I am presenting the latest issue of e-Newsletter of INC-IAH with happy note. Although after publication of three issues, there was a large gap, but we are trying it to fill up by including all the activities right from December 2015 to March 2019. We will try to bring this Quarterly. The aim of this publication is to keep you informed of new initiatives and updates on Activities of Indian Committee of IAH and also Ground water in India.

During December 2015 to March 2019 the Indian Committee of IAH attempted five national workshop/conferences: Four at MRIIRS Faridabad (Dec 2015, Dec 2016, March 2018, March 2019) and one at Raipur (January 2018) on ground water related issues. INC-IAH continued their efforts to honor our prominent scientist by Mrs Savitri Chadha INC-IAH awards for excellence and Young Scientist during 2015, 2016, 2017 & 2018. We also continued felicitating our senior Colleagues for outstanding contribution in promoting IAH Activities and Ground Water Science in India. We are pleased to honor the award of appreciation during 2019 to our three prominent hydrogeologist of the country Dr. K.K. Prasad, First President, Indian Committee of IAH - Dr Shrikant Daji Limaye, Former Vice President, IAH - Asia and Hon’ble member of IAH and Dr. S.P. Sinha Ray, Former Member, CGWB and ex-Secretary, Indian Committee of IAH.

I am very thankful to all the members of IAH from India for their continuous support in strengthening the Indian Chapter of IAH. Our fellow INC-IAH council members have extended their full support in building our Indian Chapter. I am also thankful to the team of Dr Sudhanshu Shekhar, Treasurer, INC-IAH and Dr Arunangshu Mukherjee, Executive Member for refreshing and editing the E-Newsletter.

We hope you find this e-Newsletter a valuable resource in collecting information about activities on Ground water. We welcome your suggestions and feedback on this e-Newsletter.

Dr D.K. Chadha, President, INC-IAH

Dr Dipankar Saha
Secretary, INC-IAH
## Introduction

Pan Indian aquifer classification has been attempted within the country since long and the latest in this series was that introduced by Central Ground Water Board in 2012. The modern aquifer classification in India evolved from Groundwater Provenance described first by Taylor (1959) & modified by Dr R.L. Singh (1971) and converted by ACWADAM to groundwater typologies. Further, aquifer system of Indian sub continent has been discussed recently (Mukherjee et al 2015). These classifications however are found short of satisfaction to deal with complexities and challenges imposed by the huge extraction of groundwater in parts of country and also explaining the temporal and spatial variations of groundwater quality and its pollution. Further, groundwater situations in the country instigated for a paradigm shift from groundwater development to groundwater management and forced to attempt country wide aquifer mapping & management program. The aquifer classification adopted for national aquifer mapping programme is based on studies taken under a project by Central Ground Water Board in the country.

All systematic classifications are invariably based on certain principal of division. And such divisions when unable to fulfill the expectations new classifications are felt required. Alternative aquifer classification for India is also felt inevitable seeing inherent fallacy of existing one. Present attempt is primarily based on natural hydrogeological division of water bearing formations that depends on the type of porosity and permeability and further, its affinity with the group.

## Methodology

The present classification is based on predominantly on the porosity and permeability characters of aquifer which has been attempted first time in this form. All the geological formation which forms aquifer in India has been classified into two broad divisions-the soft rock aquifer and hard rock aquifer. The soft rocks are rocks having predominantly inter-granular space or primary porosity. The soft rock aquifers has been further sub divided in to two group based on the consolidation character of strata. The hard rocks are those rocks which predominantly fracture porosity or having weathered mental. The proposed classification group similar porosity characters in same division and further sub division is based on their permeability and lithostratigraphic affinity or geographical location of their occurrence. That is the uniqueness of this classification, whereas in all the previous classification of aquifers of India has taken the chronostratigraphic position of aquifer as primary characteristic to classify the aquifer or is the based on geographical position.

The coding and colour coding of the present classification separates division, sub division aquifer and aquifers groups. To solve the area specific aquifer position in the classification a Column has been introduced for aquifer with code and or other an area specific aquifer which has not been mention in presents scheme can be introduced following the example given as per the division, subdivision and the group. These clearly differentiate the aquifer character as well as keep broadly similar aquifer in same group.

## Conclusion

For effective and coordinated aquifer mapping within the country, aquifers needs first to be distinguish clearly so that their geometry and inter relationship of a system can be established for resource estimation. In soft and hard rock aquifer the recharge mechanism varies considerably. The present classification is capable of differentiate aquifers based on their hydraulic properties and thus is more genetic nature.

### Table -Scheme of Aquifer classification of India

<table>
<thead>
<tr>
<th>Aquifer Division</th>
<th>Aquifer Sub division</th>
<th>Code</th>
<th>Aquifer Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Soft rock aquifer</td>
<td>Unconsolidated Rock Group (Quaternary)</td>
<td>1A1</td>
<td>Newer River Alluvium System (Sand/Silt/Clay or combination)-foredip and gravel fill sediments</td>
</tr>
<tr>
<td>1A</td>
<td>Pebble / Gravel/ Bazada/ Bhabher/Kand/ colluviums / Glacial Drift</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1A2</td>
<td>Aeoilian Alluvium System (Sand /Silt/clay)-Dunes, Loess</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1A3</td>
<td>Older Alluvium System (Sand/ Silt/Gravel/clay)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1A4</td>
<td>Coastal Alluvium System (Sand/Silt/Clay)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1A5</td>
<td>Laterite</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1B</td>
<td>Coastal Laterite</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1B2</td>
<td>Tertiary Aquifer System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2A</td>
<td>Deccan Aquifer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2A1</td>
<td>Basic Rocks (Basalt)/Acidic Rocks ( Rhyolite, Trachaithe, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2A2</td>
<td>Intertrappean clays- red bolls, ash beds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2B</td>
<td>Consolidated Sedimentary Aquifer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2B1</td>
<td>Sandstone/Conglomerate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2B2</td>
<td>Shale, tuff/ Shale Limestone - calcareous shale/ Sandstone-siltstone- Shale hetrotelic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2B3</td>
<td>Shale/limestone/Dolomite/Gypserous shale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2C</td>
<td>Metasedimentary Aquifer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2C1</td>
<td>Schist/ Phyllite/ Slate/tuff/ Undifferentiated metasedimentary-hetrotelics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2C2</td>
<td>Quartzite</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2D</td>
<td>Crystalline Aquifer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2D1</td>
<td>Acid intrusive (Pegmatite, . Syenite, etc.) Basic Rocks (Dolerite, Anorthosite etc.)/ Ultra Basics (Epidotite, Kimberlite, Lamprophrey, Granophyre etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2D2</td>
<td>Plutonics (Granitic rocks, Gabbro etc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2D3</td>
<td>Gneissic Complex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2D4</td>
<td>Granulites (Kondalite,Chamokite, Marble)</td>
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</table>
**RECENT RESEARCH /NEWS IN GROUND WATER**

**Delhi at epicentre of global groundwater crisis: Report**

New research has shown that the largest groundwater depletion in the world is happening in northern India. Delhi is the epicentre of this fast-developing crisis, and it’s getting worse by the day. “From Delhi, Haryana, Punjab, Western UP and Rajasthan, 32 cubic km of water is being lost every year, which is much more than the usual, and it’s only partially being recovered in successive monsoons,” said Dr Virendra M Tiwari, director of National Geophysical Research Institute (NGRI), which conducted the research. In summers, the strain on underground aquifers is higher. “In a drought year, the extraction in northern India is going up to 100 cubic km,” he said. Scientists say that groundwater is being pumped out 70% faster than what the Central Groundwater Board of India estimated earlier. Some reports say around 172 cubic km of water was pumped out in the 1990s every year. “We have no clue how much ground water storage is left in the region. But what we clearly know is that the picture is very grim,” said Tiwari in an interview to STOI. With the surge in population and shrinking of surface water resources, the level of water in underground aquifers in the region is falling by over 10 cm per year, research has shown. “And yes, Delhi is the centre of that with several other environmental impacts. Nutrients are dying out, soil type is going bad. It has a huge cascading effect,” Tiwari said. The report comes close on the heels of a Niti Aayog report last year that predicted that Delhi, along with several other metros, could run out of groundwater by 2020. According to NGRI estimates, Delhi requires 1 cubic km of water every year for drinking, industrial and domestic purposes. The top NGRI scientist also feared that drying up of the Indo-Gangetic basin, comprising some 2,000 km of land from Pakistan to Bangladesh, may also trigger moderate earthquakes. Drying up of groundwater by using bigger pumps from deeper borewells is also causing large scale contamination of water. While 10 years ago, arsenic-contaminated water was largely seen in some parts of West Bengal and Bihar, it’s now being seen moving in a northwest direction. The Ganga basin region has two big aquifers. While one is the upper aquifer, which has already shown arsenic contamination, the lower aquifer is free from it. But people have started to overexploit both, leading to more cross contamination, scientists say. Multiple studies by research agencies have shown how paddy is getting infected with arsenic, and there are fears that it will affect other crops and have a disastrous impact on health. “All the groundwater pumping is happening for agriculture and perhaps cannot be stopped. So now, you have to find a way to manage sustainable water,” Tiwari says. Worried over the state of groundwater in India, the government has entrusted NGRI to look for new aquifers in the country. Scientists here have used helicopter-borne electro-magnetic tools to find new fractures zones beneath the earth, containing untapped water in cities like Surat, Nagpur, Tumkur in Karnataka, among other areas.”We have found new aquifers and now we have to upscale our work in those areas and ensure proper water management methods are followed while drawing water,” Tiwari added. A huge success for NGRI has been in Surat, where Tiwari says they could locate new source of groundwater for the city using heli-borne technology.

Source; Times of India, 24th Feb 2019

**Microplastic contamination found in groundwater**

Microplastics contaminate the world’s surface waters, yet scientists have only just begun to explore their presence in groundwater systems. A new study is the first to report microplastics in fractured limestone aquifers – a groundwater source that accounts for 25 percent of the global drinking water supply. The study identified microplastic fibers, along with a variety of medicines and household contaminants, in two aquifer systems in Illinois. The findings are published in the journal Groundwater. “Plastic in the environment breaks down into microscopic particles that can end up in the guts and gills of marine life, exposing the animals to chemicals in the plastic,” said John Scott, a researcher at the Illinois Sustainable Technology Center and study co-author. “As the plastics break down, they act like sponges that soak up contaminants and microbes and can ultimately work their way into our food supply.” Groundwater flows through the cracks and voids in limestone, sometimes carrying sewage from roads, landfills and agricultural areas into the aquifers below, Scott said. The researchers collected 17 groundwater samples from wells and springs – 11 from a highly fractured limestone aquifer near the St. Louis metropolitan area and six from an aquifer containing much smaller fractures in rural northwestern Illinois. All but one of the 17 samples contained microplastic particles, with a maximum concentration of 15.2 particles per liter from a spring in the St. Louis area, the study reports. However, deciphering what that concentration means is a challenge, Scott said. There are no published risk assessment studies or regulations. The researchers did find, however, that concentrations from their field area are comparable to those of surface water concentrations found in the rivers and streams in the Chicago area, said Samuel V. Panno, an Illinois State Geological Survey researcher and lead author of the study. “The research on this topic is at a very early stage, so I am not convinced we have a frame of reference to state expectations or bounds on what is considered low or high levels,” said Tim Hoellein, a biology professor at Loyola University Chicago and study co-author. “Our questions are still basic – how much is there and where is it coming from?” The researchers identified a variety of household and personal health contaminants along with the microplastics, a hint that the fibers may have originated from household septic systems. “Imagine how many thousands of polyester fibers find their way into a septic system from just doing a load of laundry,” Scott said. “Then consider the potential for those fluids to leak into the groundwater supply, especially in these types of aquifers where surface water interacts so readily with groundwater.” There is still a monumental amount of work to be done on this subject, Scott said. He anticipates that microplastic contamination in both surface water and groundwater will be a problem for years to come. “Even if we quit plastics cold turkey today, we will still deal with this issue for years because plastic never really goes away,” Scott said. “It is estimated that 6.3 billion metric tons of plastic waste have been produced since the 1940s, and 79 percent of that is now in landfills or the natural environment. To me, it is such a weird concept that these materials are intended for single use, yet they are designed to last forever.”

Source: -University of Illinois at Urbana-Champaign 25th Jan 2019
Groundwater is the biggest store of accessible freshwater in the world, providing billions of people with water for drinking and crop irrigation. That's all despite the fact that most will never see groundwater at its source — it's stored naturally below ground within the Earth's pores and cracks. While climate change makes dramatic changes to weather and ecosystems on the surface, the impact on the world's groundwater is likely to be delayed, representing a challenge for future generations. Groundwater stores are replenished by rainfall at the surface in a process known as "recharge". Unless intercepted by human-made pumps, this water eventually flows by gravity to "discharge" in streams, lakes, springs, wetlands and the ocean. A balance is naturally maintained between rates of groundwater recharge and discharge, and the amount of water stored underground. Groundwater discharge provides consistent flows of freshwater to ecosystems, providing a reliable water source which helped early human societies survive and evolve. When changes in climate or land use affect the rate of groundwater recharge, the depths of water tables and rates of groundwater discharge must also change to find a new balance. The time it takes for this new equilibrium to be found — known as the groundwater response time — ranges from months to tens of thousands of years, depending on the hydraulic properties of the subsurface and how connected groundwater is to changes on the land surface. Estimates of response times for individual aquifers — the valuable stores of groundwater which humans exploit with pumps — have been made previously, but the global picture of how quickly or directly Earth's groundwater will respond to climate change in the coming years and decades has been uncertain. To investigate this, we mapped the connection between groundwater and the land surface and how groundwater response time varies across the world. We found that below approximately three-quarters of the Earth's surface, groundwater response times last over 100 years. Recharge happens unevenly around the world so this actually represents around half of the active groundwater flow on Earth. This means that in these areas, any changes to recharge currently occurring due to climate change will only be fully realized in changes to groundwater levels and discharge to surface ecosystems more than any other areas, meaning that groundwater stores beneath deserts take longer to fully respond to changes in recharge. In wetter areas where the water table is closer to the surface, groundwater tends to intersect the land surface more frequently, discharging to streams or lakes. This means there are shorter distances between recharge and discharge areas helping groundwater stores come to equilibrium more quickly in wetter landscapes. Hence, some groundwater systems in desert regions like the Sahara have response times of more than 10,000 years. Groundwater is still responding to changes in climate which occurred at the end of the last glacial period, when that region was much wetter. In contrast, many low lying equatorial regions, such as the Amazon and Congo basins, have very short response times and will re-equilibrate on timescales of less than a decade, largely keeping pace with climate changes to the water cycle. Geology also plays an important role in governing groundwater responses to climate variability. For example, the two most economically important aquifers in the UK are the limestone chalk and the Permian-Triassic sandstone. Despite both being in the UK and existing in the same climate, they have distinctly different hydraulic properties and, therefore, groundwater response times. Chalk responds in months to years while the sandstone aquifers take years to centuries. In comparison to surface water bodies such as rivers and lakes which respond very quickly and visibly to changes in climate, the hidden nature of groundwater means that these vast lag times are easily forgotten. Nevertheless, the slow pace of groundwater is very important for managing freshwater supplies. The long response time of the UK's Permian-Triassic sandstone aquifers means that they may provide excellent buffers during drought in the short term. Relying on groundwater from these aquifers may seem to have little impact on their associated streams and wetlands, but diminishing flows and less water could become more prevalent as time goes on. This is important to remember when making decisions about what rates of groundwater abstraction are sustainable. Groundwater response times may be much longer than human lifetimes, let alone political and electoral cycles.

Source: https://theconversation.com

**Groundwater Depletion In India Major Concern, Warns Report**

India accounts for almost one-fourth of the total groundwater extracted globally, more than that of China and the US combined thus using the largest amount of groundwater 24 per cent of the global total, according to a new report. Export of food and clothing items, while important sources of income, exacerbates this problem if production is not made sustainable, making it harder for many poor and marginalised communities to get access to clean water supply, warned the report released by WaterAid to mark World Water Day on March 22. The report by WaterAid, a non-profit organisation, titled "Beneath the Surface: The State of the World's Water 2019", said India accounted for almost one-fourth of the total groundwater extracted globally, more than that of China and the US combined. It said India also used the largest amount of groundwater 24 per cent of the global total — and the country's rate of groundwater depletion increased by 23 per cent between 2000 and 2010. "India is the third largest exporter of groundwater 12 per cent of the global total," the report said. It further said wheat and rice were the two most important and highest-water-guzzling crops that India produced. "Rice is the least water-efficient grain and wheat has been the main driver in increasing irrigation stress. Replacing rice and wheat with other crops like maize, millets, sorghum mapped to suitable geographies could reduce irrigation water demand by one-third. "Though replacement of rice and wheat crops is challenging, in an ideal scenario, choice of crop needs to be matched with ecology and the amount of water available in the area it is being produced in," the report said. Noting that one kg of wheat required an average 1,654 litres of water, the report said 1 kg of rice requires an average 2,800 litres of water. "So, just for rice, a family of four consumes approximately 84,600 litres of virtual water in a month," it said. "In 2014-15, India exported 37.2 lakh tonnes of basmati. To export this rice, the country used around 10 trillion litres of water, meaning India virtually exported 10 trillion litres of water," said the report released ahead of World Water Day. "WaterAid India's Chief Executive VK Madhavan, said this World Water Day (March 22), it is calling for production of these goods to be made more sustainable and for consumers to be more thoughtful in their purchasing habits. He said lack of access to clean water further pushes the marginalised and vulnerable communities towards a vicious circle of poverty. "The barrier of accessing water to meet daily needs prevents them from reaching their full potential by inhibiting their education, health and livelihood opportunities," he said. Madhavan said there is a dire need to invest in making clean water within the household accessible to everyone, everywhere. "India's success in providing its citizens with access to clean water will significantly impact the success of global goals that the government has committed to," he added. India is currently ranked 120 among 122 countries in the water quality index. In 2015, Indian government committed to the UN Sustainable Development Goal 6, which promises that by 2030 everyone will have access to clean water, decent sanitation and good hygiene. The human right to water must take priority ahead of other competing demands. Source: NDTV, 19th March 2019
One day National Workshop on “Water Conservation and Pollution” was jointly organized by the Indian National Committee of International Association of Hydrogeologists (INC-IAR) and the Manav Rachna International University (MRIU), Faridabad on 19th Dec, 2015 at the MRIU campus, Faridabad. Sh K B Biswas, Chairman, Central Ground Water Board inaugurated the workshop as chief guest for the inaugural session and also released the workshop volume containing total 41 papers. More than 30 papers were presented in four technical sessions, followed by valedictory session. On this occasion more than 200 participants from different Central Govt Dept including CGWB, State Govt Dept, institutions, including Manav Rachna International University, Faridabad, NGO’S, industries etc. have attended the function. The office bearers of INC-IAR including Dr D.K.Chadha, President, Dr D.Saha, Secretary, Dr S.Shekhar, Treasurer, Dr A.Mukherjee, Dr A.Dhar, Sh A.Kar, Executive Members, Indian National Committee of IAH and members of IAH from India were also present.

Inauguration of Workshop & Release of Abstract Volume

Three Awardees for INC-IAR Awards 2015

SMT SAVITRI CHADHA MEMORIAL INC-IAR AWARDS FOR 2015

Consecutively for the second year the INC-IAR has announced its prestigious Smt Savitri Chadha Memorial INC-IAR awards. For 2015 three awards has been given in two categories, for which nominations were invited among members of IAH from India. These awards are sponsored by Dr D K Chadha, President, INC-IAR and former Chairman CGWB. The awardees are:

- **Award of Excellence in Ground Water Investigation and Management 2015**
  Dr Arunangshu Mukherjee, Scientist D, Central Ground Water Board, Faridabad.

- **Award of Excellence in Ground Water Science 2015**
  Dr Pradeep Kumar Sidd, Professor, Department of Environment Management, Indian Institute of Social Welfare and Business Management, Kolkata

- **Young Scientist Award in Ground Water Studies 2015**
  Dr Abhijit Mukherjee, Associate Professor, IIT Kharagapur

The awards were presented by Smt. Bala Chadha, Executive Director, Global Hydrological Solution, New Delhi in presence of Dr DK Chadha, Sh K B Biswas, Chairman, Central Ground Water Board, Dr Prashant Bhalla, President, MREI, Sh Aditya Dahiya ADC, Faridabad and others on dais.

ANNUAL GENERAL MEETING OF INC-IAR-2015

The Annual General Meeting of INC-IAR was held just after the workshop on 19th December 2015. Dr D K Chadha, President welcomed the Patron of INC-IAR Sh K B Biswas, Chairman, CGWB and members and congratulated the team for excellent work done for successful organization of the workshop. Dr D Saha, Secretary, also complimented the team and brought forward the status of the various activities taken up by INC-IAR during the year 2015. Dr S Shekhar, Treasurer, INC-IAR presented the balance sheet of year 2015 and got approved. Further all the members congratulated the awardees of Savitri Chadha Memorial INC-IAR Award. The committee felicitated the former President of INC-IAR, Sh Sushil Gupta, for his dynamic leadership and the strength given to the INC-IAR. The committee also felicitated Prof Sarita Sachdeva, Head Bio-Technology, MRIU, Faridabad for her great support in organizing the joint one day workshop. The agenda items were then taken up for discussion, the following decision were made-

To pursue INC-IAR membership drive for the year 2016. It was decided to register the INC-IAR under the society act for which the draft bylaws prepared has been circulated. INC-IAR will organize an International Conference on Ground Water, which will be finalized in next meeting of executive council.
REGISTRATION OF INDIAN NATIONAL COMMITTEE OF IAH
Indian National Committee of IAH has been authorised to function from office of the Central Ground Water Board, Bhujal Bhawan, NIT, Faridabad. The Indian Chapter of IAH has been registered as INC-IAH under Dept of Industries & Commerce, Haryana Registration and Regulation of Society Act-2012, on 18th August 2016 with the registration number 02281/2016. INC-IAH has acquired PAN and TAN No with the address of registered office. The official website of Indian Chapter has been launched as www.inciah.org

NATIONAL WORKSHOP ON “ROLE OF GROUND WATER IN SMART CITIES & VILLAGES”-2016
To commemorate the 60th Year of establishment of IAH and to celebrate the Golden Jubilee Year formation of Haryana State the Manav Rachna International University & INC-IAH jointly organized a National workshop on “Role of Ground Water in Smart Cities & Villages” on 17th December 2016 at Manav Rachna International University, Faridabad. The purpose is to promote awareness of efficient use of groundwater as a social responsibility and to generate open deliberations amongst user groups on this subject. The event has been attended by about 300 participants from various groups of society as planners, academia, groundwater professionals and experts, RWA, stakeholders and students from various parts of country.

The function was inaugurated by his Excellency Prof. Kaptan Singh Solanki, Hon’ble Governor, Haryana. Sh K B Biswas, Chairman, CGWB, & Patron INC-IAH was the guest of honor. Dr Prashant Bhalla, President, MREI& Patron for the Workshop, Dr D K Chadha, President, INC-IAH, Dr D.Saha, Secretary, INC-IAH were present among the others in this occasion. In his address Hon’ble Governor, Haryana appreciated the effort being made to deliberate on this important issue. He cautioned that any city can’t be Smart until its citizen became smart. Therefore, people’s awareness is of prime significance. On this occasion he released the Proceedings of the workshop and the INC-IAH publication on “Hydrogeology of select Smart Cities of India”. The Inaugural Session was followed by three technical sessions Chaired by eminent personalities from the field. The technical session was followed by the Valedictory function, where Commissioner Municipal Corporation, Faridabad Smt Sonal Goyal, Chairman CGWB Sh K B Biswas, Dr. Amit Bhalla, Vice President, MREI, Faridabad, Dr. D K Chadha, President, INC-IAH and Dr. Sanjay Bajpai, DST, New Delhi were present.

SMT SAVITRI CHADHA MEMORIAL INC-IAH AWARDS FOR 2016
Consecutively for the third year the INC-IAH has announced its prestigious Smt Savitri Chadha Memorial INC-IAH awards. For 2016 three awards has been given in two categories, for which nominations were invited among members of IAH from India. These awards are sponsored by Dr D K Chadha, President, INC-IAH and former Chairman CGWB. The awardees are:

Award of Excellence in Ground Water Investigation and Management 2016
Prof Shakeel Ahmad, Chief Scientist, National Geophysical Research Institute, Hyderabad

Award of Excellence in Ground Water Science 2016
Prof Saumitra Mukherjee, Dean ES, Jawaharlal Nehru University, New Delhi

Young Scientist Award in Ground Water Studies 2016
Dr Sudarsan Sahu, Scientist-D, CGWB, Bhubaneswar.
ANNUAL GENERAL MEETING OF INC-IAH-2016

The Annual General meeting of INC-IAH was held after the one day National Workshop INC-IAH on “Role of Groundwater in Smart Cities & Villages” at Manav Rachna International University, Faridabad, Haryana on 17th December 2016.

Dr D K Chadha, President of INC-IAH, welcomes all the members and congratulated all for the successful organization of third consecutive National Workshop in last three years. Dr Dipankar Saha-Secretary of INC-IAH briefly informed about the activities carried out during last one year. Dr. Sudhanshu Shekhar-Treasurer, put on record the annual balance sheet of INC-IAH for 2016. The House accepted the balance sheet after discussions. Further all the members congratulated the awardees of Savitri Chadha memorial INC-IAH award 2016. The agenda items were then taken up for discussion, the following decision were made:

- It was informed that Indian Chapter of IAH has been registered as INC of IAH under Haryana Society act 2012 in August 2016. Henceforth the Association will be called INC of IAH, with head quarter at CGWB, Faridabad. As the bank account presently is in the name of Indian National Committee of IAH, therefore a new bank account need to be opened in any recognized bank at Faridabad with authorized signatories of President, Secretary and Treasurer.
- It was informed that term of present executive body of Indian National Committee, expires at the end of December 2016. Now Indian National Committee of IAH has been registered as new Name as INC of IAH in August 2016 with the same executive council members with the term of 2 years from August 2016 to August 2018. As per Memorandum of Association under Haryana Society Act 2012, the election of the society will now be held in August 2018. It was approved that the same executive council members should continue for INC of IAH also for two years.

ORGANIZATION OF ONE DAY NATIONAL WORKSHOP AT RAIPUR, CHATTISGARH

The Indian Chapter of IAH (INC-IAH) organized one day workshop on Groundwater Challenges in India was organized on 13th Jan 2018 at Sri J C Bose Hall, Pt Ravishankar Shukla University Raipur in association with school of studies in Geology and Water Resources Management, Pt Ravishankar Shukla University Raipur, Chattisgarh. This is fourth successful organization of workshop after 2014, 2015 & 2016 by the Indian Chapter of IAH. The event and was attended by over 150 participants including, President, Secretary, Treasurer, Executive Members and members of Indian chapter of IAH, faculty members, students & research scholars from various Universities, groundwater experts, Academia, Scientists from CGWB, State groundwater agencies, SECL, CMPDI, Corporate houses-like CAIRNS India Ltd, Vedanta Group, Hindalco, Emami, J K Laxmi Cement, NGOs, and other Consultants from all over India. During the workshop three technical sessions were conducted apart from the inaugural and valedictory session.

Total 27 papers were presented during these three sessions. Each session was headed by session Chair and Co-chair and was assisted by a coordinator. In every session there were one key note address followed by a Tech Talk and seven selected oral presentation. The Workshop was inaugurated by Sh Brijmohan Agrawal, Hon’ble Minister of Water Resources, Government of Chhattisgarh State and the chief guest, in the presence of Prof Shiv Kumar Pandey, hon’ble Vice Chancellor Pt Ravishankar Shukla University, Raipur and guest of honor Dr D.K.Chadha, President, INC-IAH, Dr D.Saha, Secretary, INC-IAH, Dr S.Shekhar, Treasurer, INC-IAH, Dr A.Mukherjee, Executive member, Shri Sunil Kumar, Dr P.K.Naik from CGWB and other dignitaries from state and central govt institutions etc. Dr D K Marothiya, Member State Planning Commission was present in the valedictory function as the guest of honor. The workshop was followed by a hydrogeological expedition on 14th Jan 2018 to Mandeep Khol “A Karst Cave” near Gandai in Kawardha district Chhattisgarh, about 100km away from Raipur.
NATIONAL CONFERENCE ON WATER: TECHNOLOGICAL INNOVATIONS AND SOLUTIONS ON 23RD MARCH 2018

Indian Chapter of International Association of Hydrogeologist (INC-IAH) and Centre for Advanced Water Technology and Management (CAWTM) Manav Rachana International Institute of Research and Studies have jointly organised a National Conference Water: Technological Innovations And Solutions on 23rd March 2018 at MRIIRS, Faridabad on 23rd March 2018. The main objective of the conference is for deliberations amongst stakeholders, planners, academia and user groups on this subject. The conference focussed on the innovations made in the water sector and the possible solutions to tide over the burgeoning issues confronting the water sector in the present context. The event has been attended by more than 150 participants from various groups of society as planners, academia, groundwater professionals and experts, RWA, stakeholders and students from various parts of country. Sh K.C Naik, Chairman, CGWB & Mrs Satya Bhalla, Chief Patron, MRIU were the honourable guest on that occasion. They highlighted the importance of water and suggested the innovative solutions. The other important dignitaries who were present on that occasion includes Dr D K Chadha, President, INC-IAH, Dr D Saha, Secretary, INC-IAH, Dr V M Tiwari, Director, NGRI, Dr N C Wadhwa, VC, MRIIRS, Dr Sanjay Srivastava, MD, MREI, Dr Dinesh Pande, Ex-Director, ONGC, Dr Sanjay Bajpai, Head, DST & Dr M M Kathuria, Trustee, MRIU, besides other executive council members of INC-IAH, i.e Shri Subrata Kunar, Dr A Mukherjee, Dr S Shekhar etc.

More than 20 papers were presented in three technical sessions. The technical sessions were chaired by eminent scientist of CGWB & Ex-Chairman, CGWB Dr S C Dhiman, Shri K B Biswas & Dr R C Jain. The important presenters who have shared their views include Dr P C Chandra, Prof Saumitra Mukherjee, Dr Prashant Bharadwaj, Dr Ritesh Arya, Dr Elango etc. The valedictory session was chaired by Dr M Ariz Ahmed, MD, NWM.

SMT SAVITRI CHADHA MEMORIAL INC-IAH AWARDS FOR 2017

Consecutively for the fourth year the INC-IAH has announced its prestigious Smt Savitri Chadha Memorial INC-IAH awards for 2017. These awards were conferred on the occasion of National Workshop on 23rd March 2018. These awards are sponsored by Dr D K Chadha, President, INC-IAH and former Chairman CGWB. The awardees are:

1. Award of Excellence in Ground Water Investigation and Management 2017--Dr P C Chandra, Ex-RD, CGWB
2. Award of Excellence in Ground Water Science 2017-Prof L Elango, Prof Anna University, Chennai
3. Young Scientist Award in Ground Water Studies 2017( Jointly given to )Dr S N Dwivedi, Scientist-C,CGWB, Faridabad. & Dr Sk Md, Equeenuddin, Associate Prof NIT, Rourkela.
ANNUAL GENERAL MEETING OF INC-IAH-2018

The Annual General meeting of INC-IAH for 2017-18 was held after the day long National Conference on “Water: Technological Innovations and solution” at Manav Rachna International University, Faridabad, Haryana at 18.00 hrs on 23rd March 2018 in presence of Members of executive committee i.e Dr D K Chadha-President, Dr LElango- Vice-President,Dr Dipankar Saha-Secretary, Dr. Sudhanshu Shekhar-Treasurer, Shri Subrata Kunar, Dr. A Mukherjee- Executive Members and Members/ Invitees

Dr D K Chadha, President of INC-IAH, welcomes all the members and appreciated the coordinated efforts of members of INC-IAH as well as MRIIRS in successful organization of the National Conference on “Water: Technological Innovations and solution”. The proceedings then continued as per the agenda items circulated to all members well in advance.

- Activities of INC-IAH during 2017-18: Dr Dipankar Saha-Secretary of INC-IAH briefly informed about the activities carried out during last one year. He also appreciated the role of INC-IAH members specially Dr Pradeep Naik and Dr A. Mukherjee in organizing the National Workshop on 13th January 2018 at Raipur.
- Membership Drive: Dr Sudhanshu Shekhar, Treasurer informed that 89 members have taken membership/renewed their membership for 2017. Their was a suggestion that every member should adopt one student members to increase the membership.
- Forthcoming Program’s during 2018: After deliberation it was decided that one national Conference may be organized at Nagpur during August 2018.
- Account Details during 2017: Dr. Sudhanshu Shekhar-Treasurer, put on record the annual balance sheet of INC-IAH for 2017. The House accepted the balance sheet after discussions.
- Election for Executive body 2018-2020: It was informed that the term of present body as per registration of INC-IAH expires in August 2018, the election may be held for executive council 2018-2020 during August 2018. It was decided that those who have renewed their membership for 2018 or acquired the membership of INC-IAH for 2018 by 31st July 2018 can file the nominations and vote for election of 2018-20.
- At the end Dr Pradeep Naik, Dr S. Shekhar, Dr A. Mukherjee, were felicitated for their active participation in activities of INC-IAH. The Meeting was ended with thanks to the chair and congratulating the INC-IAH Awardees 2017

NATIONAL CONFERENCE ON GROUND WATER SUSTAINABILITY ON 28th MARCH 2019 AT FARIDABAD

Indian Chapter of International Association of Hydrogeologist (INC-IAH), Centre for Advanced Water Technology and Management, Manav Rachna International Institute of Research and Studies(CAWTM, MRIIRS), Central Ground Water Board and Global Hydrogeological Solutions have jointly organized a National Conference on Ground Water Sustainability on 28th March 2019 at MRIIRS, Faridabad on 28th March 2019. The main objective of the conference is for deliberations amongst stakeholders, planners and different stake holders like Govt organizations, National and International Research Institute, Industries, NGO’s, Voluntary organizations, individual to express their views and share experiences on Ground Water Sustainability to achieve water security. The conference focused on the issues related to Ground water sector and the possible solutions to achieve ground water sustainability. The event has been attended by more than 150 participants from various groups of society as planners, academicians, groundwater professionals and experts, RWA, stakeholders and students from various parts of country. Shri Sompal, former Minister of state, water Resources, and Agriculture, Govt of India was chief guest on that occasion. Padam Shri M.C. Mehta, Sh K.C. Naik, Chairman, CGWB, Mrs Satya Bhalla, Chief Patron, MRIU, Dr D.K. Chadha, President, INC-IAH, Shri M.M. Kathuria, Trustee, MREI, Dr N.C. Wadhwa, MRIIRS, Dr Sanjay Srivastava, MREI and Dr Sanjay Bajpai, Head DST were the honourable guest on that occasion. They highlighted the importance of Groundwater and suggested the sustainable solutions. The other important dignitaries who were present on that occasion includes Dr D. Saha, Secretary, INC-IAH, Shri G.C. Pati, Member, CGWB, Dr. E. Sampath Kumar, Member, CGWB, Shri P.K. Parachure, Member, CGWB, Dr. Shakeel Ahmad, Dr Saumitra Mukherjee, JNU, Shri S.K. Sinha, Organizing Secretary besides other executive council members of INC-IAH, i.e. Shri Subrata Kunar, A. Mukherjee, Dr S. Shekhar etc. More than 20 papers were presented in three technical sessions. The technical sessions were chaired by eminent scientist Dr S.P. Sinha Ray Ex-Member, CGWB, Shri G.C. Pati Member, CGWB and Dr Saumitra Mukherjee, JNU.
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SMT SAVITRI CHADHA MEMORIAL INC-IAH AWARDS FOR 2018
Consecutively for the fifth year the INC-IAH has announced and conferred its prestigious Smt Savitri Chadha Memorial INC-IAH awards for 2018. These awards are sponsored by Dr D K Chadha, President, INC-IAH and former Chairman CGWB. The awardees are

1. Award of Excellence in Ground Water Investigation and Management 2018 - Dr R.C. Jain, GWRDC, Gandhinagar
2. Award of Excellence in Ground Water Science 2018 - Prof Sekhar Muddu, Prof IISC, Bangalore
3. Young Scientist Award in Ground Water Studies 2018 - Dr Sarah, University of Kashmir.

AWARD OF APPRECIATION

Award of Appreciation to three Prominent Hydrogeologists were also given for outstanding contribution in promoting IAH Activities and Ground Water Science in India. They are:

1. Dr K.K. Prasad, First President, Indian Committee of IAH,
2. Dr Shrikant Daji Limaye, Former Vice President, IAH, Asia and Hon’ble member of IAH
3. Dr SP. Sinha Ray, Former Member, CGWB and ex-Secretary, Indian Committee of IAH.

Dr K.K. Prasad & Dr Limaye could not personally attend the function. Dr D. Saha, Secretary, INC-IAH Collected Award of appreciation on behalf of Dr Limaye. Dr S. Shekhar, Treasurer, INC-IAH collected on behalf of Dr K.K. Prasad
ANNUAL GENERAL MEETING OF INDIAN CHAPTER OF IAH-2019

Dr D K Chadha, President of INC-IAH, welcomed all the members and appreciated the coordinated efforts of members of INC-IAH as well as CGWB &MRIIRS in successful organization of the National Conference on “Ground Water Sustainability”. He thanked CGWB and MRIIRS for financially supporting the conference. He also appreciated all who worked, particularly Dr A.Mukherjee and Dr S.Shekhar for their sincere efforts in organizing the National Conference at Faridabad a grand success.

The proceedings then continued as per the agenda items circulated to all members well in advance.

- **Confirmation of minutes of last AGM held on 23rd March 2018:** Since no comments were received on minute of last AGM held on 23rd March 2018, the house confirmed the minutes.

- **Membership Drive:** It was informed by Dr S.Shekhar, Treasurer, INC-IAH that till today 65 members have acquired/renewed their membership of IAH for 2019. All the members during 2018 were requested to renew their membership at an earliest. Members suggested various ways to increase the membership like encouraging student members, requesting ground water professional in CGWB/state ground water dept/other central govt dept etc. It was also decided to regularize the membership as per bye laws. Since one can be IAH member from India directly submitting the fee so that Executive Council/President has to regularize the membership in any case.

- **Forthcoming programme of INC-IAH:** It was proposed to organize a National conference on Ground Water at Ranchi during Oct-Nov 2019.

- **Savitri Chadha INC-IAH Award:** The house is of the view that nominee of Savitri Chadha INC-IAH Award should have regular membership of IAH at least for two consecutive years including the year of application/award. The house agreed for the change.

- **Balance Sheet of Account of INC-IAH:** It was informed by the Treasurer that Accounts for 2017-18 has been audited by appointed CA. He has the income and expenditure during 2018-19 till 25.03.2019 to the house and informed that after completion of financial year 2018-19, it will also be audited as done earlier. The house agreed and approved.

- **Appointment of CA:** It has been decided to again appoint Shri Jitender Chawla, CA, Faridabad for auditing and accounting of INC-IAH.

- **Declaration of Election of office bearer of INC-IAH for 2019-2020:** The election of office bearer of INC-IAH for 2019-2021 has been discussed. The decisions taken in the Executive Council last meeting held on 20.11.2019 regarding the following issues:-
  1. The No of terms any member can be President/Vice President/Secretary/Treasurer/Executive member
  2. The post of Vice-President may be increased from 1 to 03 post.
  3. Creation of additional post of Joint Secretary

The house discussed on the above amendments and decided that present Executive body will contact the Registrar of Societies at Faridabad and get their opinion. Afterwards election process should be initiated.

The Meeting was ended with thanks to the chair and congratulating the INC-IAH Awardees 2018 Dr R.C. Jain, Dr Sekhar Muddu & Dr Sarah.
INTERNATIONAL PARTICIPATION OF INC-IAH MEMBERS

- Dr. D. Saha, Secretary, INC-IAH attended the IAH Congress on 9th September 2018 at the Daejeon Convention Centre (DCC) in Daejeon, South Korea.

- Prof. L. Elango, Vice-President, INC-IAH attended 45th International Association of Hydrogeologists Congress - Groundwater and life: Science and Technology into Action and chaired two sessions and presented a paper.

Dr. D. Saha, Secretary, & Prof. L. Elango with Prof. Antonio Chambel, President, IAH

AWARDS/HONOURS

Distinguished Associate Award, IAH-2018
Dr. Tushar Shah has been awarded the Distinguished Associate Award from IAH. Dr. Shah is an economist and public policy specialist. He is a Senior Fellow of the Colombo-based International Water Management Institute and a former director of the Institute of Rural Management at Anand in India. Dr. D. Saha, Secretary, INC-IAH collected on his behalf at Daejeon, South Korea.

Presidents’ Award-IAH, 2018
Dr. Bridget R. Scanlon is a very worthy recipient of the 2018 Presidents’ Award. She was the 2007 Birdsall Dreiss Distinguished Lecturer. She is a Fellow of AGU and GSA and was inducted into the National Academy of Engineering in 2016. She received the M. King Hubbert Award from NGWA in 2017. Bridget is a member of the Board of Directors of the IAH US National Chapter. She has served as a Co-Chair of the IAH Commission on Climate Change and is currently serving on the Commission on Groundwater Energy. For several years she performed editorial roles for IAH’s *Hydrogeology Journal*. Dr. Scanlon is an excellent ambassador for IAH and for groundwater.
Applied Hydrogeology Award 2019 – call for nominations

We are pleased to call for nominations for the 2019 'Applied Hydrogeology Award'. A panel appointed by IAH Council will be particularly interested to receive nominations for practicing hydrogeologists who have made an outstanding contribution to the application of hydrogeology and an increase in living standards ideally in developing countries or in support of international development. The award will be presented in September at the 46th IAH Congress in Malaga, Spain.

Any IAH member may nominate a candidate, but self-nominations will not be accepted. Candidates do not need to be members of IAH. Nominations should include:

- An explanatory statement by the person submitting the proposal;
- A letter of recommendation by any other supporter;
- A brief career history of the candidate;
- A list of projects the candidate has carried out, including aims, region and period of time;

A list of projects (planned or accepted), patents, publications or equivalent information.

Your proposal must be no longer than 5 pages of text in a single pdf-file. This should preferably in English, though the panel are also happy to review nominations in other languages such as Spanish, French and German. It should reach the IAH Secretariat by e-mail (info@iah.org) before July 1st 2019.

We look forward to receiving nominations from all our IAH Regions, to reflect the work of applied hydrogeologists across the world.

Source: info@iah.org

National Geoscience award under category: Groundwater Exploration (including project development, hydrogeological studies and management of groundwater resources)

2018 - Dr. Janardhana Raju Nandimandalam School of Environmental Sciences, Jawaharlal Nehru University

2017 - NGRI team comprising: 1. Dr Shakeel Ahmed 2. Dr. Subash Chandra 3. Dr Nepal Chandra Mondal 4. Dr. Sahebrao Sonakamble

Dr Subhas Chandra, NGRI rand Dr Shakeel Ahmed, NGRI receiving the award from Hon’ble President of India, Shri Ram Nath Kovind

2016 - Dr. Pradeep Kumar Naik, CGWB, Chandigarh

Dr. Pradeep Kumar Naik, CGWB, Chandigarh, receiving award from Hon’ble President, Dr Pranab Mukherjee
“Hydrogeology” by Prof. Alan Freeze and Prof. John Cherry

We all know about the famous textbook “Hydrogeology” by Prof. Alan Freeze and Prof. John Cherry. I was a Research Associate in the Earth Science Department of the University of Waterloo (Canada) where Prof. John Cherry used to teach Hydrogeology. A few days back Prof. John and another friend Prof. Jimmy Jiao, Hydrogeologist from University of Hong Kong, visited my home in Pune and gave me the good news that the book Hydrogeology (Priced around $80 for Hard cover copy & around $40 for Paper-back copy) will soon be available for free download. So please visit the website<https://www.un-igrac.org/sites/default/files/resources/files/Groundwater%20book%20-20English.pdf> and download this 624 Pages Book for FREE. This is a great gift from John especially for the Hydrogeologists working in low income countries.

-From Dr S.D.Limaye


Editors-Dr Amarjit Singh, Former Secretary Ministry of Water Resources, RD&GR, Dr A C Tyagi Former DG International Commission on Irrigation and Drainage and Dr D.Saha, Member(Retd), CGWB

Presenting the Book to Hon’ble President of India Shri Ramnath Kovind on 22th March 2019

MEMBERSHIP OF IAH

During 2019, membership of IAH from India is 91

IAH Membership runs for a Calendar Year 2019 (January-December 2019). The following is the revised fee structure of INC- IAH for the YEAR 2019 in Indian Currency

1. Member Rs. 3600/-
2. On-line Member Rs. 2700/-
3. Student Member Rs. 1900-
4. On-line Student Member Rs. 1000/-
5. Retired Member Rs. 1900/-

Membership/ renewal of membership of IAH for 2019 by following method:-

The membership Fee amount can be deposited cash/Cheque in any Bank of Baroda branch in the name of “INC of IAH” A/C No. 26430200000544 (Bank of Baroda, CGO Complex, NH-IV, Faridabad-121001( Haryana).The scanned copy of receipt along with details of member (Name, Designation, category of membership, Organization, Address, e-mail, telephone No-) may also be sent as attachment file to The Treasurer, INC of IAH through e-mail sshekhar1962@gmail.com

The membership fee can also be send through online fund transfer to “INC of IAH” A/C No. 26430200000544, IFSC Code-BARB0CGOFAR. After payment screen print may kindly be sent through e-mail along with details of member to Treasurer.
FORTHCOMING CONFERENCES/SEMINAR

- 3-6 Jun 2019 – Aarhus, Denmark: LuWQ2019 – International Conference on LAND USE and WATER QUALITY: Agriculture and the Environment; Organised by Organised by Aarhus University, Denmark (principle organiser); http://www.luwq2019.dk/ e-mail: kovar@dce.au.dk; bkr@bios.au.dk

- 12-14 Jun 2019 – Milano- ITALY: FLOWPATH 2019, Groundwater flow and resource management. Organized by IAH Italian Chapter. http://www.flowpath2019.polimi.it/ e-mail: flowpath@iahitaly.it


- 24-26 Jun 2019 – Ragusa (Sicily); Man and Karst 2019; Organised by Hyblean Center for Speleo-Hydrogeological Research. http://www.cirs-ragusa.org e-mail: info@cirs-ragusa.org

- 21-26 Jul 2019 – Tomsk, Russia; 16th International Symposium on Water-Rock Interaction and 13th International Symposium on Applied Isotope Geochemistry, Organised by The International Association of GeoChemistry, Tomsk Polytechnic University, e-mail: info@wri16.com

- 1-7 Sep 2019 – Bali, Indonesia; 3rd World Irrigation Forum & 70th International Executive Council (IEC), ICID. Development for water, food and nutrition security in a competitive environment. Organised by Indonesian National Committee of ICID (INACID). https://icid2019.com/ e-mail: inacid.indonesia@gmail.com

- 4-6 Sep 2019 – Southern Sun Hotel, Johannesburg, South Africa; 2nd Annual SADC Groundwater Conference, Groundwater Contribution to SDGs in the SADC region. Organised by Southern Africa Development Community - Groundwater Management Institute (SADC-GMI). http://www.sadc-gmi.org e-mail: thekozani@sadc-gmi.org


- 22-27 Sep 2019 – Malaga, Spain; 46th IAH Congress: Groundwater management and governance – coping with water scarcity; Organised by IAH Spanish National Chapter with the support of the Center of Hydrogeology University of Malaga. http://www.iah2019.org e-mail: organizing@iah2019.org / scientific@iah2019.org / sponsors@iah2019.org

- 2-5 Oct 2019 – Pyatigorsk (Russia): Session of the Commission on Mineral and Thermal Water (CMTW IAH); Organised by IAH Russian chapter, St. Petersburg University Centre for Geology LLC. e-mail: nv.70@hotmail.com.

- 21-24 Oct 2019- Roorkee, India; 8th International Ground Water Conference on Sustainable management of soil-Water Resources, Organised by Dept of Hydrology, IIT Roorkee; www.igwc2019.com, e-mail lgwc2019@gmail.com

- 24-27 Nov 2019 – Brisbane; IAH/NCGRT Australasian Groundwater Conference 2019; Organised by National Centre for Groundwater Research and Training, Flinders University; http://www.groundwater.com.au/events/1116 e-mail: enquiries@groundwater.com.au

- 26-28 Feb 2020 – Roorkee, India; Roorkee Water Conclave; Hydrological Aspects of Climate Change. Organised by Indian Institute of Technology Roorkee and the National Institute of Hydrology; http://www.iitr.ac.in/rwc2020/index.html e-mail: info.rwc@iitr.ac.in

- 29 Mar - 2 Apr 2020 – Caserta, Italy; MinWat 2020; 3rd International Multidisciplinary Conference on Mineral Waters: Genesis, Exploitation, Protection, and Valorisation. Organised by IAH Commission on Mineral and Thermal Water (IAH CMTW), IAH National Chapter of Italy (IAH Italy), University of Naples. https://minwatitaly2020.org e-mail: segretario@iahitaly.it

CONTACT US

Dr D.K.Chadha-President- devinderchadha27@gmail.com
Dr L.Elango– Vice-President-elango@annauniv.edu
Dr. Dipankar Saha-Secretary - dsaha002@yahoo.com
Dr Sudhanshu Shekhar-Treasurer-sshekhar1962@gmail.com
Shri Subrata Kunar– Executive Member- kunarsubrata@gmail.com
Shri Amlanjyoti Kar, Executive Member-karamlanjyoti@gmail.com
Dr. Arunangshu Mukherjee-Executive Member-arunmuk102@gmail.com
Dr. Ashok Kumar, Executive Member-ashok_bcst@yahoo.com
Dr. Anirban Dhar-Executive Member-anirban@civil.iitkgp.ernet.in

Address-
O/O Central Ground Water Board
Bhujal Bhawan, NH-IV, Faridabad-121001, Haryana

Website– www.iahindia.org