- Scientists of Central Ground Water Board, South East Coastal Region, and Chennai attended the Brain Storming and planning workshop on Pilot Aquifer Mapping at CSIR-NGRI, Hyderabad during August 13-14, 2012.
- Scientists of Central Ground Water Board, South East Coastal Region, and Chennai participated in the "Tamil Nadu Water Summit" organized by Confederation of Indian Industry (CII), Chennai on 10.08.2012.
- A lecture/presentation on Rain Water Harvesting was delivered by Shri Sourabh Gupta, Scientist, Central Ground Water Board, Pune on 7th August, 2012 during the Maintenance Command C ADM O Conference – 2012 at IAF, Pune.
- Regional Director of Central Ground Water Board, South Western Region and Bangalore attended following programmes at Hard Rock Regional Centre, NIH and Belgaum.

- Delivered expert talk on " Hard Rock Hydrogeology" during Brain Storming session on "Hydrology of Hard Rock area" on 2.8.2012
- Attended 22nd Regional Coordination Committee on 3rd August , 2012

- Hindi Workshop was organized on 27.8.2012 at Bhujal Bhavan, Bangalore by SWR and Division XIV jointly. Sri Damodaran Asst.Director, Hindi Training Institute, RajaBhasha, Kendriya Sadan, Bangalore is the resource person. All officers and officials attended the workshop. Nodal Officer, Pilot Aquifer Mapping Sh R.R.Shukla, Sc 'C' of Central Ground Water Board, Mid Eastern Region, and Patna attended the Brain Storming workshop organised by NGRI Hyderabad.
- The Regional Director of Central Ground Water Board, West Central Region, Ahmedabad attended the National Review Workshop on Drinking Water Security Pilot Project held at Hotel Pride, judges Bungalow Road, Ahmedabad on 24th September 2012.
- Awareness Workshop on "Sustainable Management of Groundwater Resources" was organized jointly with Centre for Water Resources Development and Management (CWRDM) and Communication & Capacity Development Unit (CCDU), Water Resources Department, Govt. of Kerala during 15-16th September, 2012 at Kozhikode district. Hon'ble Minister of State (Home), Govt. of India consented the Chief Guest and inaugurated the Workshop. District Collector, Kozhikode was the Guest of Honour of the Workshop.
- A "National Seminar on Aquifer Management" organised by Central Ground Water Board at A.P. Shinde Symposium Hall, NASC Complex, PUSA, New Delhi on 8th and 9th October 2012 to firm up the implementation strategies, convergence & partnership among various stakeholders.
- Regional Director and Scientist of Central Ground Water Board, Central Region, Nagpur attended one day seminar on "Jal Sanchayan" on 12th October 2012 organised by National Power Training Institute (NPTI), Nagpur in association with NARAKAS at NPTI, Nagpur. Regional Director, Central Region, Nagpur was guest of honour during the inaugural programme. Dr. P.K. Jain, Scientist D delivered a lecture on "Varshajal Sanchayan aur Krutrim Punarbharan".
- Shri P.K.Parchure, Regional Director of Central Ground Water Board, Western Region, Jaipur attended "Jalsatyagrah, National conference on water" on 12thOctober, 2012 at Jaipur and made presentation on Ground Water Scenario of Rajasthan.

Shri P.K.Parchure, Regional Director of Central Ground Water Board, Western Region and Jaipur attended "Vishwa Manak Divas", 2012 Samaroh on 12th October, 2012 as Chief Guest of the Function.

- Head of the Department, Central Ground Water Board, Southern Region and Hyderabad along with Scientist attended a Workshop on "Development of Water Sector Reforms Framework" at ASCI College Park Campus, Road No.2, Banjara Hills and Hyderabad on 09.11.2012.
- Head of the Department and Scientist of Central Ground Water Board, Southern Region Hyderabad attended a Regional Workshop on "Climate Water Forum" jointly organized by "WALAMTARI" & International Water Management Institute (IWMI), South Asia Office, Hyderabad on 26.11.2012.
- Scientist of SWR Bangalore attended workshop on "Integrated Water management'' on 26.11.2012 at Doddaballapur, Bangalore Rural district, which was organized by Doddballpaur TMC in association with an NGO, Swaraj.

Water Conservation Day

Central Ground Water Board, Southern Region, Hyderabad celebrated "Water Conservation Day" on 19th November, 2012 by inviting the school children from "Indu Aranya International School", Indu Aranya, Bandlaguda, Hyderabad-68.

- Regional Director, Central Ground Water Board, Kerala Region, Trivendrum chaired the session on water scarcity in the seminar on Water Management organized by C Achutha Menon Foundation, Trivandrum during 21 – 23.12.2012 and also presented a Paper on Ground Water Management in Kerala – Challenges and Prospects.
- The Regional Director of Central Ground Water Board, South East Coastal Region attended the workshop on "Know Your Water Shed" conducted by Sathya Bhama University at Chennai on 19.12.12.
- Dr K. Md. Najeeb, Regional Director, CGWB, SWR, Bangalore and Dr K.R. Sooryanarayana Sc-D attended the National workshop on Conservation of water resources of West Flowing Rivers of Coastal Karnataka on 14.12.2012 and 15.12.2012 organized by Department of Applied mechanics and Hydraulics, National Institute of Technology, Surathkal and Mangalore.
- Dr K. Md. Najeeb, Regional Director attended the 5th International Groundwater Conference, IGWC from 18.12.2012 to 21.12.2012 held at Aurangabad and

presented a paper entitled "Challenges of Ground Water Management in Over Exploited Kolar district, Karnataka, India- Viable options" by S.S. Hedge ,Dr K. Md. Najeeb, H.P.Jayaprakash and Dr A. Asokan. The technical session IV was chaired by Regional Director.

- One day Hindi Workshop was organized on 31.12.2012 at Bhujal Bhawan, SWR and Bangalore. Miss Vaijantimala, Manager (Rajbhasa), Syndicate Bank, Bangalore attended the workshop as Guest Faculty.

Shri Pradeep Dube, Regional Director and Dr. P.K. Jain, Sc-D was the guests during the 1-day workshop organized by Jagruti Gramin Vikas Sanstha, Eklari, Dist-Bhandara. The workshop was organized on 15/12/2012 at Mohadi, Bhandara. Shri Pradeep Dube was the chief guest and addressed the gathering of NGO's, farmers about the importance of ground water recharge in present scenario. Dr. P.K. Jain presented a popular lecture on "Rain Water Harvesting and Artificial Recharge".

- Workshop on "Sustainable Management of Ground Water Resources" was organized at Vatakara during 24-25th January, 2013. The Workshop was inaugurated by Shri Mullapalli Ramachandran, Hon'ble Minister of State (Home) and Govt. of India. Around 200 stakeholders attended the workshop.
- Under IEC activity, one-day Regional Workshop on 'Water Conservation for Sustainable Agricultural Uses was organized at Raebareli on 22.1.2013.

- Shri O.P.Poonia Scientist "C" of Central Ground Water Board, Western Region, Jaipur attended two days workshop on "usage of Ground Water Maps (HGM) prepared under Rajiv Gandhi National water Mission (RGNDWM) project at NRSC, Hyderabad organized by Regional Remote Sensing Service Center–West, Jodhpur during 20th to 21st Feburuary,2013. Shri O. P. Poonia has also delivered a lecture on "Ground Water scenario of Rajasthan and Challenges in drinking water supply."
- Shri P.K.Parchure, Regional Director and Dr.Uma Kapoor, Scientist "D" and Shri.Rana Chatterjee, Scientist "D" of Central Ground Water Board, Western Region and Jaipur attended "Brain Storming session on restructuring of State Ground Water Department, Government of Rajasthan" on 22.02.2013 at Jaipur.
- Shri. A. Subburaj, Scientist`D' of Central Ground Water Board, South East Coastal Region attended the State Credit Seminar organized by National Bank for Agriculture and Rural Development at Chennai on 06.02.2013.

- A workshop on conservation of water, Hydrology and Environmental issues for sustainable mining was conducted by SECL at Bishrampur on 23rd February 2013. Regional Director, NCCR was the Chief Guest on the occasion and made presentation on ground water issues pertaining to mining in Koriya and Surguja districts. He also highlighted the issues pertaining to mine dewatering and its impact on ground water regime. During his presentation he also highlighted the revised guidelines of CGWA and its evaluation procedure of mine dewatering. Shri Chakraborty, Scientist 'C' made presentation on importance of RWH & Artificial Recharge which is essential for mining industries and also highlighted the optimal utilization of dewatering for recharge to ground water and augmenting water supply to the villages. On 24th February 2013, Regional Director and Shri D. Chakraborty along with the officers of SECL visited the mining sites to assess the intervention made by the SECL for augmenting ground water around the mine areas. During the field visit few additional suggestions were made by the Regional Director and the same were agreed upon by the SECL for implementation.
- A one day workshop on "Ground Water Management and Regulation-Challenges Ahead" was organized on 21st February, 2013 at Amaravati by CGWB, CR, Nagpur. Dr.Mohan Khedkar, Vice Chancellor, Sant Gadge Baba Amaravati University, Amravati was the Chief Guest of the inaugural function. Shri Pradeep Dube, Regional Director, Central Region, Nagpur presided over the function. Shri Ashok Lokhande, Joint Director, Agriculture Department, Amravati and Shri Ajay Karve, Deputy Director, Groundwater Surveys and Development Agency Amravati were Guest of Honour. During the workshop 9 papers were presented on various topics. About 90 participants/ students from various Central /State Govt. Offices.
- Central Ground water Board, Uttaranchal Region, Dehradun organized a one day workshop on "Ground Water Management in Uttarakhand" on 15th February, 2013 at Dehradun. Sh. Vijay Bahuguna, Hon'ble Chief Minister of Uttarakhand was the Chief Guest of the function. Shri Harish Rawat, Hon'ble Union Minister of Water Resources presided over the function. Shri Sushil Gupta, Chairman CGWB was the special invitee.
- Shri A.K. Bhatia, Regional Director, Central Ground Water Board, North Western Region, Chandigarh attended the State Credit Seminar organized by NABARD on 21st February, 2013.

A workshop was organized by Central Ground water Board, North Eastern Region, Guwahati on Ground Water Resource

Development & Management in NER. Dr. A.D.Patgiri, Professor, Geological Science, Guwahati University was the Chief Guest, Shri A.B.Paul, Ex Chief Engineer, PHED, Govt of Assam, Chairman Pollution Control Board, Govt of Assam were the Guest of Honour.

- Workshop on "Sea Water Intrusion in Coastal aquifers of Tamil Nadu and U.T of Puducherry" was organized at Rajaji Bhavan, Besant Nagar, and Chennai on 15.03.2013. Officers from various State government departments, Academic and Research Institutions participated and presented paper. The program was inaugurated by Er. V. Balraj, Engineering Director, Chennai Metropolitan Water Supply and Sewerage Board (CMWSSB). Shri. P.P Sreenivasan, Chief Engineer, Central Public Works Department, Chennai was the Guest of Honour. The workshop volume was issued and distributed among the participants during the workshop.
- Workshop on "Analysis of Capacity Building Needs for Aquifer Mapping & Water Resources Management in Kerala" was organized at Trivandrum on 19th March 2013. The Workshop was inaugurated by Sri V.J. Kurien, Principal Secretary to Water Resources Department, Govt of Kerala.
- Central Ground water Board, Southern Region, Hyderabad participated in the "Andhra Pradesh State Water Week, 2013" Celebrations organized by IWMI (*Climate Water Form)* on 22.03.2013 at Hyderabad and in a Workshop on "Water Climate Forum" organized by WALAMTARI, Hyderabad on 14.03.2013.
- Central Ground Water Board, State Unit Office, Visakhapatnam organized a Workshop on "Management of Coastal Aquifers" on 25.03.2013. Sri G. Sudarshan, Head of Office, Southern Region, Hyderabad inaugurated and participated in the Workshop. Dr. P.N. Rao, Scientist-D participated and presented paper titled "Coastal Aquifer Systems – An Overview" in the Workshop.
- One day seminar on "Ground Water Scenario in Jaipur Urban areas" organized by Western Region, Central Ground Water Board, at Jaipur, Rajasthan on 01.03.2013.
- Regional Director of Central Ground water Board, Western Region, Jaipur participated in workshop on "Promoting Sustainable Textiles for Sustainable development "in Indian Textile Industry on 20.03.2013 organised by 'Health & Social Development Research Center, Jaipur and made a presentation on "Textile Production Process & Water Use Efficiency/Ground Water Scenario in Jaipur Region & it's relevance to Textile Production."
- Workshop organized on 15th of March 2013 and finalized recommendation based on technical paper, 16 technical papers included in workshop volume. Out of 16 papers 8 papers received from officers of North Central Chhattisgarh Region, Raipur.
- Scientists of Central Ground Water Board, South Western Region, Bangalore attended capacity building workshop on heliborne geophysics for regional aquifer mapping organized by NGRI Hyderabad from 7 to 9 thMarch 2013.
- Organized International Women's day by arranging an awareness programme with a focal theme" Sensitisation on Water Conservation and Management " at St. John Institute of Nursing, Koramangala, Bangalore on 11 hMarch 2013 .
- One day National workshop on 'Innovations and Best Practices in Water Conservation' was organized at Bhujal Bhawan, CGWB, Bangalore on 14 th March 2013. Totally 24 No of technical papers were received and proceedings of workshop brought out.
- Dr. K. Md. Najeeb, Regional Director, SWR, Bangalore presented the key note address on 'Sustainable development of groundwater resources in hard rock areas' in the National seminar on current trends in Precambrian Geology on 21st March 2013 at Mysore.
- Scientists of Central Ground Water Board, North Western Region, Chandigarh attended World Water Day Program conducted at Institute of Engineers. Shri R.K. Garg, Engineer-in-Chief, Irrigation Department, Govt. of Punjab was the Chief Guest of the programme.
- A Workshop on "Managed Aquifer Recharge in Hills & Valleys of Himachal Pradesh" organized successfully at Dharamshala on 6 thMarch, 2013.
- Regional Director, MER, Patna, Dr. Dipankar Saha delivered a key note address in a National Seminar organised by Patna University, Patna on "Management of Ground Water Resources in India with special reference to Bihar" on 19 th March 2013. Two oral presentations were also made by Scientists of MER, Patna in the Seminar.

19. PUBLICITY AND PUBLIC AWARENESS

Central Ground Water Board/ Ministry of Water Resources participated in following Exhibition/Trade Fair during 2012-13.

Hindi Week Celebration

"Hindi Pakhwara" 2012 was celebrated in Central Ground Water Board, CHQ Faridabad from 14th to 28th September 2012. During the fortnight various competitions relating to official language Hindi were organized viz. Hindi Noting, Hindi Essay writing, Quiz, Translation, Hindi Typing, debate etc. In addition to these two competitions namely Hindi Language Knowledge and Quiz were also organized for multi tasking staff. All the officers and staff showed keen interest in the above competition. The prize distribution ceremony was organized on 1st October 2012. The winners of the competition were awarded by Col. M.C. joshi, Director (A) and smt. Anita Gupta, Regional Director (HQ). shri U.V. Singh, OL (I/C) welcome all the distinguished guest and briefed the activities during the Pakhwara. Vote of thanks was given by Shri Rakesh Gupta, AD (OL). "Hindi Pakhwara" 2012 was also celebrated in Regional, Divisional and State Unit offices of Central Ground Water Board

State level painting competition

North Eastern Region

The 3rd state level painting competition was successfully organised in the four states of North East in Assam, Arunchal Pradesh, Meghalaya and Tripura on 21st November 2012.

A total of 33100 students from Assam, 4015 from Meghalaya, 2510 from Arunachal Pradesh and 7550 from Tripura have participated in the school level painting competitions conducted in their respective schools. Students from Manipur state were also participated in the school level painting competition and two are selected for the state level painting competition. Top three winners of each state will be participated in the National Level Painting competition held on 21st January 2013 at New Delhi.

Southern Region

Selection of 50 paintings for State Level Painting Competition-2012 was carried out by the jury on 08th Nov-2012 from School Level Paintings received. State Level Painting Competition 2012 was organized successfully on 21st November, 2012 at Ravindra Bharati, Hyderabad. The Chief Guest Shri B.S.S. Prasad, I.F.S., Special Secretary, Environment and Forest, Govt. of A.P, presented the 1st, 2nd and 3rd and consolation prizes to the winners of the competition. Shri B.M. Muralikrishna Rao, Director, SGWD, Govt. of A.P was the Guest of Honour. Shri G. Sudarshan, Regional Director (I/C) presided over the valedictory function.

Kerala region

The State Level Painting Competition – 2012 was conducted at Kanakakkunnu Palace, Thiruvananthapuram on 21.11.2012. A total of 50 candidates participated in the competition. The Theme of the competition was "Replete Ground Water before it depletes'. Shri P.J. Joseph, Hon'ble Minister for Water Resources, Government of Kerala was the Chief Guest and distributed cash awards and merit certificates to the winners of the Painting Competition.

The UT Level Painting Competition – 2012 was conducted at Kavaratti, UT of Lakshadweep on 13.12.2012. A total of 47 candidates participated in the competition. The Theme of the competition was "Replete Ground Water before it depletes'. Shri A. Hamsa, Director of Education, Lakshadweep was the Chief Guest and distributed cash awards and merit certificates to the winners of the Painting Competition.

North Himalayan region

Third State Level Painting Competition has been organised successfully on 21.11.2012. Shri Kishan Kapoor, Hon'ble Minister for Industries & Labour & Employment, Sainik Welfare, Govt. of Himachal Pradesh was Chief guest

Western Region

State Level Painting Competition,2012 was organised on 21.11.2012 under the guidance of Regional Director. In the competition out of 50

students, 49 students were reported and participated.

South east Coastal Region
U.T of Puducherry

State Level Painting Competition on "Water Conservation" for U.T of Puducherry was conducted at Puducherry on 06.11.12. Shri. T. Thiagarajan, Hon'ble Minister for Agriculture and Education was the Chief Guest during the valedictory function. Shri. Tamil Selvan, Hon'ble MLA presided over the function. The winners of the painting competition were awarded prizes. The event was widely covered in the newspapers. The total no. of participants at school level painting competition was 12,763 students from 232 schools.

Tamil Nadu

State Level Painting Competition on "Water Conservation" for Tamil Nadu was conducted at Chennai on 21.11.12. Dr. Asit Baron Mandal, Director, CLRI, Chennai was the Chief Guest during the valedictory function. Col. M.C Joshi, Director (Admin), CGWB presided over the function. The winners of the painting competition were awarded prizes. The event was widely covered in the newspapers. The total no. of participants at school level painting competition was 3,51,652 students from 11,929 schools

Water Conservation Day

Central Ground Water Board, Southern Region, Hyderabad celebrated "Water Conservation Day" on 19th November, 2012 by inviting the school children from "Indu Aranya International School", Indu Aranya, Bandlaguda, Hyderabad-68.

Third National Level Painting Competition on Water Conservation held at New Delhi

The 3rd National Painting Competition on Water Conservation was organized by Central Ground Water Board, Ministry of Water Resources on 21st January, 2013 at NASC Complex, PUSA, New Delhi in order to create awareness on water conservation among children. Hon'ble Minister of Water Resources, Shri Harish Rawat was the chief guest on the occasion and distributed the prizes to the winner students. The function was attended by senior officers of Ministry of Water Resources, other Central Government departments and distinguished guests.

The Competition was held among the 88 students selected from more than 21 lakh participating students of class IV, V & VI from more than 41,000 schools of 35 States/ UTs at school and state level. Master Shubhranshu Mishra of class VI. Of DAV Public School, Kalinga Nagar, Bhubaneswar, Odisha state won the first prize of Rs 1,00,000/- (Rs. One Lakh). Central Ground Water Board, North Western Region won the trophy for registering the participation of more 4.35 lakh students.

Hon'ble Minster of Water Resources, Shri Harish Rawat in his address emphasized on role of children in conservation and protection of precious water resources. He said that the innovative ideas presented by the children in their paintings will motivate others in society for conservation and judicious utilization of water. He called upon the students, their parents as well as teachers to join hands in creating more awareness to conserve water among the masses. He informed that Ministry will further strengthen the campaign on water conservation by involving all the sections of the society.

4TH NATIONAL GROUND WATER CONGRESS AND INDIA WATER WEEK 2012

The Ministry of Water Resources, organized India Water Week 2012 on 10th April, 2012 at Vigyan Bhawan, New Delhi. National Water Award-2010 was given away by Shri Pawan Kumar Bansal, Hon'ble Minister of Water Resources & Parliamentary Affairs and Shri Sharad Panwar, Hon'ble Minister of Agriculture to M.S.Swaminathan Research Foundation (NGO), Phulabad, Jeypore, District Korapat, Odisha, on the inaugural function of India Water Week 2012.

4th National Ground Water Congress was organized on 13.04.2012 in Vigyan Bhawan Annexe, Hall D, and New Delhi. Theme of congress was Food and Securtiy with sub-themes of Water Use Efficiency & Conjunctive Use of Surface & Ground Water, Ground Water Development and Regulation, Participatory Initiatives for Ground Water Management. Shri Vincent H. Pala, Hon'ble Minister of State, Water

Resources delivered key note address on the inaugural function of Congress. Welcome address was given by Shri D.V.Singh, Secretary, MoWR. Additional Secretary and Joint Secretary, MoWR graced the occasion. Dr.S.C.Dhiman, Chairman, CGWB gave vote of thanks. Volume of Congress was released by Hon'ble Minister of State, Water Resources. Technical papers on said themes were presented by scientists from various departments viz. CGWB, Jawahar Lal Nehru University, IARI , NIH,G.B.Pant University of Agriculture and Technology Uttarakhand. Various awardees presented papers on the theme of Participatory Initiatives for Ground Water Management. More than 400 representatives from various Central/State Govt. organizations, NGO's/academic institutions participated in the congress.

Appreciation for valuable support towards the Awareness Campaign on "Water Conservation" carried out by Eco-Watch.

Central Ground Water Board, South Western Region, Bangalore received appreciation letter from Eco-Watch, Centre for Environment and Sustainable Development, Bangalore, an NGO, for the association of CGWB through exhibition of Models on rainwater harvesting and artificial recharge to ground water and distribution of resource material during their awareness campaign on "Water Conservation" in Bangalore which was conducted in the month of April 2012.

Vigilance awareness week 2012

Vigilance awareness week 2012 was celebrated in Central Ground Water Board, CHQ Faridabad from 29th to 3rd November 2012. "Vigilance awareness week 2012" was also celebrated in Regional, Divisional and State Unit offices of Central Ground Water Board.

Fig 19.1 His Excellency, The Governor of Karnataka, Dr Hansraj Bharadwaj appreciating the paintings.

Fig 19.2: State Level winners of Karnataka along with Hon. Governor of Karnataka, Dr. Hansraj Bharadwaj

19.3: Prize winners with Chief Guests at Jammu

Fig 19.4: State level painting competition-2012, CGWB, NWR, Chandigarh

20. 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 2012-13 up to 31st March, 2013 is given below in Table 22.1:

Table 20.1- Major achievements of the North Eastern Region

Sl.	Activities	Achievements
1.	**Data Generation for Aquifer Mapping**	Pre-monsoon survey carried out in the targeted area of 3550 sq.km. to identify aquifers. Carried out water level monitoring o key wells. General information data collected. Preparation of various layers like drainage, Geo-morphology etc. in progress. Plotted EW, Key wells, NHS Water bodies in the SOI map (in 1:50,000 scale. (Under National Aquifer mapping 3550 sq Km has beencovered)
a	Identification of Aquifer on available 1:250K and Data gap assessment	
b	Ground water Exploration (No. of boreholes)	EW – 17 OW – 6 PZ - 1
c	Geophysical Studies	78 Vertical Electrical Sounding and 1 bore hole logging completed.
d	Water Quality Analysis	a) Basic analysis = 117 b) Heavy metal = 113
e	Ground Water Regime Monitoring	Monitoring of water level from GWMS for the month of March, August November, 2013 and January 2014completed.
	Establishment of additional wells	238 wells
	Participatory Ground Water Monitoring	Participatory monitoring of 69 GWMW completed till date.
f	Short Term Water Supply Investigation.	50 nos.
g	Artificial Recharge Studies ongoing projects	i) **Arunachal Pradesh:** 2nd installment of Rs. 20.35 lakh each for RTRWH i n West Siang & East Kameng district released under Tribal Sub Plan & wor under progress. The utilizatio n certificates for the 1st installment o the schemes in Tawang & Lowe Dibang Valley submitted to CHQ. 2n installment of Rs 17.06 Lakh fo Tawang district & Rs 25.97 Lakh for Lower Dibang valley district released ii) **Nagaland: a.** 2nd installment of Rs. 33.92 lakh for RTRWH in Dimapur district released. The UC for 1st installment of the scheme in Dimapur & Wokha districts is submitted to CHQ. Utilization certificate received 2nd installment of Rs 48.88Lakh for in and around Dimapur town, Nagaland released
h	Ground Water Resources Assessment (No of States/ UT) (As on 31-	The reports on Dynamic GW Resources as on 31.03.11 for all the seven North Eastern States have already beer completed and submitted to CHQ.

Sl.	Activities	Achievements
	03-2012)	The computation of total ground water resources availability, as pe revised guideline, for all the sever North Eastern States is completed & sent to CHQ Reconciliation of Tripura, Mizoram Arunachal Pradesh, Manipur Nagaland, Assam , Meghalaya completed
2	Issuance of District Brochures	All District Brochures are prepared and submitted to CHQ.

Sl.	Activities	Achievements
3	Ground Water Year Books	Ground Water Year Book of NE State-issuanced
4	State Level Painting Competition	4^{TH} State Level Painting Competition successfully competed in the Region.
5	GW Regulation	50 nos received

21. PROPAGATION AND PROGRESSIVE USE OF HINDI LANGUAGE

- During the above period the provision relating to Section 3(3) of the Official Language Act, 1963 has been complied with.
- Letters received in Hindi were invariably replied in Hindi.
- Hindi Quarterly 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 Scheme for original Noting & drafting in Hindi is being implemented. Ten officials were awarded cash prize under this scheme.
- Ten sections of the Office have been specified to work cent-percent in Hindi.
- 'Bhumijal News Letter', the quarterley magazine of the Board is being published regularly. .
- Deputy Director (O.L), MOWR carried out an inspection of CHQ Faridabad in November, 2012. He expressed his satisfaction on the progress made in the field of OL implementation.
- "Hindi Pakhwara" was celebrated in CHQ, Faridabad during 14.9.2012 to 28.9.2012. Various competitions relating to official language were organized during the Pakhwara and prizes were awarded to the participants.
- Hindi Workshop is being organized regularly in CGWB.
- The Second Sub-Committee of Parliamentary Committee on Official Language conducted inspections of SUO, New Delhi on 28.5.2014, Central Region, Nagpur on 09.11.2012 and Divisional Office, Varanasi on 09.02.2013. The Committee expressed its satisfaction on the implementation of Official Language and propagation of Hindi in these Offices.
- The Website of the Board is available in bilingual form. Hindi Books are being purchased as per the prescribed target. Advertisements of all india level are being published as per rules in bilingual/trilingual form and the 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.
- The Board is committed towards the progressive use and implementation of Hindi. Sustained efforts are being made to achieve the targets stipulated under the Annual Programme.

22. VIGILANCE ACTIVITIES

During the year 2012-2013, 14 complaints cases were brought forward w.e.f 1.4.2012 and 18 new complaint cases were received during the year. Out of theses 32 complaints 9 were closed and 2 complaints cases were taken up as disciplinary proceedings. Therefore, 21 complaint cases were taken up as disciplinary proceedings. Therefore, 21 complaint cases were carried forward w.e.f 1.4.2013.

Disciplinary Proceedings

10 cases of disciplinary proceeding were B/F w.e.f 1.4.2012 and 2 cases of disciplinary proceeding were received during the year and 2 cases were disposed off. Thus total 10 cases of disciplinary proceeding were carried forward w.e.f 1.4.2013

23. RTI INFORMATION

Total 457 RTI applications were received and out of 457, 83 Number of cases transferred to other Public Authorities and 10 no. Of cases was rejected. 420 No. applications have been disposed off.

An amount of Rs 2598/- was received towards application fee and 2533 as Additional fee& any other Charge. Details are given below in table 23.1

Table 23.1: RTI Information for year 2012-2013

Year 2012-2013	RTI Received	Opening Balance as on 01-04-2012	Received during the quarter(Including Cases transferred from other Public Authorities)	Number of cases transferred to other Public Authorities	Decisions where Requests/Appeals Rejected	Decisions where Requests/ Appeals Accepted	Number of cases where Disciplinary action taken against any Officer	Number of CAPIOs Designated	Number of CPIOs Designated	Number of AAs Designated
April-June	Requests	69	100	11	2	85		8	20	1
	First Appeal									
July-sep	Requests	71	158	17	4	170		8	20	1
	First Appeal		2	1		1				
Oct-Dec	Requests	38	92	21		91		8	20	1
	First Appeal		2			2				
Jan-March	Requests	18	107	33	4	74		8	20	1
	First Appeal		11			8				
Total	Requests	196	457	83	10	420		32	80	4
	First Appeal		15	1		11				

24. PERSONNEL MANAGEMENT

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

Table 24.1- Personnel Deployment in Central Ground Water Board during 2012-2013 (Up to 31st March, 2013)

GROUP "A"							
Section	**Sanctioned**	**Filled**	**Vacant**	**OBC**	**Handicapped**	**SC**	**ST**
Scientific	403	312	91	25	2	45	13
Ministrial	7	4	3		-		
Engineering	56	49	7	10	-	9	6
Total	**466**	**365**	**101**	**35**	**2**	**54**	**19**
GROUP "B"(Gazetted)							
Section	**Sanctioned**	**Filled**	**Vacant**	**OBC**	**Handicapped**	**SC**	**ST**
Scientific	219	133	86	22	1	23	8
Ministrial	36	26	10			1	2
Engineering	110	53	57	4		13	7
Total	**365**	**212**	**153**	**26**	**1**	**37**	**17**
GROUP "B"(Non-Gazetted)							
Section	**Sanctioned**	**Filled**	**Vacant**	**OBC**	**Handicapped**	**SC**	**ST**
Scientific	183	109	74	15		23	9
Ministrial	203	178	25	4	6	24	12
Engineering	265	224	41	10	1	57	19
Total	**651**	**511**	**140**	**29**	**7**	**104**	**40**
GROUP "C"							
Section	**Sanctioned**	**Filled**	**Vacant**	**OBC**	**Handicapped**	**SC**	**ST**
Scientific	91	49	42	3		14	5
Ministrial	1136	860	276	139	12	199	80
Engineering	1462	1174	288	135	12	236	96
Total	**2689**	**2083**	**606**	**277**		**449**	**181**
GRAND TOTAL							
Groups	**Sanctioned**	**Filled**	**Vacant**	**OBC**	**Handicapped**	**SC**	**ST**
GROUP "A"	**466**	**365**	**101**	**35**	**2**	**54**	**19**
GROUP "B"(Gazetted)	**365**	**212**	**153**	**26**	**1**	**37**	**17**
GROUP "B"(Non-Gazetted)	**651**	**511**	**140**	**29**	**7**	**104**	**40**
GROUP "C"	**2689**	**2083**	**606**	**277**		**449**	**181**
TOTAL	**4171**	**3171**	**1000**	**367**	**10**	**644**	**257**

25. BUDGET AND ACCOUNTING

Statement showing actual expenditure incurred by the Board during 2012-2013 has been shown in Table27a, Table 27b, Table 27c, Table 27d and Table 27e.

Table 25a: Statement showing actual expenditure incurred by the Board during 2012-13

		PLAN	(Rs. in Lakhs)	NON-PLAN	(Rs.in Lakhs
Unit Code	**Unit Name**	**Budget**	**Expenditure**	**Budget**	**Expenditure**
16.02.01	Salary	1210.00	1660.28	10364.18	11652.71
16.02.02	Wages	27.00	26.66	0.47	0.34
16.02.03	O.T.A.	11.00	5.82	7.00	5.53
16.02.06	M/Treatment	77.00	98.83	90.00	86.95
16.02.11	D.T.E.	1000.00	987.41	120.00	109.19
16.02.12	F.T.E.	25.00	1.96	0.40	0.00
16.02.13	Office Expenses	1100.00	758.48	5.50	4.68
16.02.14	R.R.T.	215.00	148.30	2.75	1.30
16.02.16	Publications	310.00	148.16	2.00	1.68
16.02.17	Advert/Public.	0.00	0.00	0.75	0.28
16.02.20	O.A.E.	100.00	9.06	0.10	0.00
16.02.24	P.O.L.	1600.00	1332.94	2.50	1.67
16.02.27	Minor Works	200.00	165.14	0.00	0.00
16.02.28	P.S.	106.00	23.63	0.50	0.05
16.02.33	Subsidies	0.50	0.02	0.00	0.00
16.02.43	S/Stock	2350.00	1021.91	0.00	0.00
16.02.50	Other Charges	15.00	49.64	0.25	0.00
16.02.51	Motor Vehicle	205.00	81.93	1.10	0.67
16.02.52	M &E	7773.00	1584.56	0.00	0.00
16.02.53	M/Works	16660.50	4848.65	0.00	0.00
16.02.64	W.O.L.	15.00	11.80	0.00	0.00
Total:		**33000.00**	**12965.18**	**10597.50**	**11865.05**

Table 25b: Rajiv Gandhi National Training & Research Institute for Ground Water

Unit Code	Unit Name	Budget	Expenditure
06.01.01	Salary	370.00	260.34
06.01.02	Wages	6.00	0.00
06.01.06	M/Treatment	2.00	4.46
06.01.11	D.T.E.	100.00	58.39
06.01.12	F.T.E.	198.00	0.00
06.01.13	O.E.	50.00	13.73
06.01.14	R.R.T.	10.00	6.42
06.01.16	Publication	8.00	0.61
06.01.24	P.O.L.	5.00	4.44
06.01.28	P.S.	329.00	256.42
06.01.51	M.V.	22.00	1.30
06.01.52	M & E	400.00	3.29
Total		**1500.00**	**609.40**

Table 25c: Major Head: 2701-.80.004.08 Hydrology Project-Phase-II (PLAN)

Unit Code	Unit Name	Budget	Expenditure
08.01.01	Salary	**150.00**	176.62
08.01.06	M/Treatment	**0.00**	0.00
08.01.11	D.T.E.	**22.50**	15.09
08.01.12	F.T.E.	**45.00**	0.00
08.01.13	O.E.	**15.00**	5.39
08.01.20	O.A.E.	**0.00**	0.00
08.01.28	P.S.	**1500.00**	567.21
08.01.51	M.V.	**0.00**	0.00
08.01.52	M & E	**700.00**	401.80
08.01.53	M/Works	**360.00**	1.12
08.02.01	Salary	**50.00**	50.89
08.02.06	M/Treatment	**0.00**	0.00
08.02.11	D.T.E	**7.50**	3.60
08.02.12	F.T.E.	**0.00**	0.00
08.02.13	O.E.	**5.00**	1.52
08.02.20	O.A.E.	**0.00**	0.00
08.02.28	P.S.	**0.00**	0.00
08.02.51	M.V.	**0.00**	0.00
08.02.52	M & E	**0.00**	0.00
08.02.53	M/Works	**40.00**	0.00
Total 01 Ext.Supp.& 02 Dom.Supp.		**2895.00**	**1223.24**

Table 25d: Central Ground Water Board building for offices

		BUILDING FOR OFFICE	
Unit Code	**Unit Name**	**Budget**	**Expenditure**
03.00.51	Motor Vehicle	**0.00**	0.00
03.00.52	M. & E.	**100.00**	33.67
03.00.53	Major Works	**3880.00**	643.00
	Total	**3980.00**	**676.67**

Table 25e: Deduct Recoveries

		DEDUCT RECOVERIES	
Unit Code	**Unit Name**	**Budget**	**Expenditure**
17.01.70	Issue to Work	**1100.00**	1101.17
17.02.70	Other Suspense Charges	**100.00**	0.00
Total		**1200.00**	**1101.17**

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	Himachal Pradesh
iii) NORTH WESTERN REGION		
Regional Office Division Office	Chandigarh	Punjab, Haryana, NCT of Delhi & UT of Chandigarh
	Div. II, Ambala	Punjab, Haryana, NCT of Delhi & UT of Chandigarh
iv) WESTERN REGION		
Regional Office State Unit Office Division Office	Jaipur	Rajasthan
	Jodhpur	Western Rajasthan
	Div. XI, Jodhpur	Rajasthan
v) WEST CENTRAL REGION		
Regional Office	Ahmedabad	Gujarat, UT of Daman & Diu
Division Office	Div.I, Ahmedabad	Gujarat, UT of Daman & Diu
vi) NORTH CENTRAL REGION		
Regional Office	Bhopal	Madhya Pradesh
Division Office	Div.XII, Bhopal	Madhya Pradesh
vii) NORTH CENTRAL CHATTISGARH		
Regional Office	Raipur	Chattisgarh
Division Office	Div.XIII, Raipur	Chattisgarh
viii) CENTRAL REGION		
Regional Office State Unit Office Division Office	Nagpur	Maharashtra, UT of D & N. Haveli
	Pune	West Maharashtra
	Div. VI, Nagpur	Maharashtra, UT of D & N. Haveli
ix) NOTHERN REGION		
Regional Office State Unit Office Division Office	Lucknow Allahabad Div.III, Varanasi	Uttar Pradesh Uttar Pradesh Uttar Pradesh
x) UTTARANCHAL REGION		
Regional Office	Dehradun	Uttaranchal
Division Office	Div.XVI, Bareilly	Uttaranchal

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

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CONTRIBUTORS

Shri S. Marwaha, Regional Director, CGWB, CHQ Faridabad.

Shri Amlanjyoti Kar, Suptdg. Hydrogeologist,CGWB, CHQ, Faridabad.

Shri Sujit Sinha, Scientist–D, CGWB, CHQ, Faridabad.

Dr. Sudhansu Sekhar, Scientist-C,CGWB, CHQ, Faridabad.

Shri S. C. Gupta, Sr Hydrologist, CGWB, CHQ, Faridabad.

Miss Shilpi Gupta, Scientist- B, CGWB, CHQ, Faridabad.

Miss Parveen Kaur, Scientist- B, CGWB, CHQ, Faridabad.