Govt. of India
Ministry of Jal Shakti
Department of WR, RD & GR
Central Ground Water Board

भूजल संवाद

The Quarterly Magazine of Central Ground Water Board (CGWB)
April to June, 2022, Vol.17

Kallakurichi, Tamil Nadu
Emapper, Kallaku

COVER STORY

IMPACT ASSESSMENT OF INTERVENTIONS OF JSA IN SELECT DISTRICTS OF INDIA

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The Quarterly Magazine of
Central Ground Water Board
Dept. of Water Resources,
River Development and
Ganga Rejuvenation,
Ministry of Jal Shakti, Govt. of India

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Cover Photo: Glimpses of Jal Shakti Abhiyaan: Catch the Rain 2022.

MESSAGE

It gives me immense pleasure to introduce this new volume of Bhujal Samvad, a special issue on 'Jal Shakti Abhiyan : Catch the Rain 2022', a campaign that has been launched by Hon'ble President of India. Officers of Central Ground Water Board took part in this campaign with full enthusiasm and made visits to the allocated districts along with respective CNOs and provided technical inputs to District Authorities.

A section on Success Stories of NAQUIM studies covers a 'A case study from Nagireddipalli watershed, Jangaon district, Telangana State on Aquifer Rejuvenation'. Implementation of PMKSY HKKP Ground Water Irrrigation Schemes in North Eastern States is part of this issue in 'Report' section.

It is a matter of immense pride to state that Hon'ble Union Minister, Jal Shakti Shri Gajendra Singh Shekhawat has become one of the top performing Minister of the Hon'ble PM Sh. Narendra Modi cabinet. He turned out to be the most popular among housewives, which is a validation of his performance & commitment. In this quarter, Parliamentary Standing Committee on Water Resources reviewed the activities and progress of work carried out by Central Ground Water Board in the Southern States of the Country, and these two are covered under 'In Focus' Section.

The Pathshala Section contains various methodologies to mitigate the Arsenic Contamination in Groundwater.

Do communicate your thoughts, feedbacks and ideas with us to make Bhujal Samvad a success through our social media pages or send email to our editorial office (mediacell-cgwb@nic.in).

We are eager to hear from You!

Sh. Sunil Kumar
Chairman, CGWB

In Focus

Jal Shakti Abhiyan : Catch the Rain 2022

On account of success of Jal Shakti Abhiyans of 2019 and 2021 in generating awareness amongst the citizens of the country, it has been proposed to take up "Jal Shakti Abhiyan: Catch the Rain"- 2022 (JSA:CTR) campaign in all districts (rural as well as urban areas) of the country with the main theme "Catch the Rain, where it falls". The campaign has been launched by Hon'ble President of India on 29th of March 2022.

Officers of Central Ground Water Board took part in this campaign and visited the allocated districts along with their respective Central Nodal Officers (CNO). The team provided technical inputs to District Authorities and took review of the work done under Jal Shakti Abhiyan Campaign.

जल बचाए अपना जीवन बचाए!

The JSA: CTR campaign implemented by National Water Mission (NWM), have five focused interventions

Rainwater harvesting & water conservation : Water conservation & rainwater harvesting included renovation of traditional and other water bodies/ tanks; recharge using old bore wells; watershed development; Activities taken up under this included roof-top RWHS on all buildings with priority for government buildings, water harvesting pits in all compounds, maintenance of old/building of new check dams/ponds; removal of encroachments of tanks/lakes, desilting of tanks to increase their storage capacity, removal of obstructions in their channels, repairs to traditional stepwells and other RWHS, use defunct bores/unused wells to recharge aquifers.

Enumerating, geo-tagging & making inventory of all water bodies, Preparation of scientific plans for water conservation : Every district has to enumerate all existing water-bodies/ Water Harvesting Structures (WHS) based on old revenue records and using remote sensing images from NRSA and GIS mapping technology and using the data to plan scientifically new WHS. NWM had prepared guidelines for preparation of GIS based water conservation plans and inventory of water bodies of districts and forwarded it to all the districts for its implementation.

जल बचाए अपना जीवन बचाए!

Setting up Jal Shakti Kendras in all districts : State Governments were to set up 'Jal Shakti Kendras' (JSKs) in all district HQs. These JSKs are to acts as resource or "knowledge centers" for disseminating information related to water, techniques for water conservation and water saving and also provide technical guidance to local people as well as to the district administration

Intensive afforestation : Afforestation drive to be taken up to plant saplings to increase green cover in all the districts.

Awareness generation : Awareness generation to be taken up to make **Jal Andolan** a **Jan Adolan**.

जल बचाए अपना जीवन बचाए!

Hon'ble Union Minister, Jal Shakti: Top performing Minister of the cabinet.

Hon'ble Union Minister, Jal Shakti **Shri Gajendra Singh Shekhawat** has become one of the top performing Minister of the Hon'ble PM **Sh. Narendra Modi** cabinet. He turned out to be the most popular among housewives, which is a validation of his performance & commitment.

Parliamentary Standing Committee on Water Resources, Alappuzha, Kerala.

Parliamentary Standing Committee on Water Resources reviewed the activities and progress of work carried out by Central Ground Water Board in the Southern States of the Country. The meeting was held at Alappuzha, Kerala.

पुरस्कार और सम्मान

नगर राजभाषा कार्यान्वयन समिति, जयपुर की ओर से वर्ष 2020– 21 के दौरान राजभाषा हिन्दी में उत्कृष्ट कार्य एवं सर्वाधिक प्रयोग करने हेतु केन्द्रीय भूमि जल बोर्ड, पश्चिम क्षेत्र, जयपुर को द्वितीय (उप विजेता शील्ड) एवं प्रशस्ति पत्र से पुरस्कृत किया गया है।

जल शक्ति मंत्रालय की राजभाषा सलाहकार समिति की बैठक

जल शक्ति मंत्रालय की राजभाषा सलाहकार समिति की बैठक को श्री प्रहलाद सिंह पटेल, माननीय जल शक्ति मंत्री जी की अध्यक्षता में आयोजित की गई। इस अवसर पर समिति के गणमान्य सदस्यों के साथ साथ मंत्रालय तथा इसके विभिन्न संगठनों के वरिष्ठ अधिकारी गण भी उपस्थित थे।

जल बचाए अपना जीवन बचाए!

Success Stories of NAQUIM

Aquifer Rejuvenation as an Impetus for Reviving Ground Water depleted Aquifers - A case study from Nagireddipalli watershed, Jangaon district, Telangana state.

Central Ground Water Board (CGWB) had taken up Pilot Artificial Recharge studies under Central Sector Schemes to augment the ground water resources during VIII, IX & X Plans. The schemes have been executed through the State Agencies and NGOs with technical and financial support of CGWB. In recent years, CGWB has taken up artificial recharge and water harvesting activities under 'Ground Water Management and Regulation' scheme in select over-exploited mandals of the Aspirational district in Telangana state.

Artificial Recharge work in Aspirational Districts

The Board had taken up artificial recharge studies in aspirational districts in the State of Maharashtra, Andhra Pradesh & Telangana with an objective of harvesting the runoff water in stream to store at suitable locations for augmenting recharge to the ground water. The work has been executed under GWM&R scheme of CGWB in the year 2018 and have been completed in Telangana state. The work includes construction of 6 Check Dams, 1 subsurface barrier, 31 Recharge Shafts (RS) and 9 piezometer wells with an outlay of 1.75 Crores and also covers the impact assessment studies for which piezometers with Automatic Water Level Recorders (AWLR) have been provisioned.

Jangaon District (Erstwhile Warangal), Telangana

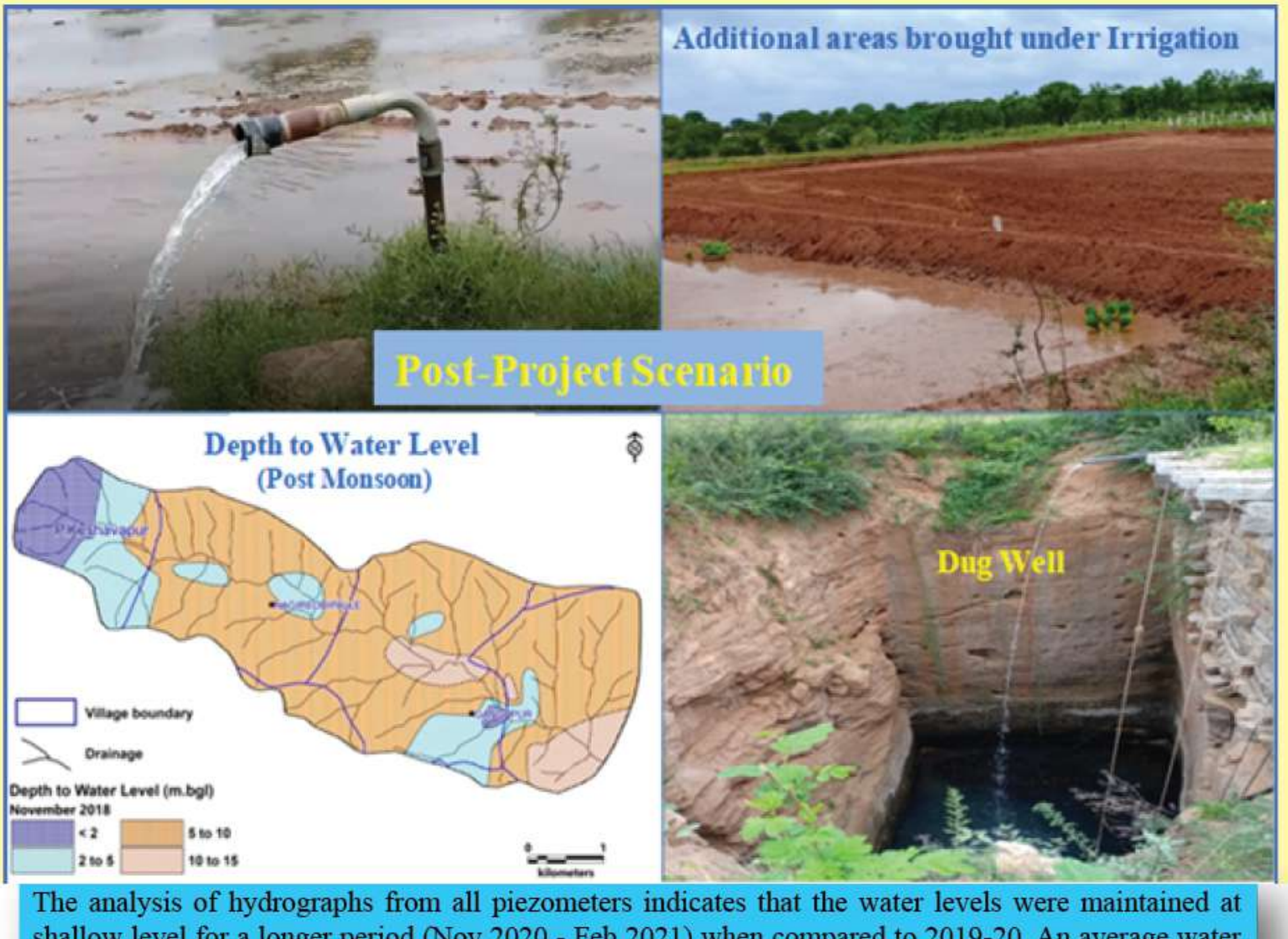
To demonstrate the project, a watershed with intensive ground water irrigation, followed with one or two seasons of paddy cultivation over a year has been considered and Nagiredipalli watershed of Bachannapet mandal of Jangaon district (erstwhile Warangal) has been identified. Moreover the watershed is suitable for the pilot study as it receives minimal average annual rainfall of 869 mm and shows decline in ground water levels. The the streams are mostly ephemeral in nature even though the watershed is part of Krishna basin.

In the watershed, ground water is restricted to the fractured zones under semi-confined conditions and the potential fractures with a discharge of 2-5 lps occur between 40-100 m bgl. The watershed shows a falling ground water level trend at the rate of 0.82 m/year. The weathered portion is totally desaturated since it has been extensively developed by dug wells, which resulted in shift in dependence for irrigation from dug wells to bore wells to the depth range of 70-100 m.

The project commenced in the year of 2018 and completed in 2019. Six check dams were constructed with proper design to accommodate the maximum storage area for recharge. 31 recharge shafts were constructed for a depth of 50 m with proper filter bed arrangement in the storage area of check dam in order to quicker the

recharge process from the check dam storage. One Sub-Surface Barrier (SSB) was constructed across main stream at the tail end of watershed to arrest the sub surface flow and to improve the groundwater sustainability.

The impact of all artificial recharge structures was monitored through 9 Piezometer wells (Pz) constructed to the depth of 120 m at suitable locations. Continuous groundwater level data was acquired by installing 8 Automatic water level recorders (AWLR) in 6 piezometers and 2 Recharge wells. During monsoon, the water level data from piezometers reflect the combined effect of natural recharge through rainfall and recharge due to structures. The continuous 6 hourly water level data is collected to assess the intensity of ground water recharge in various seasons. The impact of SSB has been ascertained by analysing the water level data from two observation wells (Pz) placed on either side. Data reveals that average water level rise of about 4.0 m has been recorded in these piezometers. But, during post-monsoon, the augmentation by recharge structures will become dominant as monsoon ceases. While the continuous water level data during non-monsoon reflects the duration of sustenance of ground water resources.



The analysis of hydrographs from all piezometers indicates that the water levels were maintained at shallow level for a longer period (Nov 2020 - Feb 2021) when compared to 2019-20. An average water level rise of 1.9 m has been noticed in these piezometers. The recharge computations based on piezometer well data indicates that Artificial Recharge measures implemented resulted in augmenting the ground water resources by a magnitude of about 4.0 MCM during 2019.

Comparison to pre-project period indicates that the estimated recharge has been enhanced to about 2.5 times higher than rainfall recharge over the watershed in the first two years. Such a quantum increase in recharge attributed to simultaneous withdrawal of ground water for agriculture during monsoon periods for two/three crops. The agricultural growth over the watershed as per the official records of agricultural department has been improved by 13 %. Earlier agricultural practices during rabi season doesn't exist due to non-availability of surface as well as groundwater. With availability of groundwater, the farmers are adopting third crop in the month March mainly due to sustainability of groundwater.

Shivam Prajapati
Central Ground Water Board

PMKSY-HKKP-GW Scheme:

The Government has formulated Pradhan Mantri Krishi Sinchayi Yojana 'Har Khet Ko Pani' Ground Water Irrigation scheme with the vision of extending the coverage of irrigation in a focused manner. The scheme of PMKSY was approved in 2015-16 for creating additional irrigation from ground water resources. Ground water component aims utilizing ground water for irrigation purpose in areas, where ground water is sufficiently available. Further, to enhance small and marginal farmer's income in such areas by providing assured irrigation facility under the scheme. The scheme effectively launched in 2019-20 after revision of guidelines.

The scheme provides financial assistance to NE/Hilly states in 90:10 ratios and 60:40 in other states for assured ground water irrigation to Small and Marginal farmers with priority to SC/ST and Women farmers. The scheme is applicable only in areas, having stage of ground water development less than 60%, average rainfall more than 750 mm rainfall and having shallow ground water levels (less than 15 m below ground level).

PMKSY-HKKP- Ground Water Irrigation Schemes in North-Eastern States

On the basis of NAQUIM studies, scope of groundwater development for irrigation schemes under PMKSY-HKKP-GW, a central sponsored scheme "PMKSY-HKKP-GW" scheme under MoJS have been established in six NER states. Presently, 09 projects amounting Rs. 785.85 Crore under this scheme are being implemented in Assam (Phase-I & Phase II), Arunachal Pradesh (Phase-I & Phase II), Tripura (Phase-I & Phase II), Nagaland, Manipur and Mizoram.

The total Central Assistance (CA) of these projects is Rs.706.91 Crore of which Rs.630.15 crores (as on 31.08.2022) have already been released for the projects by the DoWR, RD & GR, Ministry of Jal Shakti. Under these projects, a total of 12666 nos. (i.e., 99%) of irrigation wells have already been constructed (target 12829 wells) as on 31.08.2022 with the creation of 42673 hectare (i.e.,87%) of command area (target 48824 Ha) by benefitting 45843 nos. (i.e.,95%) of small & marginal farmers (target 48452 farmers).

STATE WISE GROUNDWATER IRRIGATION SCHEMES/PROJECTS UNDER PRADHAN MANTRI KRISHI SINCHAYI YOJNA- HAR KHET KO PAANI- GROUND WATER IN NER STATES

State: ASSAM

Two projects under PMKSY-HKKP-GW, a component of Centrally Sponsored Scheme, are approved by DoWR, RD&GR, MoJS and are under implementation.

Phase-I:

- Project Cost: Rs.246.07 (CA: Rs.221.46) of which Rs.183.67 crore Central assistance has been released.
- Project completed, 4779 wells have been constructed, 19116 Ha command area have been created and 19643 small & marginal farmers have been benefitted.

Phase-II:

- Project Cost: Rs.292.01 (CA: Rs.262.81) of which Rs.252.29 crore Central assistance has been released.
- Through ongoing project, 4872 wells have been constructed, 16040 Ha command area have been created and 15790 small & marginal farmers have been benefitted so far.

State: ARUNACHAL PRADESH

Two projects under PMKSY-HKKP-GW, a component of Centrally Sponsored Scheme, are approved by DoWR, RD&GR, MoJS and are under implementation.

Phase-I:

- Project Cost: Rs.45.3 (CA: Rs.40.77) of which Rs.40.45 crore Central assistance has been released.
- Through completed project, 473 wells have been constructed, 1785 Ha command area have been created and 3350 small & marginal farmers have been benefitted.

Phase-II:

- Project Cost: Rs. 44.95 (CA: Rs. 40.25) of which Rs. 39.45 crore Central assistance has been released.
- Project completed, 519 wells have been constructed, 1785 Ha command area have been created and 3350 small & marginal farmers have been benefitted.

State: MANIPUR

- project completed, 550 wells have been constructed, 2057 Ha command area have been created and 1445 small & marginal farmers have been benefitted.
- Project Cost: Rs.61.68 (CA: Rs.55.51) of which Rs.54.40 crore Central assistance has been released.

State: MIZORAM

- Project Cost: Rs.16.04 (CA: Rs.14.44) of which Rs.8.66 crore Central assistance has been released.
- Through ongoing project, 126 wells have been constructed, 244 Ha command area have been created and 211 small & marginal farmers have been benefitted.

State: TRIPURA

Two projects under PMKSY-HKKP-GW, a component of Centrally Sponsored Scheme, are approved by DoWR, RD&GR, MoJS and are under implementation.

Phase-I:

- Project Cost: Rs.45.3 (CA: Rs.40.77) of which Rs.40.45 crore Central assistance has been released.
- Through completed project, 473 wells have been constructed, 1785 Ha command area have been created and 3350 small & marginal farmers have been benefitted.

Phase-II:

- Project Cost: Rs.48.34 (CA: Rs.43.53) of which Rs. 26.10 crore Central assistance has been released.
- Through ongoing project, 854 wells have been constructed, 468 Ha command area have been created and 406 small & marginal farmers have been benefitted

State: NAGALAND

- Project Cost: Rs.18.15 (CA: Rs.16.25) of which Rs. 9.53 crore Central assistance has been released.
- Project completed, 262 wells have been constructed, 667 Ha command area have been created and 264 small & marginal farmers have been benefitted.

Conclusion

- This scheme provide support to low-income SC/ST/Women farmers of this country, especially in tribal and backward areas, to manage easily the uncertainties experienced with rain fed farming. Also, it delivers with the resources and techniques they need to deal with the uncertainties of rainfall-dependent farming, particularly in light of climate change unpredictability. This scheme comes with one of the best solutions to reduce the dependency on rainwater, rivers and streams as PMKSY-HKKP-GW supply Ground water to the farming land irrespective of seasons and enhance the farmers income. From the beneficiary's feedback some observations are as follow-

1. Due to this scheme, they are now able to plant winter crops with ease.
2. At some places farm ponds were created to benefit the crops and for fish farming purposes.
3. Majority of the farmers are planning to expand their field as more water is now available.
4. They are now able to get clear water for domestic purposes as the river's waters are unsuitable during the rainy season.
5. The ground-water is also used for animal husbandry at some places.

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Atalanta Narayan Chowdhury
Central Ground Water Board

Groundwater Arsenic Contamination – Various Methodologies of Mitigation Measures

The arsenic contamination problem is compounded because the drinking water supply in these thickly populated southern, south-eastern and eastern parts of Asia is dependent on shallow aquifers which are found to be arsenic contaminated. The remedial measures include variety of options, ranging from removing arsenic from ground water after its extraction, searching alternative aquifers, reducing the level within the aquifer itself, dilution of the contaminants by artificial recharge, blending with potable water, use of treated surface water etc.

1. Ex-Situ Arsenic Treatment

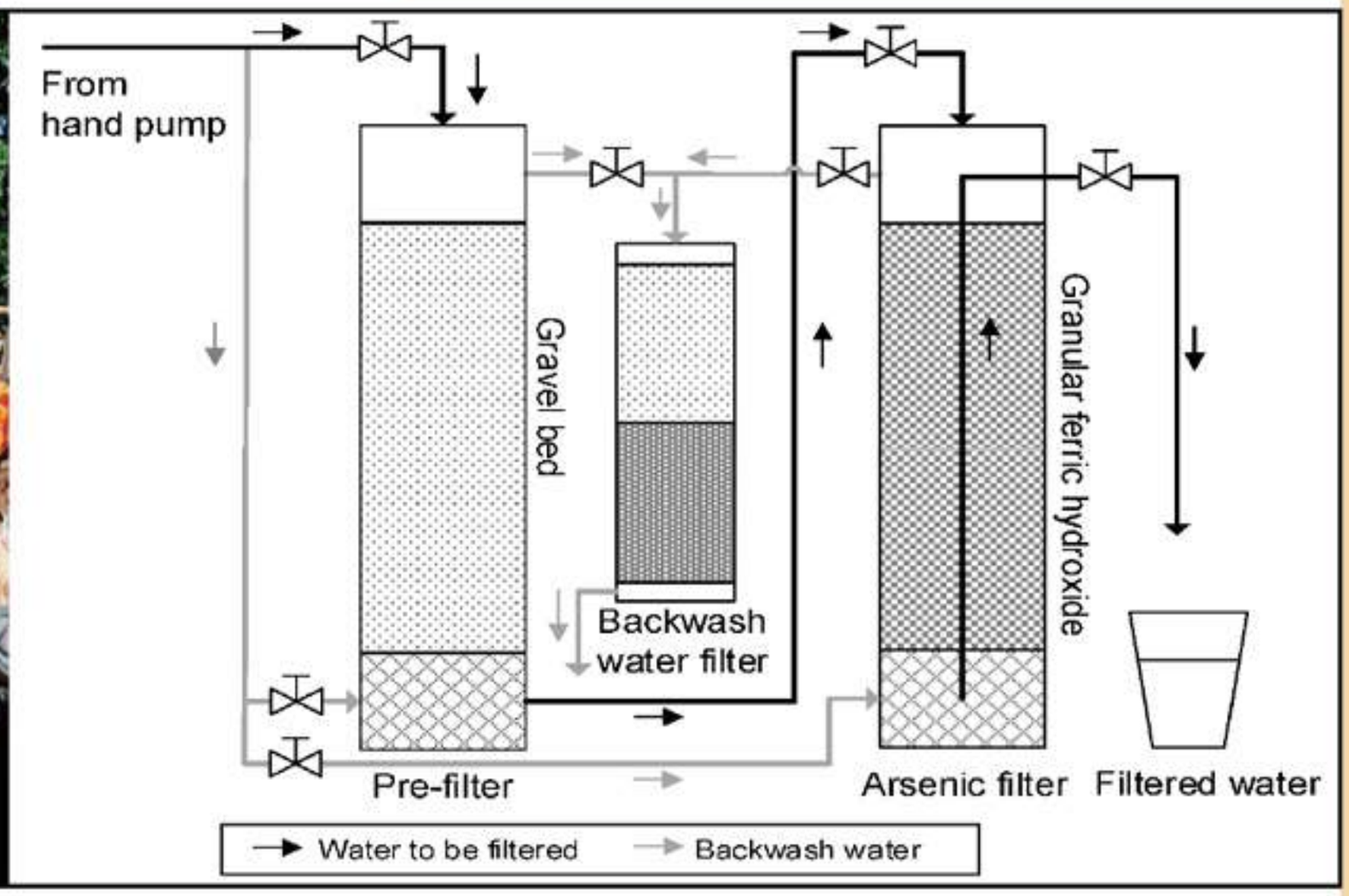
This method primarily targets to lower the concentration of As after extraction of water from aquifers. Majority of low-cost methods rely on precipitation and adsorption processes. A brief outline of the major processes in this group is given below -

1.1) Precipitation Processes

Adsorption and co-precipitation with hydrolysing metals such as Al3+ and Fe3+ is the most common treatment technique for removing arsenic from water. Sedimentation followed by rapid sand filtration or direct filtration or microfiltration is used to remove the precipitate. Coagulation with iron and aluminium salts and lime softening is the most effective treatment process. To improve efficiency of this method, Hypochlorite and Permanganate are commonly used for prior oxidation of As(III) to As(V). Atmospheric oxygen can also be used, but the reaction is very slow.

1.2) Adsorptive Processes

Adsorptive processes involve the passage of water through a contact bed where arsenic is removed by surface chemical reactions and adsorption onto activated alumina, activated carbon and iron/ manganese oxide based or coated filter media. Granular ferric hydroxide, highly effective adsorbent used for the adsorptive removal of arsenate, arsenite and phosphorous from natural water, and activated alumina-based sorptive media are being commonly used in various community based Arsenic Removal Plants (Fig. 01) installed at Bangladesh and India. No chemicals are added during treatment and the process relies mainly on the active surface of the media for adsorption.

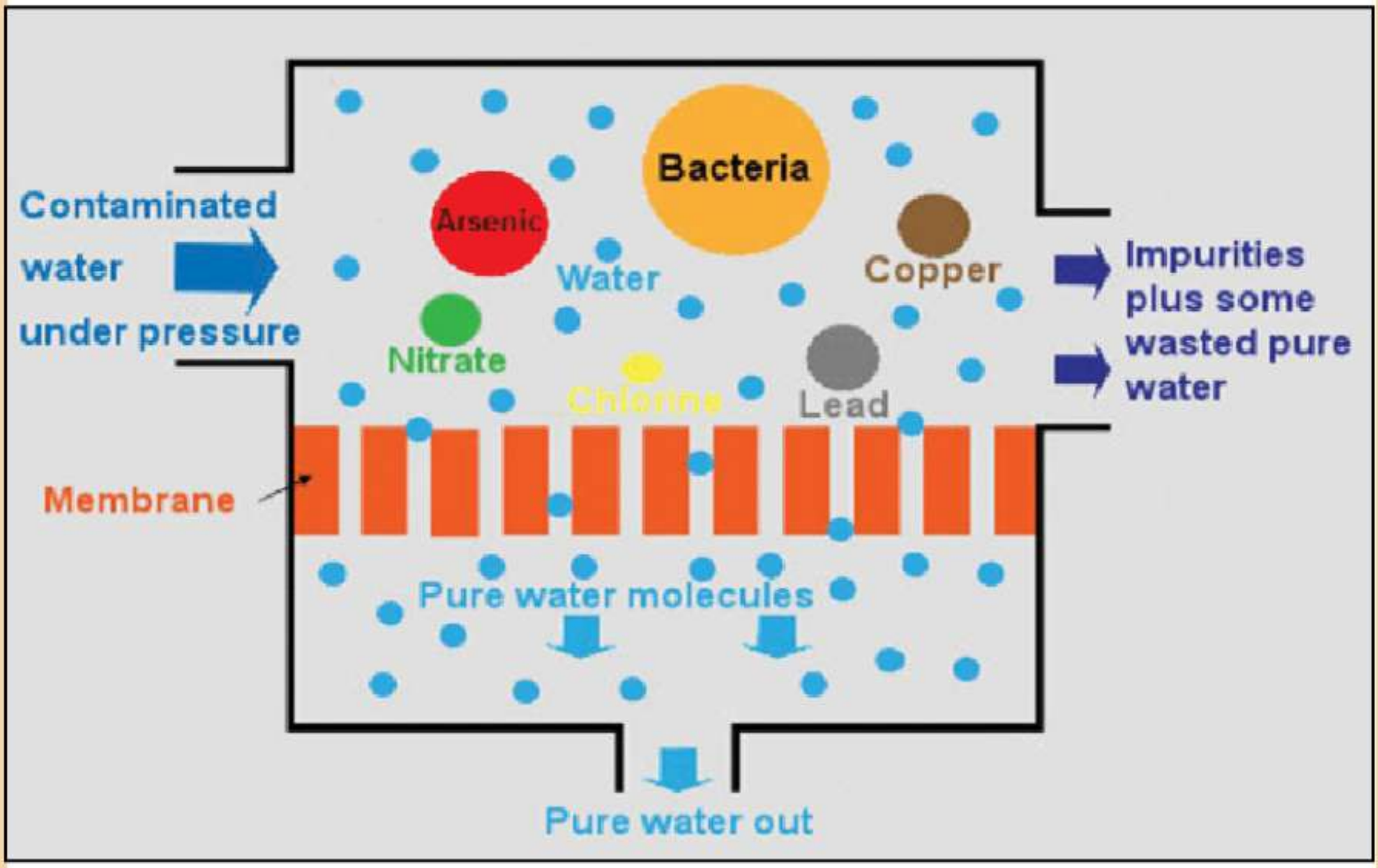


1.3) Ion-exchange Processes

This is similar to that of activated alumina, however, in this method the medium is synthetic resin of relatively well-defined ion exchange capacity. In these processes, ions held electrostatically on the surface of a solid phase are exchanged for ions of similar charge dissolved in water. Usually, a synthetic anion exchange resin is used as a solid. Ion exchange removes only negatively charged As(V) species. If As(III) is present, it is necessary to oxidise it.

1.4) Membrane Processes-

This includes nano-filtration, ultra-filtration, reverse osmosis and electrodialysis which uses synthetic membranes for removal of many contaminants including arsenic. They remove arsenic through filtration, electric repulsion, and adsorption of arsenic-bearing compounds. Fig. 02 explain basic principle of Membrane Filtration techniques.

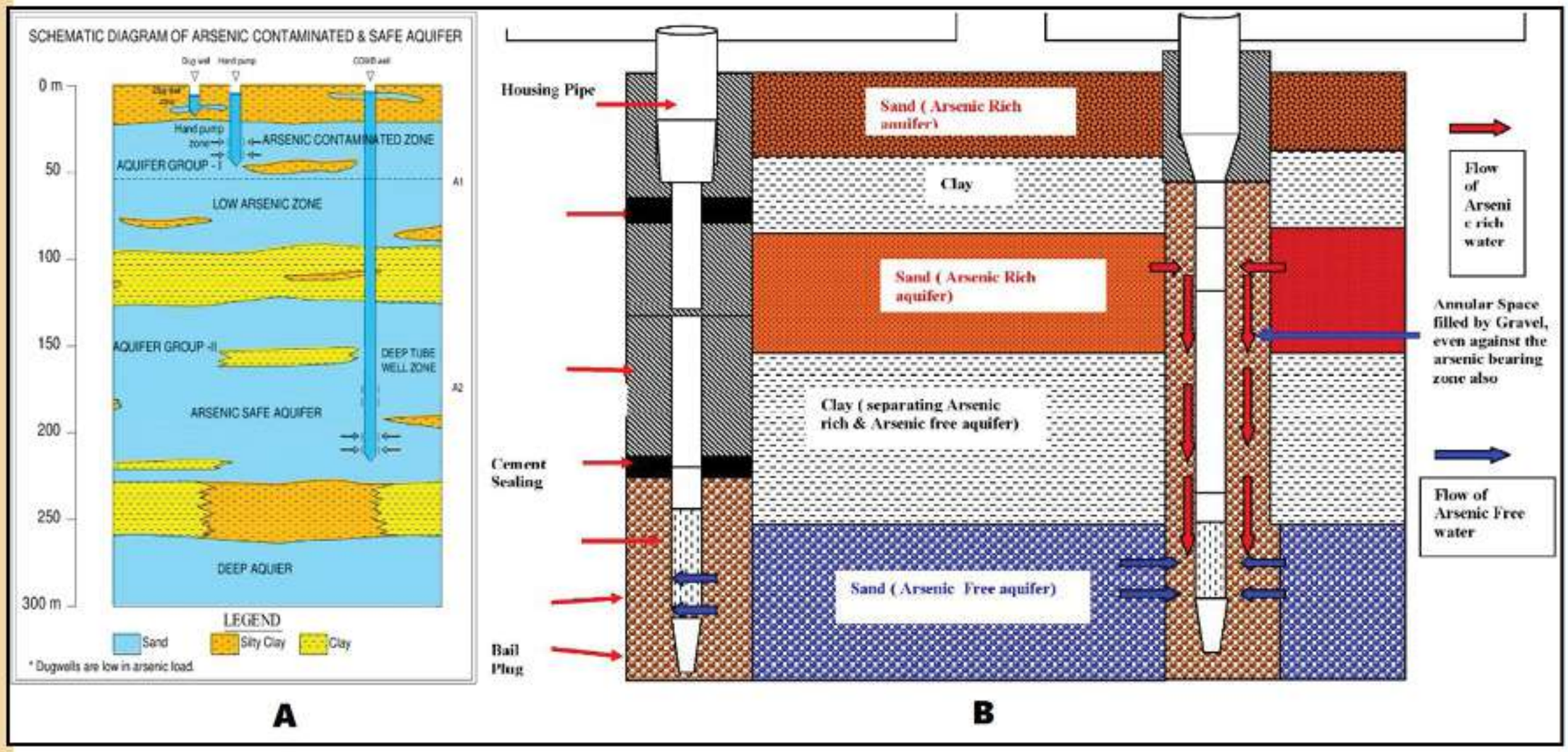


2. Arsenic Safe Alternate Aquifers

This technique advocates tapping safe alternate deeper aquifers right within the affected areas. Detailed CGWB exploration, isotope and hydrochemical modelling carried out by CGWB along with other agencies like BARC has indicated that the deep aquifers (>100 m bgl) underneath the contaminated shallow aquifer, have been normally found as arsenic free. In India except at Rajnandgaon in Chhatisgarh state, the vast affected areas in the Gangetic Plains covering Bihar, Uttar Pradesh as well as deltaic plains in West Bengal are characterised by multi-aquifer system. The sedimentary sequence is made up Quaternary deposits, where the aquifers made up of unconsolidated sands which are separated by medium to thick clay/ sandy clay layers, making the deeper aquifer/ aquifers semi-confined to confined. The contamination is confined in the upper slice of the sediments, within 80 m and affecting the shallow aquifer system. At places, like Maldah district of West Bengal single aquifer exists till the bed rock is encountered at 70 - 120 mbgl.

Long duration pumping tests and isotopic studies in West Bengal and Bihar has indicated that there is limited hydraulic connectivity between the contaminated shallow and contamination free deep aquifers and the ground water belong to different age groups having different recharge mechanisms. The deep aquifers in West Bengal, Bihar and Uttar Pradesh have the potential to be used for community-based water supply. However, if a single aquifer system exists, as found in Malda district of West Bengal, this technique may not be useful. In such cases construction of properly designed cement sealed Tubewell is advocated. The generalized schematic diagram showing the distribution of arsenic in multi-layered alluvial aquifers and

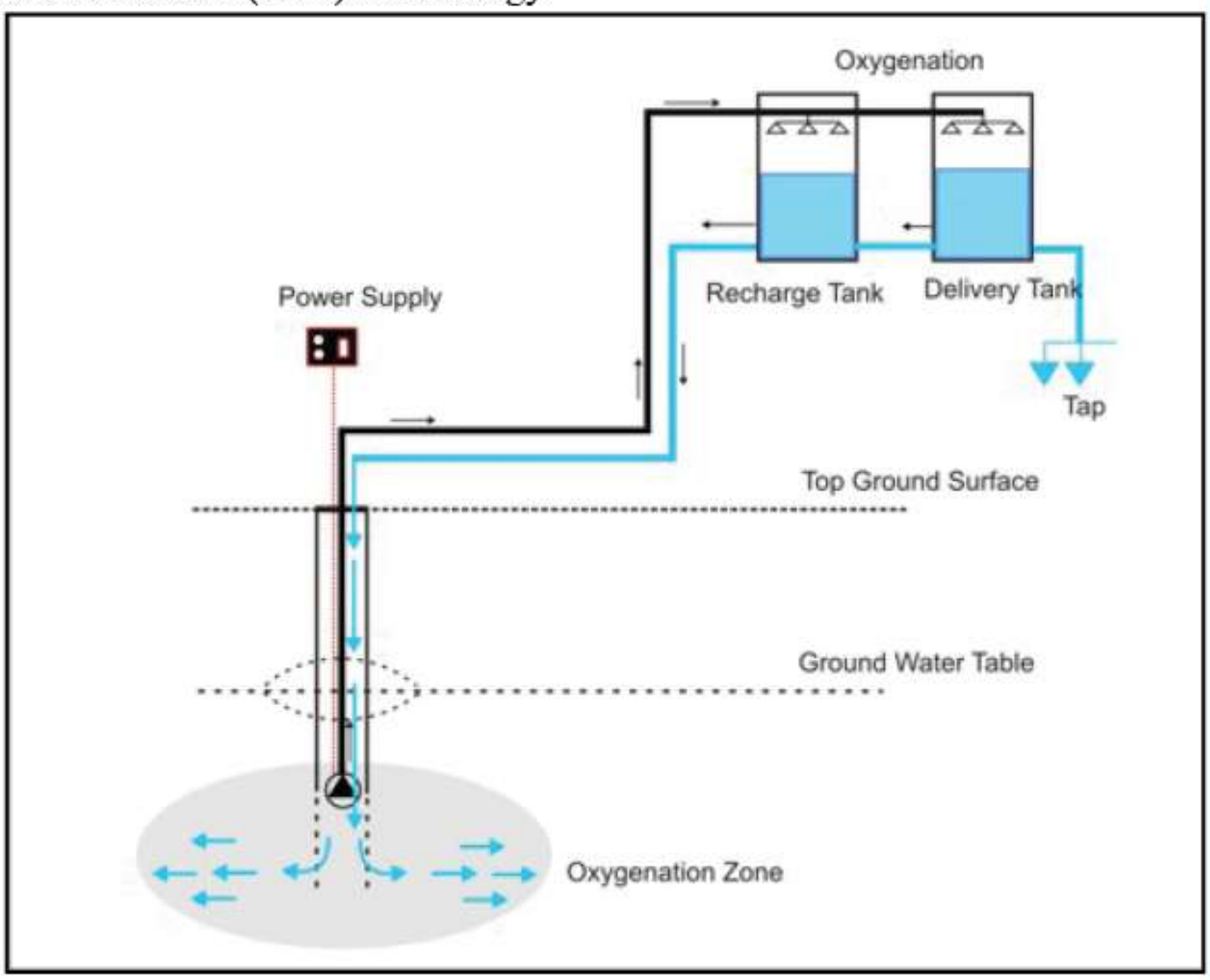
design of a deep-tube well tapping the deeper aquifer system is shown in Fig. 3A and 3B respectively. Questions remain
over sustainability of supply from this deep aquifer in the event of increased abstraction, especially in cases of poor tube well integrity, or situations with inadequate separation of the aquifers by an intervening clay layer.



3. In-Situ (Sub-Surface) Arsenic Treatment

In-situ remediation refers to all such techniques that make arsenic immobilization possible within the aquifer itself. As arsenic is mobilized in groundwater under reducing conditions, it is also possible to immobilize the arsenic by creating oxidized conditions in the subsurface. In-situ treatment for the removal of arsenic, iron, manganese, or combination thereof, has been successfully applied to water wells at abroad. In-situ remediation is generally thought to be having the advantage of non-production of disposable wastes, however, experience is limited, should be considered with caution. Key features of this remedial measures include use of atmospheric O2 for iron and arsenic rich water, Sub-terranean Arsenic Removal (SAR) Technology and Permeable Reactive Barriers (PRB) Technology.

Of the various in-situ remediation techniques, in India, only the SAR (Sub-terranean Arsenic Removal) technology, developed by a consortium of European & Indian scientists, has been demonstrated successfully at a location near Kolkata during 2005-06 and later replicated successfully in parts of West Bengal through World Bank Development Marketplace 2006 programme. In this technique (Fig. 04), the aerated water is stored in feed water tanks and released back into the aquifers. Because of the input of oxygen, the redox potential of the water is



increased. The dissolved oxygen in aerated water oxidizes arsenite to less-mobile arsenate, the ferrous iron to ferric iron and Manganese (II) to Manganese (III), followed by adsorption of arsenate on Fe (III) and manganese (III) resulting in a reduction of the arsenic content in tube well water.

5. Surface Water Supply

Non groundwater option like treated piped surface-water supply at community scale is considered as the ultimate measure of safe water supply to the consumer of arsenic affected areas because of the following reasons -

- Low level of arsenic occurrence in surface water.
- Can be delivered to the close proximity of the consumers.
- Piped water is protected from external contamination.
- Better quality control is possible.
- Water of required quantity can becollected at ease.

In respect of convenience in collection and use, only piped water supply can compete with existing system of tubewell water supply. But it is a very difficult and costly option for scattered population in the rural areas.

In spite of certain merits and demerits, feasibility of implementation of a specific methodology dependent on local geological, socio-economic, land use and climatic factors.

With all supply options, Quality Assurance Systems i.e., robust testing and monitoring regime for water quality is an essential requirement to ensure confidence in the continued supply of safe drinking water and compliance with BIS standards.

Treated Surface water supply through Pipeline

COVER STORY

IMPACT ASSESSMENT OF INTERVENTIONS OF JAL SHAKTI ABHIYAN IN SELECT DISTRICTS OF INDIA

Dr. S. Suresh,
Retd. Regional Director

BACKGROUND

The Ministry of Jal Shakti launched Jal Shakti Abhiyan (JSA) in 2019 as a time bound mission mode water conservation campaign to improve the condition in 1500 blocks falling in 254 districts which are drought affected or over exploited. The targeted activities were carried out under 5 areas of intervention:

1. water conservation and rainwater harvesting
2. renovation of traditional water bodies
3. reuse, borewell recharge structure
4. watershed development and
5. intensive afforestation using the existing Central and State Government Schemes.

In addition to this, district water conservation plans were also developed to conserve, recharge and improve water use efficiency.

Jal Shakti Abhiyan was carried out in two phases, viz., Phase I: From 1st July 2019 to 15th September 2019 for all States and Phase II: From 1st October 2019 to 30th November 2019 for States with retreating monsoon (Andhra Pradesh, Tamil Nadu, Karnataka & Pondicherry).

Senior Officers, groundwater experts and scientists from the Government of India visited the States and worked together with State & district officials in the most water stressed districts of India towards water conservation and promotion of irrigation efficiency through data creation and various campaigns.

The Ministry of Jal Shakti has followed up JSA with JSA II; Jal Shakti Abhiyan: Catch the Rain' (JSA: CTR) campaign with the objective of 'Catch the rain, where it falls, when it falls' from 22nd March, 2021 to 30th November, 2021 covering both urban and rural areas in the country. CGWB was entrusted with the responsibility of assessing the impact in terms of rise in water level in 15 select districts and also ground truthing of 5-6 water bodies in 5 out of these 15 identified districts as mentioned below.

Selected districts for impact assessment for CGWB

- Anantapur, Andhra Pradesh
- Ambala, Haryana
- Belgavi, Karnataka
- Ernakulam, Kerala
- Indore, Madhya Pradesh
- Mehasana, Gujarat
- Amritsar, Punjab
- Jodhpur, Rajasthan
- Ghaziabad, Uttar Pradesh
- Kolkata, West Bengal
- Itanagar, Arunachal Pradesh
- Dehradun, Uttarakhand
- Varanasi, Uttar Pradesh
- Srinagar, Jammu & Kashmir
- Nagpur, Maharashtra

Identified districts for Ground truthing for CGWB

- Anantapur, Andhra Pradesh
- Ambala, Haryana
- Belgavi, Karnataka
- Ernakulam, Kerala
- Indore, Madhya Pradesh


Mogya Pedme percolation tank, Indore

Out of 15 identified districts, respective State Governments have informed that no works could be taken up due to restrictions imposed for Covid -19 pandemic in Itanagar, Arunachal Pradesh, Nagpur-Maharashtra & Srinagar, UT of Jammu & Kashmir.

Ground truthing in Select Districts

Anantapur district, Andhra Pradesh

Interventions made in Kondur water Tank at Kondur, Lepakshi mandal

Anantapur district is situated in the south western part of Andhra Pradesh. Geographical area of Anantapur district is 19,300 sq.km with 13% command area, 77% non-command area and 10% hilly area. As per dynamic groundwater resource estimation (GWRE), 2020, Anantapur district falls under semi-critical category with stage of ground water extraction to the tune of 74%.

The District Water Management Agency of Anantapur district has carried out several works under 5 components of interventions of Jal Shakti Abhiyan. CGWB carried out ground truthing of water bodies in Lepakshi & Chilmatur mandals of Anantapur district and impact assessment study of the surrounding wells under 'Jal Shakti Abhiyan: Catch the Rain' campaign. Lepakshi & Chilamatur mandals fall under over-exploited and semi-critical categories as per GWRE, 2020.

Impact on groundwater levels due to JSA interventions: Water level data of 300 wells (240 State Ground Water Dept. wells data, 60 CGWB data) from 2018 to 2021 was analyzed to understand the impact of JSA on groundwater levels in Anantapur district.

The perusal of water level data since 2018 indicates that groundwater level has improved due to various interventions under Jal Shakti Abhiyan since 2019. Water level trend analysis indicates <1m water level rise in 73% wells, 1m to 2m rise in 1.4% wells and <1m fall 25% wells

Ambala district, Haryana

Interventions made in Check dams and ponds in Ambala district.

Ambala district is located in the northern part of Haryana state and bordered by the State of Himachal Pradesh on its northeastern parts. Geographical area of the district is 1568.85 Sq. Km with a population of 1128350 (2011 census). The stage of ground water extraction in Ambala district is 124% as per dynamic ground water resource assessment 2020.

Remarkable works are being carried out in Ambala district under JSA: Catch the rain campaign by various State departments of Haryana.

Impact on groundwater levels due to JSA interventions : Perusal of pre monsoon water level data of dug wells of May, 2019 & May,2021 indicates rise in water level in most of the dug wells in the range of 0.03 to 4.29 m, whereas, a comparison of 2019 to 2021 post monsoon water level data of dug wells indicates rise in water level from 0.04 to 5.87 m. This indicates the positive impact of Jal Shakti Abhiyan in Ambala district.

Similarly, in case of deeper aquifer, a rise of water level in the range of 0.20 to 3.18 m is observed in most of the piezometers when water level data of pre-monsoon May 2019 and May 2021 are compared. A comparison of post–monsoon water level data of Nov-2019 and Nov-2021 for deeper aquifer also indicates the impact of Jal Shakti Abhiyan in terms of rise in water level in the range 0.20 to 4.01 m

Ernakulam district, Kerala

Interventions made in Peruvaram Pond, Pavarur block, Ernakulam district, Kerala

Ernakulam district occupies the central part of Kerala state and is bordered in the east by Western Ghats and the Lakshadweep Sea in the West. Kochi is the headquarters of Ernakulam district and a major port city on the west coast of India. The district is well connected with a good network of roads and railways. The district is spread over an area of 3068 Sq. km. As per dynamic groundwater resource estimation (GWRE), 2020, Ernakulam district falls under safe category with stage of groundwater extraction to the tune of 47%.

The State Government has undertaken several activities under Jal Shakti Abhiyan in Ernakulam district. Panchayats in the district have taken up water conservation activities in existing village ponds and stream channels during JSA: CTR campaign period (2021-22).

Impact on groundwater levels due to JSA interventions : Long term water level trend from the nearby Network Monitoring Stations has been analyzed through hydrographs. It has been observed that all the four hydrographs show a rising trend.

Interactions with the local population residing/ holding agricultural land near to the identified structures also reported that most of the dug wells in the vicinity of the water bodies, have increased yield by 30 to 50%.

Indore, Madhya Pradesh

Interventions made in Mogya Pedme percolation tank, Indore, Madhya Pradesh

Indore district lies in the heart of Malwa plateau and is bounded in the north by Ujjain district, in the south by Khandwa district, in the east by Dewas district and in the west by Dhar district. It spreads over an area of 3831 sq. km and has a population of 32,72,335 (2011Census). Indore district falls under the over exploited category as per dynamic groundwater resource estimation (GWRE), 2020, with 126% stage of ground water extraction.

In Indore district, several work have been taken up for water conservation under Jal Shakti Abhiyan through MGNREGA during 2020-21 & 2021-22.

Impact on groundwater levels due to JSA interventions : A perusal of pre-monsoon and post-monsoon data indicates that ground water level in Indore district has risen in general after constructing water bodies under Jal Shakti Abhiyan: Catch the rain campaign.

In order to study the impact of these interventions on groundwater levels, block wise average water level data has been compared with succeeding years. Rise in water level has been observed in pre monsoon 2021, in all the four blocks when compared with pre monsoon 2019 water level, which indicates a positive impact of Jal Shakti Abhiyan campaign. Enquiries with the local population residing/ holding agricultural land near to the interventions revealed positive impact in terms of increase in yield, pumping hours and cropped area

Belgavi district, Karnataka

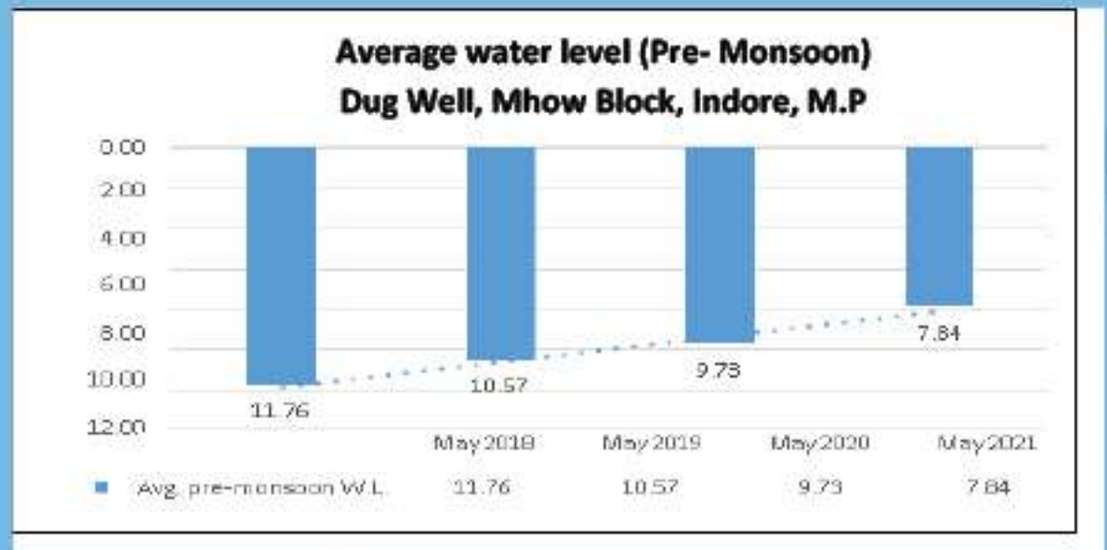
The district of Belgavi is located east of the Western Ghats and is situated in the northwestern part of Karnataka state. It is bordered by the state of Goa on its southwest and Maharashtra state towards its west and north. It covers an area of 13,444 Sq. Km and has a population of 47,78,439 (2011 census). As per dynamic groundwater resource estimation (GWRE), 2020, Belgavi district falls under semi-critical category with stage of ground water extraction to the tune of 74%.

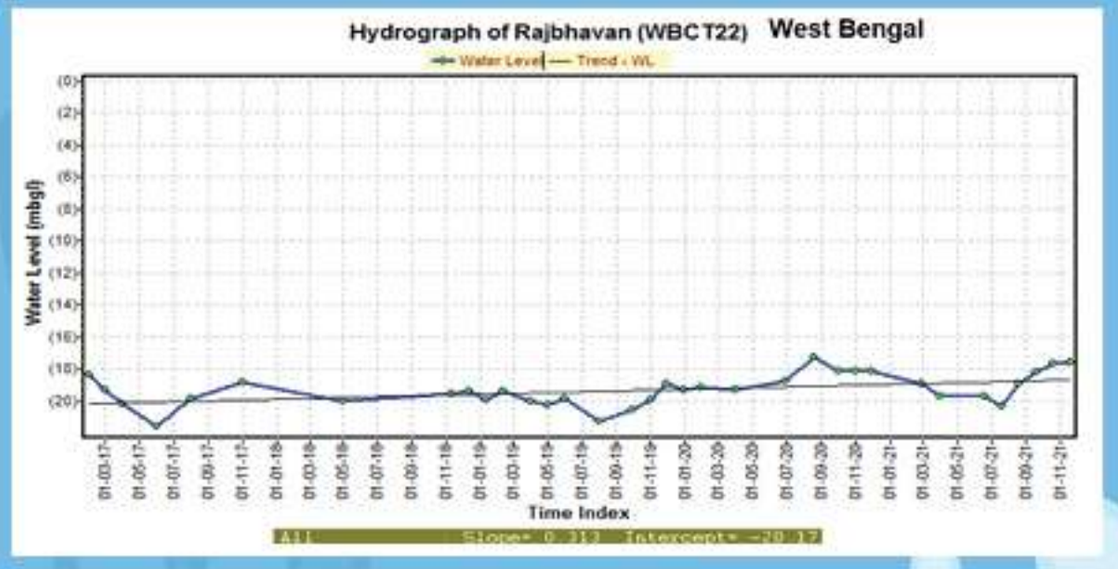
Interventions made in Nala Bund at Kannan village, Ethan block, Belgavi, Karnataka

Several interventions have been done in Belgavi district by the Agricultural Department, Govt. of Karnataka since the inception of Jal Shakti Abhiyan in 2019.

Impact on groundwater levels due to JSA interventions : Perusal of pre-monsoon and post-monsoon data indicates that groundwater level has risen in general after constructing water bodies under Jal Shakti Abhiyan-2019. In comparison to the water level data of pre-monsoon May 2019 and May 2021, there is a rise of water level in both dug wells and borewells ranging from 1.18 to 4.30 m and 0.45 to 9.85 m respectively.

In the same pattern for post–monsoon, rise of water level is observed ranging from 0.23 to 1.69 m in dug wells and from 0.03 to 18.70m in bore wells in comparison to Nov-2019 and Nov-2021. Long term water level trend of Athani & Savdatti Taluk exhibits the positive impact of Jal Shakti Abhiyan in terms of rise in water level in the surrounding areas of intervention.





Some of the select hydrographs showing the impact in select districts

CONCLUSION

The data of observations wells of State Agencies & Central Ground Water Board were analyzed to study the impact of activities undertaken in Jal Shakti Abhiyan. The water level change (absolute value), long term water level trend, fluctuation with reference to decadal mean are the parameters assessed by CGWB in different districts. In case of absolute values, in some districts, all the observation wells have shown rise, while in some districts, only a part of the wells have shown rise in depth to water level.

Similarly, in case of fluctuation with respect to decadal mean during pre and post monsoon (2021 – Decadal mean), both rise and fall were noticed in different districts. In the case of long-term trend also, some wells showed rising trend, while some showed declining trend.

The changes in the water levels could be attributed to increase in rainfall in 2021 and also due to additional recharge generated due to JSA interventions. The quantification of additional recharge due to JSA interventions is quite difficult to determine, as the change in water level is due to the cumulative effect of rainfall and interventions.

However, it can be concluded that, in general, the interventions of Jal Shakti Abhiyan have a positive impact on the ground water scenario of these areas.

Social Media Highlights

Top Tweet earned 1,759 impressions

Swachchata Abhiyan and Shramadan by CGWB,Jammu
@MoJSDoWRRDGR
pic.twitter.com/cFLC9Up8qk

7 21

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Top media Tweet earned 1,497 impressions

Scientists from CGWB SUO, Shillong, carried out inspection of infrastructure project for verification of compliance of conditions mentioned in the NOC.
@MoJSDoWRRDGR
pic.twitter.com/Sr3KljVBcu

13 30

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Top Tweet earned 1,804 impressions

Exploratory well drilled down to a depth of 197 m bgl at Nisangram High School, Goalpara District, Assam has yielded a discharge of 2.25 lps and drawdown of 33.77 m. Aquifer encountered is Gneissic rock. @MoJSDoWRRDGR
pic.twitter.com/X66Eycnm5g

10 23

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Top media Tweet earned 1,777 impressions

केंद्रीय भूमि जल बोर्ड मुख्यालय फरीदाबाद में दिनांक 10.05.2022 को एक दिवसीय हिंदी कार्यशाला में 45 अधिकारियों तथा कर्मचारियों ने भाग लिया। कार्यशाला के समापन समारोह के अवसर पर अध्यक्ष, केंद्रीय भूमि जल बोर्ड ने सभी प्रतिभागियों को प्रमाण पत्र प्रदान किए ।
@MoJSDoWRRDGR
pic.twitter.com/grgpoD46cU

2 12 32

Social Media Highlights

Central Ground Water Board
28 July ·

#JalShaktiAbhiyan #CatchTheRain 2022 field visit to Porbandar district, Gujarat under the supervision of Sh Alok Kumar Verma, Director Ministry of Consumer Affairs, Food and Public Distribution (CNO) & Ms Rumi Mukherjee, Scientist D, Central Ground Water Board (TO). The team provided technical inputs to District Authorities
Ministry of Jal Shakti, Department of Water Resources, RD & GR

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Boost post

अजीत सिंह डाबडी and 28 others

2 shares

Central Ground Water Board
29 July ·

Dr Anadi Gayen, Regional Director, CGWB, Kolkata visited Exploratory Drilling site at Chandavila HS school, Jhargram. He evaluated the work progress, rig condition, technical issues in field and conferred his valuable inputs in accomplishing the work in due course. Ministry of Jal Shakti, Department of Water Resources, RD & GR

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अजीत सिंह डाबडी, Ashok Das and 45 others

2 comments

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Central Ground Water Board
28 June ·

Jal Shakti Abhiyan, JSA : CTR campaign at Diu district, UT of Diu under the supervision of Central Team, Sh. Umesh Kumar, Director, DoNER (CNO) & Sh S N Dwivedi, Scientist CGWB, Faridabad (Technical Officer) #JalShaktiAbhiyan #WaterConservation
Ministry of Jal Shakti, Department of Water Resources, RD & GR

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अजीत सिंह डाबडी, Rajendra Sirra and 36 others

2 comments 2 shares

Top media Tweet earned 1,729 impressions

Rajiv Gandhi National Groundwater Training and Research Institute, Govt. of India, Raipur has successfully organized Training programmes on 'Aquifer Systems and Preparation of Aquifer Maps' and 'Accreditation of Chemical Laboratory' @MoJSDoWRRDGR
pic.twitter.com/YNZ5hAnMYD

15 43

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Central Ground Water Board
29 June ·

राजीव गांधी राष्ट्रीय भूमि जल प्रशिक्षण एवं अनुसंधान संस्थान, रायपुर में एक्विफर का राज्यवार हिंदी कार्यशाला का आयोजन किया गया।श्री कौशल गुप्ता ,क्षेत्रीय निदेशक एवम श्री नीरीष डर्मा,क्षेत्रीय निदेशक ने भवसान में हिंदी की प्रभावक संभावना पर प्रकाश डाला।
Ministry of Jal Shakti, Department of Water Resources, RD & GR

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अजीत सिंह डाबडी and 30 others

4 comments 1 share

Central Ground Water Board
1 August ·

CGWB, Chandigarh participated in Mega-exhibition "Aspiring Haryana 2022" held in Hisar from 28th July to 30th July 2022. Sh Ranbir Singh Gangwa, Deputy Speaker, Govt of Haryana inaugurated the programme. Sh Vidyanand Negi, Sh K.G Bhartariya & Ms. Gargi Walia, Scientists, CGWB explained about GW scenario of Haryana, NAQUIM, GW issues & mitigation measures to arrest the decline & deterioration in Haryana state.
Ministry of Jal Shakti, Department of Water Resources, RD & GR

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अजीत सिंह डाबडी and 33 others

1 share

Top Tweet earned 2,747 impressions

Pre-Monsoon Ground Water monitoring by officers of CGWB, Patna in different districts of Bihar. @MoJSDoWRRDGR
pic.twitter.com/NKVT7bOVNj

6 15 62

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Central Ground Water Board
27 June ·

Swachchata Abhiyan and Shramadan @Central Ground Water Board, Bhujal Bhawan, Faridabad. Single Use plastic to be banned wef 1st July 2022 #SayNoToSingleUsePlastic #PlasticFreeIndia #SayNoToPlastic
Ministry of Jal Shakti, Department of Water Resources, RD & GR

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अजीत सिंह डाबडी, Rajendra Sirra and 33 others

2 shares

Collectable


01


02


03


04


05


06


07

01 Geophysical & Hydro-geological studies are being carried out for the very first time at Great Nicobar Island.

02 Officers of CGWB and GSI, jointly visited to Tmmalapalli Uranium Deposit area of Kadapa and Ananthapur Districts of Andhra Pradesh.

03 Exploratory drilling at Kirimira, Jharsugud district, Odisha.

04 Artesian well at Bhergaon, Udalguri district, Assam.

05 Artesian Zone Mapping in Khowai Valley, Khowai District Tripura.

06 Exploratory well drilled down to a depth of 197 m bgl at Nisangram High School, Goalpara District, Assam has yielded a discharge of 2.25 lps and drawdown of 33.77 m.

07 Exploratory well at Pretshila, Gaya district, Bihar with a discharge of 4.4 lps. Formation encountered is Granite gneiss.

Collectable

01 Parliamentary Standing Committee on Wter Resources at Alappuzha, Kerala.

02 Public Interaction Program at Barhampur village, Jale block, Darbhanga district, Bihar.

03 Groundwater Sample collection done by the officers of CGWB, Patna for re-assessment of Arsenic contamination in Patna and Bhojpur districts of Bihar.

04 Premonsoon Ground Water Level monitoring and sample collection for Water Quality analysis at Hazaribagh district, Jharkhand.

05 Public Interaction Programme conducted by CGWB, Jaipur at Kableshwar Gram Panchayat, Block Dausa on Water Management and Local Groundwater Issues.

06 Public Interaction Programme at Gudiganapalli Mahabubnagar, Telangana state Azadi ka Amrit Mahotsav.

07 Plantation Drive at Central Ground Water Board, Bhujal Bhawan, Faridabad

Collectable

01 Sh. Sriram Vedire, Advisor, Ministry of Jal Shakti chaired a meeting on development of Integrated Water & Crop Information and Management System (IWCIMS) with the officers of CGWB.

02 Aquifer Performance Test carried out by Scientists of CGWB, Lucknow for determination of Aquifer Parameters of Aquifer Group III (confined Aquifer) at Sitapur District, Uttar Pradesh.

03 Public Interaction Programme at Nuapada, Odisha.

04 Officers of CGWB and GSI, jointly visited to Tmmalapalli Uranium Deposit area of Kadapa and Ananthapur Districts of Andhra Pradesh.

05 Sh Subodh Yadav, Joint Secretary, Dept of WR, RD & GR , MoJS interacted with the Scientists of CGWB.

06 Officers of Central Ground Water Board, Patna collecting Ground Water Samples for fluoride contamination studies in Jharkhand.

07 Installation of temperature and humidity sensor to the existing weather station at Central Ground Water Board, Eastern Region, Kolkata.