



# INDIA INTERNATIONAL SCIENCE FESTIVAL 2019

## IISF 2019 Kolkata

## Young Scientists' Conference

## Abstract Book

### ORGANISERS



Ministry of Science & Technology  
Ministry of Earth Sciences  
Ministry of Health Family Welfare  
Government of INDIA

सत्यमेव जयते





सत्यमेव जयते



# IISF KOLKATA, 2019

## Preface

The Young Scientists Conference (YSC) of the India International Science festival (IISF-2019) was held in the Biswa Bangla Convention Center (BBCC) in Kolkata during November 5-7, 2019. The grand event was inaugurated in the august presence of Prof. Ashutosh Sharma, Secretary, DST, Dr. Sekhar C. Mande, Director General, CSIR, Prof. Vijay Bhatkar, Chancellor, Nalanda University and President, VIBHA and Shri. U. Rajababu, Project Director, Mission Shakti, DRDO at the Main Hall of Biswa Bangla Convention Centre.

The conference brought near about 1500 researchers including experts from different subjects. Around 1400 young scientists/researchers/PhD scholars/post-doctoral fellows/entrepreneurs from various universities, post graduate colleges, engineering colleges, R&D organizations, national laboratories, IITs, NITs, IISERs, Industries and NGOs under the age of 45 participated YSC to discuss their research findings and exchange innovative ideas on the identified research themes such as - **Make in India, Bio Diversity, Frontier Areas of Sciences, Swachh Bharat, Swasth Bharat, Digital India, Water Crisis and Conservation.**

The conference activities were spread over three days with plenary, oral and poster sessions. There were interactive panel discussions on entrepreneurship, various aspects related to career progression, overseas education and opportunities for the young scientists. The dignitary representatives of embassies highlighted various educational programs of various countries. Near about 1000 delegates presented their scientific research through poster presentations.

This book of abstracts showcases the research findings of the brilliant minds of the country. Even a cursory look at the themes of the book of abstracts tells the huge potential and progress being made by our researchers in India.

YSC organizing committee thanks all the participants for making this event a grand success.

*"Do not be led by others, awaken your own mind, amass your own experience, and decide for yourself your own path." ~ Atharva Veda*

Coordinators, YSC

Jajati K. Nayak  
Ayan Datta

# Mr SOUMYADEEP ROY

Image	Delegate ID	Theme	Details
	YSC 11907	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> Department of Atmospheric Science, University of Calcutta <b>Designation :</b> M.Sc Third Semester Student

India ,the country with the 2nd most population is facing the Worst water crisis in history.This shortage of water can be attributed to the continuous drainage of ground water. Growing populations and economies engender more demand for water resources. The effect of climate change on ground water level is underexposed. We have tried to estimate a study to further shed light into the dependence of ground water level on the the water level in West Bengal. The present study demonstrates an association between some climate parameters and water storage over Gangetic west Bengal. Ground water storage in Gangetic west Bengal during 1996-2016 has been studied for it's temporal variation and it's association with surface pattern has been demonstrated through some statistical computation. As surface temperature and rainfall have significant impact upon water resources in india we have chosen our study period spread over premonsoon ,monsoon and post monsoon i.e. march-november. During this period the trend of surface temperature and rainfall have been analyzed in the context of ground water storage. The current scarcity of water resources in south Indian cities has further highlighted the necessity of conservation of water resources. Through extensive statistical analysis it has been observed that the climate parameters have significant correlation with the storage of ground water. Correlation and regression analysis has been carried out for each station and each season for this purpose. Outcome of this study indicate the validity of the attempt of enhancing the ground water shortage by various Govt. agencies.

# Ms MANALI SAHA

Image	Delegate ID	Theme	Details
	YSC 11898	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> University of Calcutta <b>Designation :</b> Msc student

India, the country with the 2nd most population is facing the Worst water crisis in history. This shortage of water can be attributed to the continuous drainage of ground water. Growing populations and economies engender more demand for water resources. The effect of climate change on ground water level is underexposed. We have tried to estimate a study to further shed light into the dependence of ground water level on the the water level in West Bengal. The present study demonstrates an association between some climate parameters and water storage over Gangetic west Bengal. Ground water storage in Gangetic west Bengal during 1996-2016 has been studied for it's temporal variation and it's association with surface pattern has been demonstrated through some statistical computation. As surface temperature and rainfall have significant impact upon water resources in india we have chosen our study period spread over premonsoon, monsoon and post monsoon i.e. march-november. During this period the trend of surface temperature and rainfall have been analyzed in the context of ground water storage. The current scarcity of water resources in south Indian cities has further highlighted the necessity of conservation of water resources. Through extensive statistical analysis it has been observed that the climate parameters have significant correlation with the storage of ground water. Correlation and regression analysis has been carried out for each station and each season for this purpose. Outcome of this study indicate the validity of the attempt of enhancing the ground water shortage by various Govt. agencies.

#### References:

1. Pallavi Porte et al 2018. Groundwater Level Prediction Using Artificial Neural Network Model. Int.J.Curr.Microbiol.App.Sci.7(02):2947-2954.doi:<https://doi.org/10.20546/ijcmas.2018.702.358>

# Ms SANDHYA MISHRA

Image	Delegate ID	Theme	Details
	YSC 11546	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Chemical Engineering <b>Organisation :</b> IIT PATNA <b>Designation :</b> Research Scholar

Synthetic dyes are used highly in many industries such as textile, paper-making, printing and dye manufacturing. The dye effluents of these industries are extremely colored and the discard of these toxic wastes into collected waters can affect the environment. Mostly, dyes are considerably toxic in nature and their presence in effluents may cause serious issues due to their potential negative effect on aquatic life as well as human life. Moreover, dyes generally have complex aromatic structures and most of them are very difficult to degrade by physical, chemical and biological treatments. Many technologies are used such as adsorption, ultrasonic degradation, catalytic oxidation, photocatalytic degradation and microwave (MW) –enhanced advanced oxidation processes. Recently, MW-induced catalytic degradation has become a very promising technology in chemical applications due to its superior activity, short reaction time and especially when coupled with suitable microwave absorbent. Catalytic degradation technologies have been of research interest due to its promise for providing an improved environment. As the demand grows for relevant industries in this arena, fast and efficient catalysis is of crucial importance. Nanoscale spinel zinc ferrite (SZFO) is a well-known dielectric exhibiting superparamagnetic nature. Candidature of co-precipitation synthesized SZFO atomic sheets as a dream microwave (MW) catalyst has thoroughly been investigated in this work. Zinc ferrite sheets exhibit a remarkable degradation of organic pollutant brilliant green (BG) under MW irradiation about ~99% within 5 min. The catalyst was characterized by X-ray diffraction (XRD), Vector network analyzer (VNA), thermal gravimetric analysis (TGA) and Fourier transform infrared spectroscopy (FTIR), high-resolution transmission electron microscopy (HR-TEM) to study structural and morphological properties.

# Ms NAVJOT KAUR

Image	Delegate ID	Theme	Details
	YSC 11457	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Others  <b>Organisation :</b> PANJAB UNIVERSITY, CHANDIGARH  <b>Designation :</b> RESEARCH SCHOLAR</p>

Arsenic-rich (As) groundwater is a serious concern in Punjab affecting thirteen districts along the Sutlej and Ravi River alluvial deposits including the present study site of Rupnagar district. Water samples from the Quaternary deposits along eastern part of Rupnagar have been examined for detailed geochemistry during pre- and post-monsoon seasons. Two traverses were made along the northern and southern side of a thermal power and cement plant with total of twenty-four surface stream, hand pump (~50-60 ft.) and bore well (~180-200 ft.) samples. Overall circum-neutral pH with relatively greater cationic and anionic contents with higher As (avg. 360 vs. 247 ppb) along the southern traverse (mostly hand pumps and bore wells) compared to northern traverse (mostly stream waters) characterize the areal geochemistry and, interestingly, the groundwater flow direction is Southwest in the region. Post-monsoon samples contain more As than pre-monsoon for any particular location and As concentrations are relatively higher near to the waste dumps that slowly lowers outward. The present findings suggest that the huge coal ash wastes might be a dominant contributor of such high As, especially along the southern traverse, while not overruling geogenic As-rich alluvial deposits as evidenced along northern reverse. Greater As contents during post-monsoon season are attributed to favorable leaching by monsoonal infiltration. Arsenic correlation with  $PO_4^{3-}$  is indicative of a likely ionic exchange between  $PO_4^{3-}$  and  $HAsO_4^{2-}$  owing to their comparable ionic radius resulting higher As(aq), whereas likely formation of ferric hydroxide colloids in such circum-neutral oxidic conditions might explain the negative correlation between  $Fe^{3+}$  and As. High  $Fe^{3+}$  and  $SO_4^{2-}$  and a good correlation between them suggest iron sulphide (e.g.,  $FeS_2$  or  $FeAsS$ ) might be an As containing host in the coal ash dumps that ultimately liberate As by its oxidative dissolution upon exposure to atmospheric  $O_2$  requiring microscopic confirmation.

# Ms MAITREYIE NARAYAN

Image	Delegate ID	Theme	Details
	YSC 11480	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> G.B. PANT UNIVERSITY OF AGRICULTURE AND TECHNOLOGY, PANTNAGAR <b>Designation :</b> RESEARCH SCHOLAR

In current years, microbial fuel cell (MFC) technology has been explored comprehensively for their innovative features and environmental benefits. A microbial fuel cell integrated with constructed wetland (MFC-CW) is a latest technology which treats different wastewater including domestic, industrial, urban, agricultural etc and simultaneously produce electricity which has more wastewater treatment ability and easy maintenance as compared to others devices. Constructed wetland-microbial fuel cells (CW-MFCs) are original devices with a unique combination of artificial ecosystems (constructed wetlands) and bioelectrochemical techniques (microbial fuel cells), in which electricity generation is produced with biodegradable substances as bacteria oxidize organic or inorganic matter in wetland soils and can be improved on account of rhizosphere effect of wetland plants and contaminants in the wastewater can be efficiently detached due to the synergistic effect of the two segments. The construction and operation costs of constructed wetlands are very low due to the minimal or even no energy requirement.

# Mr Kumar Pratyush

Image	Delegate ID	Theme	Details
	YSC 11491	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> Priyadarshini J. L. College of Pharmacy, Nagpur <b>Designation :</b> Research Scholar

PJLCP Automated Water Conservation Unit

Kumar Pratyush\*, Alpana J. Asnani, Dinesh R. Chaple

Priyadarshini J. L. College of Pharmacy, Electronic zone, Electronic building, Hingna Road, Nagpur-440016

kumar.pratyush29@gmail.com

Water is one of the basic necessity of living organisms and its diversified use is well known to all. Reasons like deforestation to gear-up rate of advancement through industrialization are the key agents for the current changes in the climatic conditions. Looking into previous years we can easily find that several regions of India have faced the flood disasters which has again affected several lives. State like Maharashtra are still amongst those states where number of farmer's suicide is marginally high. Seeing all this we planned a conservation unit in our institute that is used for conservation of water. The arrangement included economical models using upgraded techniques. Microwave have better penetration power and can be used for experimentation purpose as a source of heat. This property of microwave was used as a key potential to distill the waste water. The water from the wash basin was collected and allowed to enter a setup where it was distilled and collected in sealed container. The cost of distillation was reduced to 70% and the distilled water was used by students and staffs for research purposes. The microbial study using cup plate method was performed and results showed that there was no bacterial as well as fungal growth present. The overall distilled water requirement of college was reduced to 55%. The complete process complied to green approaches and was also sustainable in nature. Last but not the least process was also economical and can be replicated in other firms also.

Keywords: Deforestation, Farmer's suicide, Microwave, Distilled water, Economical.

# Mr Yashas S R

Image	Delegate ID	Theme	Details
	YSC 11552	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Nano Engineering</p> <p><b>Organisation :</b> JSS Academy of Higher Education and Research, Mysuru</p> <p><b>Designation :</b> Research Scholar</p>

The escalating water crisis and water contamination today necessitates the design of sustainable water remediation systems. Essentially, this aim is in-line with the 'sustainable development goal (SDG6): Clean water and sanitation'. The conventional systems have failed to remediate CECs present in water. CECs are a subset of pharmaceuticals, personal care products, pesticides, metals, surfactants, industrial additives, and solvents. They induce chronic toxicity, endocrine disruption in humans and aquatic wildlife and subsequent development of pathogen resistance. The paradigm shift from biological treatment systems to advanced oxidation processes have opened doors to treat these new classes of pollutants. The present study integrates the nanomaterial-based photocatalysis and electrocatalysis technologies to treat CECs using alternative driving energy. Here, photoelectrocatalysis is a combination of the photocatalytic oxidation process and the electrochemical oxidation process. The nanocomposites, carbon/perovskite, and conductive polymer/perovskite were evaluated for coupling for material design. The promising electrocatalytic traits of carbon and conducting polymers coupled with active perovskite stands pivotal in the study. The system accents its applicability as it can work on a continues basis on photocatalysis (day time) and electrocatalysis (dark) wherein suitable photon source like sunlight or LED was operated in the day time for photocatalysis and the hybrid material introduce serves as electrocatalyst for nighttime operations. The synergy of proposed materials and energy sources is believed to treat CECs highlighting the economy, less power consumption, ease of system design and continues operation. Hence, the proposed system is dependable for efficient environmental protection and conservation.

# Ms Pallavi S

Image	Delegate ID	Theme	Details
	YSC 11560	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Applied Engineering <b>Organisation :</b> JSS University <b>Designation :</b> Research Scholar

**Abstract:** The current study aimed at evaluating the water crisis and seasonal water quality variation of drinking water in Mysore city, India. Drinking water samples were collected at various seasons (pre-monsoon, monsoon, post-monsoon) and determined the water quality by considering important parameters. The Water Quality Index value of drinking water for pre-monsoon, monsoon and post-monsoon are 129.75, 77.65 and 108.41 respectively which represents the poor water quality. The high value of WQI is mainly due to the higher values of total alkalinity, electrical conductivity, total hardness, calcium and manganese in the water samples. Quality water distribution across the city, distribution frequency, and hazard events were studied through citizen science and field surveys. The results showed an uneven distribution of water and a significant variation of water quality across the city. The study highly recommends that the water distribution system in the city require additional advanced decentralized water treatment and distribution strategies to prevent cross contaminations and health risks.

# Mr ABHISHEK PANDEY BHARAT

Image	Delegate ID	Theme	Details
	YSC 11638	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Others</p> <p><b>Organisation :</b> CSIR- Central Institute of Mining and Fuel Resesarch Dhanbad</p> <p><b>Designation :</b> AcSIR PhD Scholar</p>

This study focuses on the qualitative aspects of mine water from the coal mines of Talcher coalfields of Mahanadi Coalfield Limited. 18 mine water samples were analyzed for pH, electrical conductivity (EC), total dissolved solids (TDS) major cations ( $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Na}^{+}$  and  $\text{K}^{+}$ ) and major anions ( $\text{F}^{-}$ ,  $\text{Cl}^{-}$ ,  $\text{HCO}_3^{-}$ ,  $\text{SO}_4^{2-}$  and  $\text{NO}_3^{-}$ ). The hydrochemical data has been evaluated in terms of major ion chemistry and suitability of the mine water for domestic and irrigation uses.

The analytical results shows pH of the mine waters varies from 3.87–8.28 indicating acidic to alkaline nature of the water. The electrical conductivity (EC) values varied from  $344 \mu\text{S cm}^{-1}$  to  $1660 \mu\text{S cm}^{-1}$  for measured samples and spatial differences between the EC values reflects the wide variation in lithology, surface activities and hydrological regime prevailing in the region. The anion chemistry of the analyzed mine water samples shows the dominance of  $\text{SO}_4^{2-}$  (72.4%) and  $\text{HCO}_3^{-}$  (20.6%) with minor contribution from  $\text{Cl}^{-}$ ,  $\text{NO}_3^{-}$  and  $\text{F}^{-}$ . The observed high values of  $\text{SO}_4^{2-}$  in the mine water of the area may be attributed to the oxidative weathering of pyrites. On an average,  $\text{Cl}^{-}$  contributes 6% to the total anionic balance.  $\text{F}^{-}$  and  $\text{NO}_3^{-}$  have low concentrations in the mine water samples and on average contribute  $\text{HCO}_3^{-} > \text{Cl}^{-} > \text{NO}_3^{-} > \text{F}^{-}$ . Among major cations,  $\text{Ca}^{2+}$  was the dominant ions representing on average 53.7% of total cations.  $\text{Mg}^{2+}$  and  $\text{Na}^{+}$  ions were of secondary importance, representing on an average 24.8% and 13.4% of total cations, respectively.  $\text{K}^{+}$  was least dominant cation and contributes 8.2% to the total cations. The order of cationic abundance was  $\text{Ca}^{2+} > \text{Mg}^{2+} > \text{Na}^{+} > \text{K}^{+}$ . The mine water quality assessment for drinking purposes indicates that most of the mine water samples have high TDS, Total Hardness and  $\text{SO}_4^{2-}$  concentrations when compared to Indian drinking water quality standards. This suggests that mine water of the study area is not suitable for direct use in drinking and domestic purposes and needs a proper treatment before its utilization. The assessment of mine water samples for irrigation uses shows that the mine water is of good to permissible quality and can be used for irrigation. However, considering Magnesium Hazard and Permeability Index, some of the mine water samples have restricted suitability for agricultural uses.

# Mr SARAVANAN M

Image	Delegate ID	Theme	Details
	YSC 11650	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> civil Engineering <b>Organisation :</b> SREE SAKTHI ENGINEERING COLLEGE <b>Designation :</b> ASSISTANT PROFESSOR

The human excreta, cow dung, vegetable wastes are presently used as common substrate for biogas generation. Production of renewable energy recycling of nutrient and production of waste volumes are some of the advantages of the anaerobic digestion. It not only reduced the cost of waste treatment through a reduction in the volume of waste, but also the tannery waste generate high revenue to the company. Otherwise the nutrients of the organic wastes are lost in landfills, nitrogen in particular. In this study, to maximize methane yield, preparing of slurry of the tannery waste was chosen as a treatment task. In digestion a consortium of microorganisms is involved which are catalyzing a complex series of biochemical reactions resulting in mineralizing organic matter producing methane and carbon dioxide. In this study Hybrid reactor working biogas digester using tannery water as the substrate provide the consortia. The main steps in anaerobic digestion are hydrolysis acido-genesis. Substance such as carbohydrate are rapidly fermented. Some of the more commonly used indicators include volatile fatty acids (VFA), acids effluent COD, BOD concentration and pH. In this study, the feasibility of degradation of the tannery waste water in an Hybrid reactor to be investigated. The volume of the gas produced, analysis of pH, total solids (TS), volatile solid (VS) and elements contents in the outlet and off-line analysis of the gas composition were monitored.

# Ms Mamta Bisht

Image	Delegate ID	Theme	Details
	YSC 11709	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Others  <b>Organisation :</b> IARI Pusa                      New delhi  <b>Designation :</b> Phd</p>

Assessment the physio-chemical parameters of groundwater for irrigation purposes at Mewat, Haryana, India  
Mamta Bisht and Gopal Krishan

National Institute of Hydrology, Roorkee

E-mail ID: mambisht10@gmail.com

Abstract Groundwater is the major sources of drinking and irrigation in arid and semiarid regions of India. Decreasing rainfall amount during monsoon season in this regions lead to more stress on groundwater resources. The Mewat district of Haryana, India, agriculture is the main source of livelihood. Therefore, the quality of groundwater plays an important role for sustaining the agricultural yield. This region have been facing high groundwater salinity, and salinity increases with depth. The present study was carried out to find out the physio-chemical parameter of groundwater for irrigation purposes during pre-monsoon i.e. April, 2018. Twenty three groundwater samples were collected from various sources i.e. open wells, bore wells and hand pumps with their GPS co-ordinates from three blocks (Tauru, Nagina, and Firozpur Jhirka). The quality of groundwater samples including EC, pH, sodium (Na<sup>+</sup>), chloride (Cl<sup>-</sup>), potassium (K<sup>+</sup>), sulphate (SO<sub>4</sub><sup>2-</sup>), Nitrate (NO<sub>3</sub><sup>-</sup>), calcium (Ca<sup>2+</sup>), magnesium (Mg<sup>2+</sup>) were analyzed by standard methods. The specific irrigation groundwater criteria such as Electrical conductivity (EC), Residual sodium carbonate (RSC) and Sodium adsorption ratio (SAR), Kelly ratio and hardness have computed from these chemical parameters. Based on EC, RSC and SAR results, 7 groundwater samples were classified as good (EC4000  $\mu$ S/cm; RSC 10). As per spatial variability maps, the higher salinity or poor groundwater quality were found in Nagina block (Naglashahpur village; EC 54500  $\mu$ S/cm). The lower salinity or good groundwater quality was observed in Tauru block ( EC

# Mr Rakesh Goswami

Image	Delegate ID	Theme	Details
	YSC 11862	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Biology</p> <p><b>Organisation :</b> Department of Zoology</p> <p><b>Designation :</b> Research Scholar</p>

Water covers about 70% earth's surface while freshwater is only 2.5% of its which is basic need for all humans and animals. The data regarding water pollution and human health was obtained and compiled through a thorough review of various published research articles of international reputed journal and relevant books. According to WHO report 80% bacterial, viral and parasitic diseases are waterborne such as skin infection, typhoid, cholera, encephalitis, poliomyelitis, hepatitis, and gastrointestinal infection which are spreading through polluted water. The major cause of water pollution is population growth, discharge of domestic waste, radioactive waste, excessive use of pesticides, fertilizers, leakage from water tanks and industrialization. The larvi-vorous fishes such as *C. fasciatus*, *P.ticto*, *Oreochromis mossambica*, *R. elegans*, *Esomus danricus*, *Oryzias melastigma*, *Puntius sophore*, *Rasbora daniconius*, and *Aplocheilus panchax* are used as a biological agent to control the parasites which caused the water born diseases Several studies identifies the native larvi-vorous fishes<sup>2</sup> and evaluates their potential larvivoracity for biological control of mosquito larvae in the endemic malarious region. Mosquitoes are responsible for transmitting several diseases including malaria, dengue, chikungunya, filariasis, and yellow fever, etc. Release of larvi-vorous fish is one of the cheapest methods of vector management approach, with long suppression of mosquito population. The waterborne diseases can also be controlled by plantation of flowers. The study of antimicrobial efficacy of different solvent of plant extract have been established which plays a prominent role to control the pathogens of water born diseases. Flowers can be taken as an alternative source of antimicrobial agent against the human pathogens<sup>1</sup>.

References

1. Padalia, H., & Chanda, S.. Antimicrobial efficacy of different solvent extracts of *Tagetes erecta* L. flower, alone and in combination with antibiotics. *Appl. Microbiol.* 2015 Open Access, 1, 106.
2. Das, M. K., Rao, M. R. K., & Kulsreshtha, A. K. Native larvivorous fish diversity as a biological control agent against mosquito larvae in an endemic malarious region of Ranchi district in Jharkhand, India. *Journal of vector borne diseases*, 2018. 55(1), 34.

# Ms NIVETHA A

Image	Delegate ID	Theme	Details
	YSC 11895	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Chemistry  <b>Organisation :</b> Bharathiar University  <b>Designation :</b> PhD Research Scholar</p>

## Abstract

Water is one of the most significant necessities to maintain for all form of existence on earth and therefore various efforts have been taken by many researchers to remain it fresh and create it convenient [1]. Water pollution is increasing at an ever increasing pace and the whole world is in the cancerous grip of it. Various industries are discharging their untreated effluents into the nearby water resources; thus, adding to the existing water pollution to a great extent. Hence, there is a pressing demand to develop an alternate technology for wastewater treatment using enriched SnO<sub>2</sub> nanoparticles with natural modifiers.

## Problem

Water is an essential part of our everyday life. Recently, water crisis is one of the major problems in the universe due to the pollution of water. To rectify this problem, this research work focuses the removal of organic pollutants from water using SnO<sub>2</sub> nanoparticles.

## Methods

SnO<sub>2</sub> nanoparticle is synthesized by simple co-precipitation method and physical and chemical nature of the nanomaterial is enhanced using different modifiers.

## Results

The synthesized nanomaterial has confirmed by UV-Vis analysis, FT-IR, XRD, and SEM-EDX analysis. The band gap energy of the nanoparticle was found to be 2.3 eV. From the SEM analysis, the synthesized nanoparticle was found to spherical in nature. The metal and oxide bond formation was confirmed by FT-IR analysis. The crystallite size and phase of the nanoparticle was found to be 21 nm with tetragonal phase respectively. The SnO<sub>2</sub> nanoparticle has acted as a good catalyst for the reduction of 4-nitrophenol.

## Conclusion

The present work deals with the conversion of 4-nitrophenol into 4-aminophenol. Future implication of our work is to degrade the organic pollutants from water and save our environment without water calamity using modified nanomaterials.

## References

1. Vanaraj Solanki, S. B. Krupanidhi, K. K. Nanda, Simultaneous water quality monitoring and degradation of hazardous organic pollutants, Review of Scientific Instruments, 89, 096102 (2018).

# Mr Hemant Bherwani

Image	Delegate ID	Theme	Details
	YSC 11985	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Applied Engineering</p> <p><b>Organisation :</b> CSIR-NEERI</p> <p><b>Designation :</b> Scientist</p>

Sewage generation from Class I&II cities and other towns and villages of India is estimated to be around 62000 MLD (million liters per day) out of which about approximately 44,000 MLD flows untreated. Thus, water bodies, including lakes and rivers, get contaminated, which results in increased treatment cost during extraction, poses health risk, destroys freshwater ecosystem and produces unaesthetic conditions. The limited estimates show that in Ganga basin alone, there are more than 1000 drains which discharges raw untreated sewage into it. Even if India starts tapping and treating the wastewater today, it will take enormous amount of money and at least 10 to 15 years to construct and commission the required conventional treatment plants. The above points pose a big challenge to some of our national missions including Swachh Bharat, Swasth Bharat and Namami Gange.

An immediate solution is needed to treat the drains and that too in a cost effective and essentially time effective manner. Restoration of Nallah with Ecological Units (RENEU) is a technology which provides in-situ drain treatment without changing the geometry of the drain. RENEU is first tested in CSIR-NEERI campus with satisfactory results. It is scaled up and is implemented during Kumbh 2019 on six drains of Prayagraj, cleaning the drain water, before it enters River Ganga. The flow of these drains varied from 3 to 12 MLD. The treatment is based on physical and biological processes. RENEU uses screens for removal of floating matter followed by sedimentation for suspended solids. The anoxic chamber and biomats lead to biological treatment. Phytotrap and florrafts are installed for nutrient uptake. Chlorination is done for disinfection. The treated water meets the discharge standards and can be used for gardening and irrigation purposes. The discharge water quality standards are endorsed by Namami Gange and third party as well. RENEU is being installed at many locations in Uttarpradesh, Bihar, Harayana, New Delhi and Maharashtra with scale-up upto 100 MLD, giving a big positive push for above national missions.

RENEU needs 1/6-1/8th of the cost in establishment and incurs only 1/3rd on the O&M expenditure as compared with existing treatment practices. The time required is above two to three months for each drain for setting up the whole treatment system, including commissioning. The technology is also creating green jobs as training is being given to many personnel for fabrication, installation, commissioning, operation and maintenance of RENEU system.

# Dr Dr. Amit Kumar Marwah

Image	Delegate ID	Theme	Details
	YSC 12191	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Mechanical Engineering <b>Organisation :</b> Acropolis Institute of Technology & Research <b>Designation :</b> Professor

Water is a primary component of the biosphere. The ability of the biosphere to support life as well as the health and enjoyment of that life depends on water quality. Adequate supplies of clean water are vital for agriculture, domestic use, recreation, wildlife and many manufacturing process. Direct measures of water quality are the concentrations of biological, chemical and physical contaminants. Water quality standards vary with the intended use. Whenever the quality of a water supply does not meet standards for its intended use, some type of treatment is necessary. Treatment processes vary in sophistication, but all add to the cost of water. Application of best treatment practice can markedly improve the quality of water supply, reducing treatment cost as well as providing environmental benefits. The major water treatment practices are clarification, filtration, ion exchange, disinfection, reverse osmosis and distillation.

India, with a geographical area of nearly 3.3 million square kilometers experiences extremes of climate with varying rainfall. Water management in the country is the need of the time. One of the water conservation measures is recycling and re-use of water. Waste water from urban domestic use after proper treatment could be harnessed for irrigation and industrial use. The researcher has developed a low cost water recycling process and a product which consumes no electricity and works on the natural principle of water treatment. The process and the product have been accepted for the grant of patent in Indian Patent Office.

# Mr SACHIN .

Image	Delegate ID	Theme	Details
	YSC 11572	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Chemistry</p> <p><b>Organisation :</b> CSIR-NATIONAL PHYSICAL LABORATORY</p> <p><b>Designation :</b> Ph.D. SCHOLAR</p>

**Abstract:** Water is the universal component of all living creatures on earth. Every living organism required safe drinking water for their survival. But today, almost 40% of the world total population is suffering from drinking water crises. The situation is already very critical in India. Being the world's second most populated country, India is severely facing the problem of pure drinking water. Many cities of India including Delhi, Bangalore, and Hyderabad have many water crises. People are dying because of consuming contaminated water. In India, the situation is already critical and data tells that around 200,000 people die every year due to drinking contaminated water. The main cause of contamination of water is rapid industrialization and urbanization. Due to rapid industrialization and urbanization, our water bodies are being contaminated by micropollutants at an alarming rate. The main toxic contaminants found to be in the water are heavy metals like Cd, Hg, Cr (VI), Pb and toxic dyes such as congo red, crystal violet, p-phenylenediamine, etc. Several advanced techniques remove these toxic contaminants from water such as adsorption, ion exchange, chemical precipitation, oxidation-reduction, and membrane-based filtration. In the present work, out of all these advanced techniques, the adsorption technique was utilized for the instant removal of micropollutants from the contaminated water. A wide range adsorbent was developed using Carbon nanotubes (CNTs) to remove both heavy metals and organic dyes from the contaminated water. This functionalized CNTs based adsorbent was found to be highly potential and shows the removal efficiency of 99% for both dyes and heavy metals within a few minutes of contact time. To understand the adsorption rate of heavy metals and organic dyes over functionalized CNTs based adsorbent, the kinetics and adsorption isotherms models were analyzed.

# Ms Kumari Sonu

Image	Delegate ID	Theme	Details
	YSC 11672	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Nano Engineering <b>Organisation :</b> JSS Academy of Higher Education and Research <b>Designation :</b> PhD Scholar

TiO<sub>2</sub> Photocatalysis is proven to be one of the most promising technology in removing organic dyes from wastewater. TiO<sub>2</sub> is the front runner for photocatalytic dye degradation since it is inexpensive, environmentally friendly and abundant. In this work, TiO<sub>2</sub> nanostructures were synthesized by the hydrothermal method and analyzed for photodegradation effect on methylene blue dye using low power UV source (2 mW/cm<sup>2</sup>). The synthesized TiO<sub>2</sub> is analyzed as it is for photodegradation efficiency and compared the data with TiO<sub>2</sub> treated with Tetramethylammonium hydroxide(TMAH), which consists of abundant OH radicals. The results reveal that TiO<sub>2</sub>-TMAH exhibits higher photodegradation efficiency (80% at 60 mins) at a faster rate compared to the bare TiO<sub>2</sub> system (50% at 60 mins). In another case, dye samples treated with TiO<sub>2</sub> leave sediments after photodegradation and that could be reused for further degradation of new dye samples. The treated water and sediments were analyzed using EDX and FTIR techniques to identify the trace elements and compounds in the treated water and sediments. Further, the treated water is utilized for the seed germination process, as an initiative to recycle and reuse the photocatalyst and dye infiltrated water for environmental applications.

# Mr Gunaseelan Kuppurangam

Image	Delegate ID	Theme	Details
	YSC 11726	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Energy Engineering <b>Organisation :</b> Pondicherry University <b>Designation :</b> Research Scholar

The present work is a new attempt of incorporating the concepts of Plant Air cathode microbial fuel cell technology with the utilization of low cost composite ceramic ion exchange separators tubes with the variant shapes , flame oxidised stainless steel mesh as anode, nitrogen doped  $\gamma$ -Mn<sub>2</sub>O<sub>3</sub> nano catalyst for high reduction potential at the cathode and finally the resulted generated electricity is stored in the Super capacitor coupled LDR assembly for powering the Photo mosquito trap to eradicate the mosquitos which is the very potential vector for the diseases like malaria and dengue etc. after the sunset. The MFC technology comes under the category of renewable energy technology which came into light at the earlier 19th century, but it was not popularised due to the lack of awareness, low power production even with the high fabrication costs.

This system can be employed for broad range of real time applications and provides solutions for treating sewerage wastewater, domestic wastewater treatment, resource recovery, controlling the Indoor / outdoor air pollution gases and generating electricity for powering the electrical gadgets like mobile phones, Electronic LED Mosquito Killer Lamps, digital alarm clocks, night LED lamps and electrical room fresheners etc. This system with the inbuilt aquaponics set up can aid to grow ornamental plants, fruits, vegetable and fishes culturing may lead to the circular economy practice towards managing water crisis and conservation of water.

# Dr Tanveer Hashmi

Image	Delegate ID	Theme	Details
	YSC 11747	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> Parul University <b>Designation :</b> Assistant Professor

Environmental pollution is a big issue to world wide. Pesticides are toxic substance and mostly used for the purpose of the crop production & kill insect, but most of the pesticide has been banned in India as well as worldwide. Most of the industries manufacturing pesticides, which are situated in Gujarat, Maharashtra and other state of India. In which the dump their waste in the river which contaminates the river water. In this review, the presence of several banned pesticides in the river of India has been studied. Water and sediment are contaminated by pesticides, which are toxic and hazardous for living organism. The determined effect of the pesticides would be due to their absorption by aquatic-biota which ultimately leads to human exposure. Therefore, removal of such pesticides is necessary. This study was carried out to remove various pesticides by using bacterial isolates. Scenario of India & worldwide bio-degradation study has been presented here.

# Mr aman gupta

Image	Delegate ID	Theme	Details
	YSC 11873	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Others</p> <p><b>Organisation :</b> RSCET</p> <p><b>Designation :</b> Chief Coordinator</p>

India Vishwa Guru for world and respected name among universe being ours rich culture and traditions. Foreigners also attracted here and take glimpse of Great Bharata culture during their visit.

No doubt 'Har Ghar Mein Shochalaya' changed the picture of country in whole universe as India become open defecation free country. Now villages also need some facelift and modernized structures for confidence building measure & new look of New India.

Here we are talking about structures needed to cover water bodies like wells, handpumps, bowlis, springs uniformities in design and standard structures.

Present majority of drinkable water wells, springs, bowlies, handpumps are in open sky which faces pollution, mixing of open water including rainy water, animals/birds, dust all these factors contaminates precious natural resource which is used for drinking purpose by major population percentage resides in villages. Contaminated water becomes reasons for ill health. If wells, springs, handpumps, bowlies which are used by majority of population resides in villages & even in urban. These natural water bodies and resources also contribute for daily consumption and decreasing great burden on system engaged for collection, supplying and distribution i.e authority/department.

Now awareness required to guide people to cover these water resources to avoid contamination.

A program also need to chalk out to cover these water resources with small size roofs standing on four or five cemented pillars to cover handpumps, bowlies, springs, wells etc.

Very reasonable funds required for this purpose of concrete/natural structure which saves many precious life from health contamination. Its also save precious natural water from wastage otherwise one or two bucket of water thrown to get clean bucket of water because generally masses assume if they thrown one or two bucket upper layer water of natural resources they may get much better clean water. Covering open water also save it from falling object from open sky which also contaminates water.

In other words promotion of Swach Bharat in villages, Global beauty, safety of precious lives from contamination & sickness, environment safety, promotion of greenery, protection of precious water & natural resources, avoiding wastage, increasing reuse habit etc. all are possible in single stroke.

# Dr Aditya Sarkar

Image	Delegate ID	Theme	Details
	YSC 12149	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> Presidency University, Kolkata <b>Designation :</b> Assistant Professor

**Abstract:** Groundwater salinity has been recognized as the most common hydrogeological challenge faced by many parts of North India. Although it could be traced back to both geogenic and anthropogenic sources, a recent upsurge in groundwater salinity across the region is often associated with change in groundwater dynamics. The over-exploitation of shallower groundwater resources not only tends to disrupt the natural replenishment processes but also increase the possibility of mixing of freshwater with brackish groundwater from deeper aquifers. In this context, the study tries to reconnoiter the variation in groundwater salinity in parts of North India, mainly focusing on the state of Haryana. This state has been reported to be the most cultivated state in the country. Further, it has also witnessed large-scale abstraction along with significant urbanization. These activities have led to rapidly declining water levels as well as quality issues in the state during recent years. The initial observations from our study showed that there has been an uneven change in groundwater salinity across the state in the last decade. It also revealed that although groundwater abstraction seems to be the most important factor to influence the groundwater salinity, other local geogenic and anthropogenic sources also play a role in its spread. Based on our findings, it is proposed that more detailed investigation could be undertaken for better understanding of the processes responsible for spread of groundwater salinity. This would be helpful in better groundwater quality management in the region.

**Keywords:** Haryana; Groundwater; Salinity; Irrigation; Abstraction; Contamination

# Ms Sadhana Devi

Image	Delegate ID	Theme	Details
	YSC 12172	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> Centurion University <b>Designation :</b> Assistant Professor

Among 'Tribal people', we never found one complaining for shortage of water even if residing on hill-tops. Electricity has reached to most of them in Odisha but for supply of water they are neither dependent on electricity nor on any government schemes.

The secret is lying in their traditional knowledge of tapping the water, sequencing the usage and circulating through every need with modified gradient of contours. To add a regular maintenance aspect and to assure the cleanliness of stored water, storage is always linked with annual ritual function or a temple.

This paper elaborates on actual water conservation techniques practiced in Begunia, Serango and Khallikotte areas of Odisha tribal belt. All the data discussed is derived from actual field visit for a DST project on 'Cultural mapping of Odisha tribal art and its sustainability'. The techniques used and their simplicity, may add another aspect of water conservation to our modern lifestyle.

Swapping lakes patterns, Small check-dams at starting point and another at termination, modifying the contours within the steps on slopes, locking soil erosion and constructing temples for large storage of drinking water - based on exact principles of water treatment plant are some of the issues discussed in this paper.

# Mr GAURAV CHAKRABARTY

Image	Delegate ID	Theme	Details
	YSC 12296	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> TRINITY <b>Designation :</b> Research Scientist

# An Overview on Water Scarcity in India Using Hydrological Modeling: Reasons and Remedies

Gaurav Chakrabarty<sup>1</sup>, Ritesh Kumar<sup>2</sup> and Muniyan Sundararajan<sup>2</sup>

<sup>1</sup>Research Scientist, Trinity, Loharkulli, Saraidella, Dhanbad, India.

<sup>2</sup>Scientists, CSIR-CIMFR, Barwa Road, Dhanbad.

## Abstract

In India, the land use of about 51.09% falls under cultivation, 21.81% under forest and 3.92% under pasture. Built up areas and uncultivated land occupy about 12.34% and its total area is about 32,87,263 Km<sup>2</sup>.<sup>1,2</sup> The total area of about 46,389 Km<sup>2</sup> occupied by water bodies in which the small reservoirs and irrigation tanks occupies about 14,856 Km<sup>2</sup> and the medium and large reservoirs occupies about 31,534 Km<sup>2</sup>.<sup>3</sup> About 1.4% of the land works as permanent recharging system and about 88% of the land may have the scope for runoff to pass through. However, a detailed geological study should be carried out to delineate the rechargeable zone. Recent studies have reported that the groundwater table has gone down significantly due to the following reasons:

- Absence of regular maintenance of dams, lakes and ponds has significantly.
- Unscientific methods of construction and pavement roadways while broadening has occupied a large area of land.
- Unempirical housing developments in the modern age.
- Deposition of used polyethylene bags and unused plastic articles along with sediments on earth-surface and in water bodies due to lack of proper waste management.

This research article presents the application of Geospatial Science in Water Crisis Assessment through the usage of Hydrological Modeling as well. Further, a scientific study on the sediment deposits at the bottom of the water bodies that hinders the water recharge has been explained well. The paper presents following remedies with detailed scientific explanations and data to resolve the problems of water scarcity in the country:

- Regular maintenance of dams, lakes and ponds by removal of sediments.
- Contraction and pavements of wide roads should be resigned so that it may have a structure to collect runoff along the roads to recharge the ground. This will also increase the elasticity property of the soil under the road to protect from the damage during earthquakes.
- Enforcement of legal criteria to control the builders and housing developers to ensure the groundwater recharging system in a minimum prescribed area within the owned land.
- Arresting the sediments along with polyethylene bags and unused plastic articles through check dams constructed across the rivers and streams.

## Reference

1. <https://www.indiawaterportal.org/articles/land-use-map-india-national-institute-hydrology>
2. [https://en.wikipedia.org/wiki/Geography\\_of\\_India](https://en.wikipedia.org/wiki/Geography_of_India)
3. <http://www.fao.org/3/v5930e/V5930E01.htm>

# Mr VIJAY KUMAR

Image	Delegate ID	Theme	Details
	YSC 12301	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> entomology <b>Designation :</b> PhD student

Water is probably the most important substance for preserving life. In fact, scientists looking for evidence of life on other planets regard the presence of water as a vital clue. Under the changing climate and raising global warming situation leads an increased demand for water. Hotter temperatures diminish the amount of water available in lakes and rivers. In India around 83% of available fresh water is used for agriculture. Therefore, water crises inevitably become food crises. Rainfall being the primary source of fresh water, the concept behind conserving water is to harvest it when it falls and wherever it falls. The importance of storing rainwater through different traditional techniques can be understood by an example of the desert city of Jaisalmer in Rajasthan which is water self-sufficient despite experiencing meager rainfall as against Cherrapunji, which is blessed with the highest rainfall in the world, but still faces water shortage due to lack of water conservation methods. Some of the traditional Storing rain water methods include; Kuls or Guls - People in western Himalayas build diversion channels to provide water to the fields in the hilly regions. Johads and khadins moistened the soil and the stored rain water conserve for future use. These were common in Rajasthan. Tanks or 'Tankas' consisted of a very large tank generally underground, connected to the roof from where the water travelled through a pipe. These kept the house cool and were common in the arid and semi-arid regions of Rajasthan. Another method is Bamboo Drip System - In this system rainwater was collected through bamboo pipes which transported water over hundreds of meters and then collected and distributed to the roots of the plants. This system still prevails in Meghalaya and other North-Eastern states.

# Ms Aiendrila Dey

Image	Delegate ID	Theme	Details
	YSC 11762	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Others</p> <p><b>Organisation :</b> Indian Institute of Technology, Kharagpur</p> <p><b>Designation :</b> PhD student</p>

Recent increase in urbanization and population has played a major role of influence on water resource management over changing climate. To address these issues, integrated models have been developed for evaluating the future climate change impact and providing solutions for sustainable water resource management on a catchment scale. Different hydrological model structures might be conceptualizing the dynamic multiscale interactions among hydrological processes in numerous ways, and it might be limiting its applications under a range of catchment or climatic conditions. Thus, it is a very challenging task to identify the most compatible model for accurate streamflow prediction, for a given catchment and which can be achieved through a comprehensive understanding of structural similarities and comparison among the models. In this study, we focus on the performance evaluation of hydrological simulations using two types of model structures viz., a semi-distributed hydrological model [Soil and Water Assessment Tool (SWAT)] and a lumped rainfall-runoff model [HYdrological Simulation Model (HYSIM)]; and employed these models in the Damodar River basin (India). The performance of the two models is evaluated by comparing diagnostic evaluation based on flow data, soil moisture, and water balance; and through appropriate statistical indices at daily time steps during the simulation period 1991-2013. The results from these two models indicate that a large source of uncertainty exists in hydrological fluxes based on structural differences in the selected models. The diagnostics and aggregated performance measures prove that model structure influences greatly on water balance, soil moisture, and low flow simulations, and also it helps policymakers to make critical water management decisions.

# Mr samin shaikh

Image	Delegate ID	Theme	Details
	YSC 11781	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Chemistry <b>Organisation :</b> KVN NAIK COLLEGE, NASHIK, <b>Designation :</b> ASSIST PROFESSOR

Abstract: - Now a days, One-third of the developing world is facing scarcity of water. The demand for water among various sector is continually increasing due to deforestation, population growth, mismanagement of water and other issue. Most of the part of Maharashtra state is drought prone. Village like Vadajhire has a rugged topography and basaltic geological formation so there is limitation on canal as well as well irrigation. In past most of the efforts were made by the government like Pani Foundation in storing the flowing water and less attention was given to percolation of water, which is useful for wide availability of water. A seven day district level camp on “water Conservation” organized by National Service Scheme of KVN Naik College, Nashik, from 12/05/18 to 18/05/18. Water storage and Water Conservation technique is must to increasing the level of underground water. Effective techniques likes CCT, LBS, WAT were applied in Vadjire Village and on the basis of statistical data of ground water we came to the conclusion that ground water level could be increase by such techniques to solve drought problem to some extent. This is useful to increase underground water level by approximately 0.5 % as compared to last two years.

# Mr ARUN RATHOD

Image	Delegate ID	Theme	Details
	YSC 11923	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Agricultural Engineering</p> <p><b>Organisation :</b> Dehradun</p> <p><b>Designation :</b> Research Scholar</p>

Agriculture is backbone of our country's economy as it provides livelihood to around 55% of our population. But in recent years due to irregular monsoon and outdated modes of irrigation there has been great stress on farmers. This phenomenon is not limited to any one region of the country but could be seen across all major states.

Irrigation through tube wells is most common practice among farmers as it is quite easy to install and operate. But its irresponsible use results in wastage of water on a large scale which ultimately diminishes the water table in that area. This creates a water crisis in that region which have far reaching socio-economic consequences. Further modern irrigational practices like sprinklers and drip irrigation require good amount of monetary investment in the initial stage which makes them unreachable to small and marginal farmers of India.

In order to provide a solution to this problem we propose a 'Smart Auto-Irrigation System' which could be integrated with any mode of irrigation like tube wells, sprinklers etc. which require electricity to operate. This Smart Auto-Irrigation System will control the flow of water in to the fields and will automatically cutoff the water supply when the optimum amount of water is provided to crop. The system is comprised of two parts; 1: Controller and 2: Sensor. The controller will control the electricity supply to the pump or sprinkler on the basis of information send to it by the sensor which is embedded in the ground.

Working of Smart Auto-Irrigation System could be understood by following example. Suppose a farmer irrigates using a tube well. Now in order to use this system he divides his field in to 100 rows and places sensor near the roots of the last plant of every 20th row at a suitable depth. So in total he deployed 5 sensors in his field. Now the water from tube well is directed into 5 pipes. Each pipe will drain 20 rows. As soon as the water from these pipes reaches the roots of the last plant of their section the sensor will send a signal to controller which will cut off the power supply and flow of water will stop. When water near the roots fell to a low threshold point the controller will automatically restart the pump. In order to make system more efficient separate controller could be attached to each pipe.

# Mr RAVIKESH KUMAR PAL

Image	Delegate ID	Theme	Details
	YSC 11947	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> Bihar Agricultural University <b>Designation :</b> PhD scholar

**Abstract:** Land and water are the essential and basic needs for the development of agriculture and monetary advancement of the nation. According to International Water Management Institute (IWMI) about one-third of the total world's population will confront absolute water shortage by the year 2025. Agriculture consumes more than 80 per cent of the nation's exploitable water resources. The overall development of agriculture sector and the planned growth rate in GDP is mostly dependent on the reasonable utilization of the available water resources.

A large amount of water is losses through evapotranspiration, leaching, deep percolation and application losses etc. Therefore, we adopt those irrigation methods which were helpful to reduces water crises and to increasing the area under efficient methods of irrigation viz., drip irrigation, sprinkler method and pot irrigation method over traditional methods. In traditional surface irrigation methods, the losses in water conveyance and application are large. These losses can be considerably reduced by adopting drip and sprinkler irrigation methods. Among all the irrigation methods, the drip irrigation is the most efficient and it can be practised in a large variety of crops, especially in vegetables, orchard crops, flowers and plantation crops. Drip irrigation is an efficient method of providing irrigation water directly into soil at the root zone of plants results in a very high water application efficiency of about 90 to 95%. It also permits the utilization of fertilizers, pesticides and other water-soluble chemicals along with irrigation water resulting in higher yields and better quality produce. Drip irrigation system is regarded as solution for many of the problems in dry land agriculture and improving the efficiency in irrigated agriculture. Drip irrigation is adaptable to any farmable slope and is suitable for most soils. In contrary to commercial drip irrigation, simple self-made systems are cheap and effective.

**Keywords:** Water, Drip irrigation, Sprinkler irrigation etc.

# Ms Sruthi N

Image	Delegate ID	Theme	Details
	YSC 12118	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Chemistry <b>Organisation :</b> Bharathiar University <b>Designation :</b> Research scholar

Synthesis of Novel Fe and imine based Metal Organic Framework for Detection of heavy ions in Water  
N.Sruthi, M.Roshna and A.Kannan\*

Department of chemistry, Bharathiar University, Coimbatore, Tamil Nadu, India-641046

E-mail address: ayyavookannan@gmail.com / sruthibkcp@gmail.com

Abstract:

A metal organic framework (MOF) is a coordination polymeric network containing metal and organic ligand as the linking units. The main advantage of MOF are having potential voids therefore it is used for many application such as catalytic activity, energy storage device, drug delivery, batteries, sensing, waste disposal and biomedical applications etc., So, the design of MOF have best characteristics of high stability, good porosity and large surface area hence they are very attractive in the field of detection of elements. In such views in mind, we have decided to synthesis of novel Fe-MOF using imine based ligand via hydrothermal method, ligand and MOF are characterized by analytical methods. The present investigation is focused on synthesis of novel Fe MOF is high porosity so it can detect heavy ions.

References:

1. S. R. Batten, N. R. Champness, X. M. Chen, J. Garcia-Martinez, S. Kitagawa, L. Öhrström, M. O'Keeffe, M. P. Suh, J. Reedijk, Crystengcomm, 2012, 14, 3001-3004.
2. X. Zhang, T.F. Xia, K. Jiang, Y.J. Cui, Y. Yang, G.D. Qian, Solid State Chem. 2017, 253, 277-281.

# Mr Dhananjay Kumar C

Image	Delegate ID	Theme	Details
	YSC 12177	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> civil Engineering <b>Organisation :</b> CSIR-4PI Bengaluru <b>Designation :</b> Junior Research Fellow

Hydrological simulation models have proven to be an important tool for managing and planning water resources, enabling the assessment of the impacts of rainfall on surface runoff and soil moisture. Adequate characterization of potential evapotranspiration (PET) plays a critical role in hydrologic budgets, rainfall–runoff models, infiltration calculations, and drought prediction models. ET was driven by relative humidity in spring, sunshine hour duration in autumn and both sunshine hour duration and relative humidity in summer. In this study, changes in Evapotranspiration in the Kosi River Watershed during 1979–2014 were examined using remotely-sensed evapotranspiration data with the Soil and Water Assessment Tool (SWAT). We used agronomic, climatic and hydrological data to drive the SWAT model for changes in potential evapotranspiration and surface runoff in the study area. The SWAT hydrologic model utilized monthly stream flow data from two gauge station within the Kosi river watershed. Results found that the spatial and temporal patterns of evapotranspiration and water yield were simulated for the period of 35 years, closely linked to climatic condition in the basin. Although surface run off increased in the month of June to August and PET which depends on temperature, increased in the month of March to June.

# Mr SATHISH KUMAR R

Image	Delegate ID	Theme	Details
	YSC 12339	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Chemical Engineering</p> <p><b>Organisation :</b> NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI</p> <p><b>Designation :</b> RESEARCH ASSOCIATE</p>

The shortage of freshwater for domestic and for agricultural purposes focuses attention on a growing scientific and technological challenge of low-cost water reclamation technique. In recent decades, membrane systems are gained considerable attention for various wastewater reclamation to meet the stringent environmental regulation, potable water demand. In addition, membrane systems have advantages such as energy efficiency decreased footprint and easy to scale up. However, the usage of membrane systems is suffered by biofouling. Biofouling is a serious problem in membrane systems which causes severe performance loss, requiring costly periodic chemical cleaning, reduces membrane life and so increasing operating costs and/or decreasing product quality. Several research works have suggested that biological mitigation is the novel approach to control the biofouling. In biological mitigation technique, cell to cell communication (i.e. quorum sensing) was interrupted to mitigate the formation of biofilm. Hence, herein, we utilized quorum sensing inhibitors (QSI) such as curcumin, vanillin and 2(5H)-Furanone as modifiers for the fabrication of novel biofouling resistant membranes. In the present study, QSI compounds were embedded in Polyethersulfone (PES) membrane matrix by a facile blending method. The presence of quorum sensing inhibitors in PES matrix was confirmed by FTIR and <sup>13</sup>C NMR studies. The performance of the prepared membranes was studied by the pure water flux experiments, filtration of activated sludge, and also by filtration studies of BSA and Egg Albumin. Synthetic activated sludge filtration studies reveal that the fouling property of the modified PES membranes was enhanced because of the incorporation of Quorum Sensing Inhibitors (QSI) in PES matrix. The incorporation of curcumin in membranes was effectively improved the antifouling tendency without compromised affecting the chemical oxygen demand reduction. This study highlights the anti-biofouling potential of curcumin, vanillin and 2(5H) - Furanone incorporated PES nanocomposite membranes, which could be utilized for various wastewater treatment applications.

# Ms Reshma Jahaan K

Image	Delegate ID	Theme	Details
	YSC 12471	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> civil Engineering <b>Organisation :</b> SRI KRISHNA COLLEGE OF TECHNOLOGY <b>Designation :</b> Assistant Professor

The idea is artificial recharge of dry bore wells in nearby areas which will not only improve the underground water level, but also will decrease the earth's temperature. This method is done by digging a pit around the existing dry bore well and filling the pit with filter material in layers. Surface run off from upstream catchment areas is diverted towards this recharge structure. Water passes through this filter material and clear water enters the bore well and directly reaches the underground aquifers. The novelty and usefulness of this method is that without drilling new bore wells, existing dry and low yield bore wells can be converted as recharge wells and directly converted as recharge wells and directly the recharge deep aquifers. The plan is to adopt an area and implement this technique so as to create awareness on mitigation of climate change as well as to reduce the accidents happening in dry bore wells. The artificial recharge projects are site specific and even the replication of the techniques from similar areas are to be based on the local hydrogeological and hydrological environments. The first step in planning the project is to demarcate the area of recharge. The Project can be implemented systematically in case a hydrologic unit like watershed is taken for implementation.

# Prof MADHURI PAWAR

Image	Delegate ID	Theme	Details
	YSC 11818	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Chemistry <b>Organisation :</b> ASHOKA COLLEGE OF EDUCATION <b>Designation :</b> ASSISTANT PROFESSOR

## ? Abstract:

Water is major natural resource for the life of living being. It is made up by main constituent present in the surrounding that is oxygen and hydrogen. It acts as Universal Solvent and a ray of life.

In India in the region Maharashtra Water, scarcity is major problem. This happens due to the sudden increase in temperature because of pollution, increase the percentage of CO<sub>2</sub> in atmosphere leads to global warming. Environmentalists and small activists these days have field days are root cause for the world's water shortages. What also needs to be examined is what is causing global warming and the current climate crisis today. Use of excessive water on a daily basis by Industries, domestic and agriculture also caused scarcity of water.

To inculcate the knowledge about water conservation and the social awareness amongst the people, education must be given them, means educating the public by dispensing important information. Some plan of action must be prepared by government of India, ministry and various NGO. These will help them for proper planning of water utilization and importance for daily life and future too. This will decrease the crisis of Water in our country and the specific region of India.

# *Dr Shradhanjali Behera*

Image	Delegate ID	Theme	Details
	YSC 12005	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> Sambalpur University <b>Designation :</b> Researcher

## ABSTRACT

Decrease of ground water level in day-to-day is a matter of thought because of its great value. Both surface and ground water conservation is a global issue with high impact. In the present research, we proposed a new technique to increase the ground water level efficiently. The proposed technique which is based on the principle of reciprocating positive displacement pump and is suitable to push the excess flowing river water or channel water into the ground automatically by the flowing force using the device throughout the year. Again, this model can also capable to push the rain water flowing away via an artificial channel formed due to heavy rain fall. The merits of the above proposed technique over other available techniques are: (i) This process works through the year to increase the ground water level, (ii) This can implement even at small channels including river, (iii) The excess water flowing away in river and small cannels can be utilise for the purpose, (iv) principle of a simple reciprocating positive displacement pump can be applied and no extra power is required except the flowing force of river water, and (v) water with various salts can be put inside the ground, however the rain water harvesting can not meet this requirement.

# *Ms swarnali barua*

Image	Delegate ID	Theme	Details
	YSC 12029	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Others</p> <p><b>Organisation :</b> presidency university</p> <p><b>Designation :</b> asst.prof</p>

The northern part of the state of West Bengal is known to have a varying geology with an undulating topography. This region includes the Darjeeling district, which is a part of Eastern Himalayas, along with other five districts (Jalpaiguri, Cooch Behar, Uttar Dinajpur, Dakshin Dinajpur and Malda), that forms the northernmost reaches of alluvial plains of the Bengal Basin. Although endowed with abundant freshwater resources, a recent rise of urbanization and irrigation in these districts has greatly affected their groundwater systems. However, the impact of these changes varies significantly with the hilly regions suffering acute water shortage, while the plains show an increase in reports of groundwater contamination. Based on this observation, this study tries to review the changes in hydrogeology of the North Bengal region in recent years. The earlier results from the study has shown that even though the general groundwater potential of the entire region is good, many localities showed high levels of Fluoride, Arsenic and Iron in groundwater. Further, the groundwater abstraction for irrigation in the region doesn't seem to show any significant impact on the general groundwater quality. This implies that sources of groundwater contamination in the region might not be linked to the anthropogenic changes and needs to be further investigated. It is proposed that exploring the nature of aquifers might be useful in it. Since, there is very limited hydrogeological information available for the region, such initiatives could be helpful in better understanding of groundwater resources in North Bengal. This could be beneficial in developing conservation and management plans for present and future requirements.

# Ms shanmugapriya P

Image	Delegate ID	Theme	Details
	YSC 10199	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Nano Engineering</p> <p><b>Organisation :</b> Sri sairam Engineering college</p> <p><b>Designation :</b> ASSISTANT PROFESSOR</p>

Water is a basic requirement for any application, but the quantity available for use in its raw form is limited to about 1%, about 97.5% being held in seas and 1.5% being caught up in glaciers. Which increases the demand for conversion of the available salty water and waste water in a well-planned way. As known, solar energy has been providing a gateway for purification through distillation, this could be made more efficient by incorporating nanoparticles in the solar stills in the form of carbon nanotubes/membranes for filtration. The nano filters have the capability of excellent absorption of irrelevant particles present in the water, thus providing high degree of potability. This project provides a system where the solar stills helps to distil water, the drawback of its low daily productivity and absorption of heavy metals (in case of waste water) is compensated by the application of nanoparticles, which improve productivity exhibiting thermal efficiency, and also satisfying cost constraints at the same time. The system is monitored using a microcontroller for controlling and maintaining optimum conditions of the set up including temperature, humidity etc.

By this method the demand for clean water and the availability of abundant impure water are both tallied to meet the on growing domestic and industrial necessities. The advantage of this process on a higher end is that the natural composition of the water are retained after treatment thus providing high potability rate. Keeping pollution in mind, this system employs and operates in an eco-friendly manner, maintaining ecological balance.

# *Dr MOHAMMAD SUBZAR MALIK*

Image	Delegate ID	Theme	Details
	YSC 10266	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> CSIR-Advanced Materials and Processes Research institute (AMPRI) Bhopal <b>Designation :</b> Research Associate

In the study, GIS-based DRASTIC model approach has been used for the assessment of groundwater contamination vulnerability in parts of the Tawa river catchment, Hoshangabad, Madhya Pradesh, India. The purpose of the study is the identification of the susceptible zones of groundwater contamination by the integration of the various input data layers of the model in a GIS environment. The input variables of the model i.e. Depth of water table, Net recharge, Aquifer media, Soil type, Topography, Impact of vadose zone and Hydraulic conductivity were evaluated from various sources integrated with the model and groundwater contamination vulnerability map has been prepared. The output groundwater vulnerability map has shown that 34.84% of the area is in the high-risk zone of groundwater contamination. The high probability of contamination in the zone is due to rigorous farming and good recharge practices along the river valleys. Further, a large part of the area covers 54.84 % is falling in a moderate zone of groundwater contamination. A small part of the area covers 10.32 % towards southern hill slopes lies in the low-risk zone of groundwater contamination. Further, the output model results were validated by chemical analysis of groundwater in which 30 groundwater samples have been collected from the delineated groundwater contamination vulnerability zones. These water samples were analyzed for evaluation of nitrate concentration. In low groundwater contamination vulnerable zone, nitrate was present in

# Mr RAKESH AHIRWAR

Image	Delegate ID	Theme	Details
	YSC 10270	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> Academy of Scientific and Innovative Research (AcSIR), CSIR-AMPRI Bhopal <b>Designation :</b> Research Scholar

Geomorphological analysis of sub-watersheds of the Hoshangabad and Budhni industrial area, Madhya Pradesh, India was carried out using geospatial techniques for soil and water conservation. In the study, we have taken four sub-watersheds under analysis for the prioritization of soil and water conservation in the area. Survey of India topographic sheets 55 F/9, 55 F/10 and 55 F/13 on scale 1: 50,000 were used to evaluate the geomorphometry parameters of the area. SRTM DEM data has been analyzed for slope analysis and outlining of the sub-watersheds. LISS-III, IRS data has been processed for land use/land cover analysis. NBSS & LUP, ICAR, 1997 soil map has been processed for soil mapping. The various morphometric parameters evaluated for each sub-watershed include; drainage network, drainage geometry and texture analysis and relief parameters using ArcGIS. Further, each sub-watershed has been prioritized by assigned ranks using the compound parameter. After prioritization, land use, soil type and slope classes of each sub-watershed were integrated to propose suitable sites and structures for soil and water conservation. It has been suggested that the proposed soil and water conservation structures must be executed on a priority basis to reduce the adverse effect on the land and environment. The study reveals that prioritization of sub-watersheds is very relevant, supportive and useful in the area, where there is high diversity in agricultural practices, soil texture, and land cover. Therefore, priority wise implementation of the proposed soil and water conservation structures will not only reduce the soil erosion but also increase the surface and groundwater resources in the area. Thus, it is concluded that the prioritization of sub-watersheds is very helpful for the soil conservation and management of groundwater.

# *Dr Mohana sundaram k*

Image	Delegate ID	Theme	Details
	YSC 10643	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Electrical <b>Organisation :</b> VEL TECH MULTITECH Dr. RANGARAJAN Dr. SAKUNTHALA ENGINEERING COLLEGE <b>Designation :</b> Professor

This project describes the design and development of a water quality monitoring system, with the objective of notifying the user the real-time water quality parameters such as pH values, Temperature values, Turbidity values, Flow rate values using IOT with the help of micro-controllers and embedded system. The proposed system is able to measure the physiochemical parameters of water such as flow, temperature, pH and the Turbidity. These physiochemical parameters are used to detect water contaminants and also to check the quality of water. The quality sensors are designed and implemented with signal conditioning circuits and are connected to a microcontroller-based measuring node, which processes and analyses the data. The sensors are shown to work within their intended accuracy ranges in the system. In this design, the Ubidots platform is used to connect the monitoring system with the cloud. Various qualification tests are run to validate each aspect of the monitoring system. The result will demonstrate that the system is capable of reading physiochemical parameters and can successfully process, transmit and display the readings in the cloud.

# Mr VELAN V

Image	Delegate ID	Theme	Details
	YSC 10669	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Chemical Engineering</p> <p><b>Organisation :</b> Paavai institutions</p> <p><b>Designation :</b> Chemical engineering</p>

## COST EFFECTIVE WAY TO CLEAN INDUSTRIAL EFFLUENT USING ANN MODEL

V.Velan<sup>1</sup>, V.Purushothaman<sup>1</sup>, R.Vinothkumar<sup>1</sup>, M.Ajith<sup>1</sup>, K.Muthamizhi\*

\*,<sup>1</sup> DEPARTMENT OF CHEMICAL ENGINEERING, PAAVAI ENGINEERING COLLEGE, NAMAKKAL, TAMILNADU.

Velanchem1023@gmail.com and tamilkrypal@gmail.com

### Abstract

Discharge of liquid waste in environment is major challenge nowadays. The objective of the present study is to eliminate such challenges and also to evaluate the potential of using aluminum sulfate and potassium sulfate in the ratio of 1:4 to reduce the toxicity, turbidity and amount liquid waste collected from Amirthavarshini located in Pachal, Namakkal, Tamilnadu. The study also includes the determination of various chemical parameters such as pH, Turbidity, Electrical Conductivity, Total Solids and chemical parameters like Chloride, alkalinity, Acidity and Hardness at different conditions. In summary, the combined use of aluminum sulfate and potassium sulfate would be helpful in reducing the amount of waste that is usually released into the environment and also the study using ANN can predict the performance of wastewater treated.

### References:

1. R.S. Govindaraju, "Artificial neural network in hydrology. II:hydrologic application, ASCE task committee application of artificial neural networks in hydrology," Journal of Hydrologic Engineering vol 5, pp. 124–137, 2000.
2. F.S. Mjalli, S. Al-Asheh, and H.E. Alfadala, "Use of artificial neural network black-box modeling for the prediction of wastewater treatment plants performance. Journal of Environmental Management," vol. 83(3), pp. 329-338, 2007.
3. G. El-Din, and D. W. Smith, "A neural network model to predict the wastewater inflow incorporating rainfall events," Water research, vol. 36(5), pp. 1115-1126, 2002.
4. M.S. Nasr, M. A, Moustafa, H. A. Seif, and G. El Kobrosy, "Application of Artificial Neural Network (ANN) for the prediction of EL-AGAMY wastewater treatment plant performance- EGYPT," Alexandria Engineering Journal, vol. 51(1), pp. 37-43, 2012.

# Mr Mohammed Noohu Nazeer

Image	Delegate ID	Theme	Details
	YSC 10749	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> University of Madras <b>Designation :</b> Research Scholar

Amidst the changes in the precipitation pattern due to climatic variations, water conservation is more important than any other issues that we are facing today. Apart from the conservation of water reserve, it is more important to reuse the water resource if it is possible. Here in this paper, two important issues are dealt; wastewater management and supplying the treated water to drought-prone agricultural zones. Installation of hydro pots in the railway platform is the idea we are suggesting to reduce the water wastage. As of now the biologically treated water from train toilets are drained directly to the railway tracks. Instead, the water drained from the trains is stored and transferred to the hydro pots which are fixed under the railway platform. Flash floods are a severe problem in urban stations, to a certain extent the issue could also be controlled by the installation of hydro pots. Water stored in hydro pots is injected to the locally available tankers and transported to the agricultural lands based on the needs. Water scarcity could be addressed to a greater extent and these of course help the farmers of our country in increasing the crop production if established properly. Indian railway can show a better model in water conservation, to the world if this could be properly implemented.

# Mr Shobharam Ahirwar

Image	Delegate ID	Theme	Details
	YSC 10993	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Others  <b>Organisation :</b> CSIR-AMPRI, Bhopal  <b>Designation :</b> Research Schaler</p>

**Abstract:** Groundwater is unevenly distributed all over and is limited in hard rock terrains. In the study a case study was done used combined approach of remote sensing and GIS to delineate the potential zones of groundwater recharge in upper Betwa watershed, Obedullahganj block, Raisen district, Madhya Pradesh. The different thematic layers viz; geology, lineament density, soil, slope land use/land cover and drainage density were prepared for 683 km<sup>2</sup> study area. District resource map (DRM) of GSI, 2002 has been analyzed for geology. SRTM Digital Elevation Model (DEM) was used to obtain the slope. LANDSAT 8 OLI data has been processed for lineament density and LULC analysis. Survey of India toposheets was used for drainage density analyses and NBSS& LUP map for soil study. Ratings were assigned to each parameter of the thematic maps and weightage was given as per the relative influence of each parameter i.e. land use/land cover (25%), lineament density (5%), slope (20%), drainage density (15%), soil type (25%) and geology (10%) in the area. Finally, the output groundwater recharge potential map has been prepared by overlaying all thematic maps in terms of the weighted index overlay method, which was further classified into three zones (i) low potential zone (121.80 km<sup>2</sup>) (ii) moderate potential zone (387.78 km<sup>2</sup>) and (iii) high potential zone (173.35 km<sup>2</sup>). The output results were validated by plotted specific yield data and groundwater depth of selected wells in delineated groundwater recharge potential zones using GPS locations. Thus it has been seen the spatial distribution of potential recharge zones of groundwater is controlled by the above mentioned factors in the watershed.

**Keyword:** Groundwater recharge potential map; Geology; LU/LC; Lineament density; Slope; Drainage density, Soil, Remote sensing and GIS; Upper Betwa watershed

# Mr Ravikumar S

Image	Delegate ID	Theme	Details
	YSC 10073	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Physics <b>Organisation :</b> Research scholar <b>Designation :</b> PhD

Initially, sphere shaped SiO<sub>2</sub> was prepared by a simple sol-gel method without any template. Later, the sphere like SiO<sub>2</sub> was modified with cadmium sulfide (CdS) semiconductor and porphyrins. The formation of composites (CdS/SiO<sub>2</sub>-porphyrins) was confirmed by different characterization techniques such as XRD, Raman, FT-IR, FE-SEM, EDS, DRS and PL measurements. The photocatalytic activity of CdS/SiO<sub>2</sub> was slightly influenced by porphyrins such as meso-tetra-phenyl-porphyrin (TPP) and 5,10,15,20-meso-tetra-(para-amino)-phenyl-porphyrin (TPAPP). A mechanism was proposed for RR 120 dye degradation by CdS/SiO<sub>2</sub>- porphyrins under sunlight.

# Dr Hitesh Panchal

Image	Delegate ID	Theme	Details
	YSC 10310	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Mechanical Engineering <b>Organisation :</b> GEC Patan <b>Designation :</b> Assistant professor

Research consists of detailed feasibility study of 1TR AWG for warm and humid states of India over entire year using energy and mass transfer equations. Results clearly indicates that ample amount of condensate can be extracted from atmosphere round the year. 1 TR system is capable to generate about 30 liters water per day at 70% RH and 30 0C temperature, which is sufficient for the household domestic application. 1 TR VCR system is thermodynamically designed in engineering equation solver software to execute the calculations. The experimental setup is developed as per the thermodynamic model. The experimental setup consists of VCR system with heating and humidification unit to produce different climatic conditions. Measuring and controlling instruments like pressure gauge, rotameter, sight glass, TEV, water flow control valve are provided to accurately analyze the system. The AWG system is analyzed for different climatic conditions. The maximum amount of condensate of 1700 ml/hr is obtained in warm and humid regions and least condensate of 280 ml/hr is obtained in warm and dry regions.

# Dr Gaurav Bhoj

Image	Delegate ID	Theme	Details
	YSC 10327	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Chemistry <b>Organisation :</b> IIT Gandhinagar <b>Designation :</b> Researcher

## Abstract

Composite material based on magnetic and conducting materials exhibit new or enhanced physical properties, of interest for future. In recent times, titania with magnetic property have been reported to ensure the recovery and reuse of the catalyst for waste water treatment. Titanium dioxide mediated photo catalytic oxidation offers potential a facile and cheap method for removing inorganic and organic pollutants from waste water treatment. This technology is at a sufficient advanced stage now to present a possible solution to the current environment crisis in both developed and developing countries with regard to the supply of high quality water for drinking and commercial uses.

In this technique we synthesized iron titanium nano composites by using sapindus mukorosis species first time in research history. The results showed that alpha particles iron oxide and nastase titanium dioxide were present in the nanocomposite. The as prepared particles consisted of me so porous structure with in an average pore size of 30 cm and a surface area of 50 m<sup>2</sup>/g.

# Mr FARUK POYEN

Image	Delegate ID	Theme	Details
	YSC 10332	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Applied Engineering</p> <p><b>Organisation :</b> University Institute of Technology</p> <p><b>Designation :</b> Assistant Professor</p>

In India, irrigation processes consume a majority of the water and the uncontrolled methods lead to huge volumes of loss. In this article, a noble approach is proposed and a model is prototyped to automate the irrigation mechanism supplying the farms with just the necessary volume of water thereby curtailing on the unwanted wastage. Evapotranspiration (ET), a combined effect of evaporation and transpiration is calculated from data collected by a turnkey local weather station, and based on a Fuzzy rule base, considering the necessary parameters, just the exact amount of water can be supplied to the fields. This way, optimum volumes of water prevent both water stress as well as the deluge and hence will boost the yield from the cultivating lands. The weather parameters which are locally measured for ET determination are air temperature, relative humidity, wind speed, atmospheric pressure, and solar radiation. The parameters which are considered for designing the Fuzzy rule-base to compensate for the loss are crop type, soil type, and growth stage. The other factors which also have roles to play in this design aspect are surface run-off and loss due to leaching. Out of the several ET determining methods, three methods viz Penman-Monteith (PM), Kharrufa and Hargreaves methods are shortlisted to the simulation. Out of these three methods, the PM method showed a little better response than the other two. Hence for the final validation process, the PM method is fed to the controller unit. The successive yields were compared, one using any control method and the second using the rule-base. It is observed that a 26% water saving along with a 40% increase in yield is registered. The rule-base can be extended to all crops for any soil-type across any growth stage across any geographical location. The prototype model is low on cost.

# Prof Kapil goyal

Image	Delegate ID	Theme	Details
	YSC 10591	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Agricultural Engineering</p> <p><b>Organisation :</b> DAV College Amritsar</p> <p><b>Designation :</b> ASSOCIATE pROFESSOR</p>

**Blockchain Technology: Smart Farming in Agriculture**

Kapil Goyal, Associate Professor, Computer Science, DAV College, Amritsar

erkapilgoyal@gmail.com

**Abstract:** Originally Blockchain technology was invented for the virtual currency bitcoin, but today Blockchain innovation has widely used in smart farming. Smart farming involves the integration of advanced technologies like Internet of Things (IOT), Smart Sensor, Connected and Automatic guns etc. The basic objective is to increase production efficiency and the quality of agricultural products. It is one of the secure techniques for the farmers engaged in agricultural community.

**Problem:** My research manuscript will address key issues faced by farmers in general like weather conditions, soil quality, water level and crop's growth progress, production cycles like irrigation, fertilizing, or pest control. At the same time farmers also worried about monitoring of Climate Conditions, greenhouse automation, seeding and planting, automatic Watering and Irrigation, Weeding and Crop Maintenance.

**Method:** A blockchain based agriculture solution holds a lot of promise for the agribusiness industry with its ability to bring transparency in the system. I have conceptualized Smart Farming Model (SFM) that deal with said problems. My key methodologies are; The Connected Farm: Sensors and the IoT, Blockchain technologies help monitoring of Climate Conditions and Greenhouse Automation.

**Result and Findings:** Some of the key findings are; better control over the internal processes and, as a result, lower production risks; increased business efficiency through process automation; Enhanced product quality and volumes.

**Conclusion:** Blockchain is a long-term, but worthwhile investment to increase farmers' prosperity. Investing in this technology may yet end up revolutionizing the industry. Blockchain technology is still in its infancy, which makes investors and developers wary. Food giants like Nestlé, Walmart have already begun to incorporate blockchain technology.

**Reference:**

Blockchain Technology: Agriculture's next revolution By Sarah C. Schoeffel

Smart Farming—Automated and Connected Agriculture by Meghan Brow

# Prof Kirti Zare

Image	Delegate ID	Theme	Details
	YSC 10601	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Chemical Engineering <b>Organisation :</b> dypiemr <b>Designation :</b> Assistant Professor

Industrial waste is one of the burning problem as we know it is generating in tones every day. So we need to search an alternative route to utilize the industrial waste in order to save the environment and our health [1]. In the present work, we are suggesting a sustainable technique for the utilization of textile industry sludge for preparation of low cost efficient adsorbent for the remediation of ofloxacin antibiotic from the aqueous solution. Sludge was first pyrolysed at 400°C and then treated with 1.2M HCL to remove the inorganics and ash. The adsorbent was then characterized by following techniques: BET, XRF, ZETA, TGA, XRD, SEM/EDX and FTIR, then adsorbent was for remediation of ofloxacin. The BET surface area was found 7.63 m<sup>2</sup>/g; it was found that on increasing the pyrolysis temperature, surface area gradually decreases. Removal efficiency of 63.88% was obtained for 30 mg/L of ofloxacin concentration at following operating conditions: pH-6, Temperature- 25°C, rpm-150, time-240 min, dose- 5g/L. Kinetic study and Isothermal study was performed to optimized all the operating parameters [2].

# Mr KARTHIKEYAN SIVAPRAKASAM

Image	Delegate ID	Theme	Details
	YSC 10681	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Applied Engineering <b>Organisation :</b> PSNA COLLEGE OF ENGINEERING AND TECHNOLOGY <b>Designation :</b> ASSISTANT PROFESSOR

Our water bodies become susceptible to pollution by dirt, chemicals, garbage wastes, especially those of the urban areas and anthropogenic pressure. This has led to the stain of drinking water and make the water habitat intolerable thereby gradually degrading the eminence of public health and aquatic life. In order to make monitoring more cost-effective and fewer preservation efforts, in this project an approach to test water sample parameters in real-time like pH, turbidity, dissolved oxygen, temperature, oxidation-reduction potential, etc. Here customized sensor nodes are placed for monitoring the parameters. The information is going to be consistent and this information will be transferred to the database using TCP protocol. And if the threshold limit is exceeded, a warning will be notified to authorities by IFTTT protocol and API push notification.

# *Dr Vadivel Sethumathavan*

Image	Delegate ID	Theme	Details
	YSC 10756	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Chemistry <b>Organisation :</b> PSG College of Technology <b>Designation :</b> Assistant Professor

We report the photocatalytic property of a novel AgCl loaded carbon nitride (AgCl/g-C<sub>3</sub>N<sub>5</sub>) composite was prepared by a simple precipitation route. The brown colored g-C<sub>3</sub>N<sub>5</sub> was synthesized by a nano-hard templating method using 3 amino 1,2,4 triazole precursor. The morphology, crystallinity and optical properties of the AgCl/g-C<sub>3</sub>N<sub>5</sub> composite were characterized using the X-ray diffraction analysis (XRD), transmission electron microscopy (TEM), and diffuse reflectance spectroscopy (UV-DRS) spectroscopy. The bisphenol-removal efficiency was reached 96% within 30?min, which could be attributed to the effective formation of a heterojunction and excellent visible light absorption of AgCl by g-C<sub>3</sub>N<sub>5</sub> incorporation.

# Ms Neha Giri

Image	Delegate ID	Theme	Details
	YSC 11140	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Biology <b>Organisation :</b> Zoology <b>Designation :</b> Research Scholar

The knowledge of resistivity pattern has been the global necessity especially for developing countries like India to control the emergence of resistance to antimicrobial agents. E.coli is used as an indicator of faecal contamination of water and is used worldwide to monitor water quality. The aim of this study is to investigate the resistance pattern of E.coli isolates from Nainital Lake. Isolation and identification of E.coli was done by using Microscopy and by IMVIC test. All E.coli isolates were screened against 15 antibiotics to determine the prevalence of Multi Drug Resistance among isolates by Kirby Bauer Disk Diffusion method on Muller Hinton Agar. Based on the resistance pattern of the isolates, the Multiple Antibiotic Resistance (MAR) index for each isolate was calculated. The Antimicrobial Susceptibility Pattern has demonstrated that highest level of resistance to Ampicillin, Cefixime, Erythromycin, Penicillin; there was a low level of resistance to Cefotaxime, Co-Trimoxazole, Cefuroxime, Tetracycline, Norfloxacin and more than 4 isolates had MAR index of 0.2 and above. The data showing the presence of multidrug resistance in E.coli are of great concern for future. There is an urgent need of community education for health care providers and general population regarding careful utilization of antibiotics.

# Ms KIRTI SINGH

Image	Delegate ID	Theme	Details
	YSC 11174	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Chemistry  <b>Organisation :</b> DSB            CAMPUS NAINITAL            KUMAUN UNIVERSITY  <b>Designation :</b> PhD            STUDENT</p>

Biosorption: a greener treatment of heavy metals from waste water

Kirti Singh\*, Manoj Dhouni, Pushpa Joshi

Department of Chemistry, D.S.B. Campus, Kumaun University Nainital, Uttarakhand, India

E-mail: pkirtisingh777@gmail.com

Water resource on earth counted as one of the most essential but less available need to living organisms. Pollution of water bodies by heavy metals in last few decades is a serious issue to cure. In recent years it is a major challenge to develop a greener way for decontamination of heavy metals from aqueous ecosystem. Biosorption has been proving a cost effective, eco-friendly and a greener approach for heavy metal sequestration of waste water. Biosorption a physico-chemical process involves use of dead biomass as adsorbent. This review work represents various aspects of biosorption technique.

Description of different biosorbent, there preparation, better bisorbent selection, activation and there regeneration. The future possibilities of commercialization of biosorption technique including metal recovery possibilities and bisorbent recovery are represented on the basis of various work done before last few decades till date in a comparative manner.

References:

1. Hannachi, Y.; Boubaker. Desalination and water Treatment. 2015, 1-15.
2. Ahalya, N.; Ramachandra, T.V.; Kanamadi, R.D. Journal of Chemistry And Environment. 2003,7,4.
3. Michalak, I.; Chojnacka, K.; Witek-Krowiak, A. Appl. Biotechnol, 2013, 170, 1389-1416.
4. Abdi, O.; Kazami, M. J. Mates. Environ. Sci. 2006, 6, 1386-1399.
5. Ingole, W. N.; Dharpal, V. S. IJAET. 2012, 3,143-153.
6. Das, Nilanjana.; Vimala, R.; Kartika, P. IJB. 2008, 7, 159-169.
7. Davis, T.A.; Volesky, B.; Mucci, A. WaterRes. 2003, 37, 4311.
8. Mater, J. Environ. Sci. 2015 6, 1386-1399.
9. Romera, E.; Gonzalez, F.; Ballester, A.; BlazquezMunoz, M.L. J. A. Bioresour. Technol. 2007, 98 -3344.

# Ms SHILPA J

Image	Delegate ID	Theme	Details
	YSC 10096	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Chemistry <b>Organisation :</b> UNIVERSITY OF MYSORE <b>Designation :</b> Research Scholar

Physical Water quality characteristic of aquatic environment arise from a multitude of, chemical and biological interactions. The water bodies, rivers, lakes, dams and estuaries are continuously subject to dynamic state of change with respect to the geological age and geochemical characteristics. To prevent solid waste from being dumped into the canals and near the waste water treatment plants by ensuring regular collections, and by increasing composting and recycling in collaboration with the existing solid waste management programs in the area and to prevent grow the plant species irrigated using urban wastewater in Mysuru City and a strict regulation passed to not consume this plant species in surrounded area.?

# Ms BHRAMAR DUTTA

Image	Delegate ID	Theme	Details
	YSC 10531	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Biology</p> <p><b>Organisation :</b> The University of Burdwan</p> <p><b>Designation :</b> Research Scholar</p>

Sunderban, the world's largest coastal wetland, situated at the mouth of Ganga-Brahmaputra rivers system, harbouring varieties of species starting from unicellular bacteria to multicellular mangrove plants. Soil sample collected from four different places. Physical parameters like pH of soil, conductivity, organic carbon, hydrogen, nitrogen content measured. Ten halotolerant isolates were characterized by MALDI TOF biotyping, 16 S rRNA sequencing and biochemical characterization. Morphological analysis performed by Gram staining, Florescence microscopy, SEM analysis, biochemical tests were performed including optimization of media and growth parameters. Thus bacterial diversity study enable us to find potential positive impact on environment indirectly benefits human welfare their uses for producing compatible solutes, osmolytes, EPS, pigments, and enzymes. The current study aimed to explore rhizospheric bacteria isolated from pneumatophore region and its role in salinity stressed rice plant. Seed of Amal-Mana variety were bioprimed with Bacillus sp. The non primed seeds served as control. Study revealed that biopriming with bacteria with 1% NaCl for 24 h expressed high values for speed of germination, root and shoot length, fresh weight and dry weight of seedling also increase in chlorophyll content in bioprimed seed compared to control and non primed salinity exposed plants. So for bioremediation halophilic bacteria could be used in salt affected flooded wetland.

# Mr Virbhadranath Vyas

Image	Delegate ID	Theme	Details
	YSC 10809	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Physics <b>Organisation :</b> Modern School, Koradi Road <b>Designation :</b> Teacher

## Small Scale Multipurpose Solar Pond

Virbhadranath Vyas

Modern School, Nagpur, Vidya Nagar, Koradi Road Nagpur

Virphysicsvyas007@gmail.com

A small scale multipurpose solar pond (SSMSP) designed with the dimensions 11.5 x 2.5 inches which will not only generate limited power but can also be used to construct multipurpose farm apparatus which will facilitate the farmer with various applications. This prototype was made keeping the farmers of Vidharba region in mind so as to make an effort to provide to some extent a holistic solution to their crisis. In Vidarbha like everywhere else every farm has a well, on similar grounds we can have a Solar Pond. It is an apparatus that is used for collecting and storing solar energy. It is an artificially designed pond filled with salt (fertilized salt) by maintaining definite concentration of halocline vertically with three zones -

- 1) UCZ - Upper Convective Zone (almost zero concentration salinity)

# Mr NITAI CHARAN PATRA

Image	Delegate ID	Theme	Details
	YSC 10003	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Physics <b>Organisation :</b> BAHADURPUR DESHAPRAN SIKSHA NIKETAN (H.S) <b>Designation :</b> TEACHER IN CHARGE

## WATER CRISIS AND CONSERVATION

NITAI CHARAN PATRA

BAHADURPUR DESHAPRAN SIKSHANIKETAN (H.S), BAHADURPUR , PURBA MEDINIPUR,721626

Bahadurpur.deshapran@gmail.com / nitaipatra1000@gmail.com

**Abstract:** Water crisis all over world is a very major problem for living beings. Drinking water crisis in India is very much and specially it has realized in Tamilnadu recently. All other states in India is also suffering from this problems. Global warming has reduced the amount of rain due to change in climate. To reduce this problems rain water harvesting system has been used for use of water in domestic purpose. Salted sea water should be filter to use it for drinking purpose.

A new concept can be used. Sea water may be vapoured by using solar heater and cooker and next the vaporized water may be collected in a system to make in filtrate to convert it to drinking water. A project in this regards may be carried out for solving future water crisis and conservation of water.

In sanitation system water should not be used and tissue paper should be used. Excreta and urin may be separated in a technical manner. Mug water should be used for bathing purpose and that's all.

References: Hassan BAR, Ghanim M.

# Mr Manish Kumar

Image	Delegate ID	Theme	Details
	YSC 10051	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> CSIR- Central Scientific Instruments Organisation, Chandigarh (India) <b>Designation :</b> Sr. Tech. Officer

Water is very common thing to survive on the earth. 0.014% water is fresh and easily accessible of the whole water. 97% water is saline and 3% is hardly to access. Water scarcity is the less availability of pure drinking or potable water which should be exists without any pollutant. The whole world is facing water crisis so it is a major issue globally. Water crisis may cause due to climate change like droughts or floods, deforestation, high pollution, improving living standards, irrigation agriculture, green house gases, and wastage of water. According to World Economic Forum report (March 2019), 4 billion people are facing of water scarcity i.e. at least one month of the year. In India, Composite Water Management Index (CWMI) report released by the Niti Aayog in 2018, 21 major cities (Delhi, Bengaluru, Chennai, Hyderabad and others) are racing to reach zero groundwater levels by 2020, affecting access for 100 million people. Management system is the key to make the plans and policies for water cycle: from source to distribution, economic use, treatment, recycling, reuse and return to the environment. It should be ensured that water must be in reach of every person.

# Dr Kishorkumar Khot

Image	Delegate ID	Theme	Details
	YSC 10417	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Chemistry</p> <p><b>Organisation :</b> School of Nanoscience &amp; Technology, Shivaji University, Kolhapur</p> <p><b>Designation :</b> Assistant Professor</p>

Nanocrystalline, uniform pentanary mixed metal chalcogenide (PMMC) thin films of copper indium cadmium sulfoselenide ( $\text{CuInCd}(\text{SSe})_3$ ) were successfully synthesized using simple, self-organized arrested precipitation technique (APT) in an aqueous alkaline medium. The optical, structural, morphological, compositional and electrical properties of synthesized thin films were investigated as a function Indium ( $\text{In}^{3+}$ ) concentration. An optical absorption study was indicated that direct allowed transition and optical band gap energy decreases typically from 1.46 to 1.25 eV. The X-ray diffraction (XRD) studies revealed that the PMMC thin films have a nanocrystalline nature and crystallite size increases with increase in the  $\text{In}^{3+}$  concentration. The alteration of surface morphology from nanospheres to peas-like morphology with uniform, well-adhered distributed throughout the substrate surface were observed by field emission scanning electron microscopy (FESEM) micrographs. The high-resolution transmission electron microscopy (HRTEM) images and selected area electron diffraction (SAED) pattern were illustrated that compactly interconnected particles with nanocrystalline nature. Energy dispersive X-ray spectroscopy (EDS) and X-ray photoelectron spectroscopy (XPS) results confirmed that synthesized thin films had an appropriate chemical purity. The electrical conductivity (EC) and thermoelectric power (TEP) measurement, the analysis indicated that the films have n-type conductivity. A photoelectrochemical conversion efficiency of 2.40 % was achieved with a current density of 2.87 mA/cm<sup>2</sup>. The developed route may provide an alternative approach to synthesize multinary metal chalcogenide thin films solar cell. Furthermore, we have developed a predictive model of a CICSSe thin film solar cell using the artificial neural network (ANN). The proposed model is useful for the integrated development environment (IDE) for the predictive modeling and design of high efficient solar cells.

# Mr MOITRI LET

Image	Delegate ID	Theme	Details
	YSC 10446	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Biology <b>Organisation :</b> the university of burdwan <b>Designation :</b> research scholar

Fluorine is mostly electronegative, toxic and highly reactive. Fluoride resistance microbes may play a dominant bioremediative role by accumulating the anions so that they become less available. The objective of this study is to isolate and characterize fluoride resistance bacteria from fluoride contaminated soil and water samples of Nasipur village, Birbhum district; West Bengal. From water sample analysis through SPADNS photometric procedure, significantly higher fluoride concentration of 1.95 mg/L was found in tube well samples of Nasipur village. For primary screening, different concentrations of sodium fluoride (NaF) are used and 7 isolates are selected. Among of them MNF9 were able to tolerate maximum fluoride concentration i.e.0.80g/l. For further screening, colony morphology, microscopic analysis, antibiotic susceptibility test, extracellular enzyme production and carbohydrate fermentation assay, are performed of those 7 isolates. Most of the isolates produce extracellular enzymes such as catalase, amylase, protease and these isolates are susceptible to maximum antibiotics and also they utilize mainly galactose and triple sugar as a carbon source. Through 16S rDNA sequences the 5 isolates show maximum similarity with these strains such as Acinetobacter, Aeromonas, Bacillus and Pseudomonas. Hence, these fluoride-resistant bacteria could be used as promising strains for application in water defluoridation from contaminated sites.

**Keywords:** Antibiotic susceptibility, bioremediation, extracellular enzyme, defluoridation

# Mr Abby Varghese

Image	Delegate ID	Theme	Details
	YSC 10490	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> Central University of Tamil Nadu <b>Designation :</b> Research Scholar

Over 1.2 billion people, i.e. one-fifth of the world's population live in areas that are water scarce and another 1.6 billion people face economic water shortage (Molden, 2013). With the continued increase in urban water demand, it is estimated that the demand will increase by 80 percent by the year 2050. Apart from the increased demand, climate change has altered the traditional timing and distribution of water creating uncertainty, especially in parts of south Asia that are densely populated and highly rain-dependent.

According to the National Sample Survey, only 47% of urban households have individual water connections and about 40% to 50% of water is reportedly lost in the distribution system due to various reasons. When distribution becomes a challenge, the easiest workaround is to tap the groundwater. Often, such unhealthy practices of tapping groundwater use deep boring techniques, which further worsen the water crises. According to a study by the Centre for Science and Environment, 48% of urban water supply in India is met from groundwater (Shah, 2016). Nevertheless, even when most of the cities are facing water scarcity, we see the same cities being flooded immediately after a heavy shower. However, this rainwater is one major source of potable water which these days have wreaked havoc in most of the major cities of India such as Chennai and Mumbai.

The increased build-up regions often prevent the rainwater to infiltrate the soil forcing it to flow overland flooding low lying region. In this study, we recommend model of the district that reduces the urban storm water using modified infrastructural techniques to encourage improved rainwater management and recharging of groundwater reserves. Our research would assist urban planners in identifying spaces for such urban storm water harvest structures and natural recharge infrastructures.

# Ms Anurupa Maiti

Image	Delegate ID	Theme	Details
	YSC 10521	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Chemistry <b>Organisation :</b> IIT kharagpur <b>Designation :</b> PHD scholar

Nitrogen-phosphorus co-doped exfoliated tungsten disulfide as an advanced electrocatalyst in hydrogen evolution reaction  
Anurupa Maiti and Suneel Kumar Srivastava

Department of Chemistry, Indian institute of Technology Kharagpur (W.B.), India

Presently, transition metal disulfides have been used as promising non-noble metal based electrocatalysts in hydrogen evolution reaction (HER) from water splitting in quest of alternatives renewable and clean energy sources. In present work, we report the fabrication of N and P co-doped exfoliated tungsten disulphide (PNEWS2) as a superior electrocatalyst in HER. Our findings demonstrated PNEWS2 as an efficient catalyst exhibited low overpotential (59 mV), small Tafel slope (35 mV decade<sup>-1</sup>), large TOF (0.7 s<sup>-1</sup>), larger exchange current density (1.15 mA cm<sup>-2</sup>), long term stability (15 h), extremely high electrochemically active surface area (Cdl = 37.1 mF cm<sup>-2</sup>) and high turn over frequency (0.791 s<sup>-1</sup>) owing to its large number of accessible active sites, high mesoporous surface area, synergistic effect of N and P doping. This multifaceted strategy on formation of flake like 1T (metallic) phase with expanded interlayer spacings of PNEWS2 display superior electrocatalytic performance alternative to Pt in hydrogen evolution reaction.

Keywords: metal sulphide, doping, hydrogen evolution reaction, synergistic effect

# Ms SUPARNA DAS (PATRA)

Image	Delegate ID	Theme	Details
	YSC 10558	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Others <b>Organisation :</b> KHEJURI COLLEGE <b>Designation :</b> ASST. PROF.

## WATER CRISIS AND CONSERVATION

NITAI CHARAN PATRA/SUPARNA DAS PATRA  
KHEJURI COLLEGE, BARATALA, PURBA MEDINIPUR.

suparnadaspatra1985@gmail.com

**Abstract:** Water crisis all over world is a very major problem for living beings. Drinking water crisis in India is very much and specially it has realized in Tamilnadu recently. All other states in India is also suffering from this problems. Global warming has reduced the amount of rain due to change in climate. To reduce this problems rain water harvesting system has been used for use of water in domestic purpose. Salted sea water should be filter to use it for drinking purpose.

A new concept can be used. Sea water may be vapoured by using solar heater and cooker and next the vaporized water may be collected in a system to make in filtrate to convert it to drinking water. A project in this regards may be carried out for solving future water crisis and conservation of water.

In sanitation system water should not be used and tissue paper should be used. Excreta and urin may be separated in a technical manner. Mug water should be used for bathing purpose and that's all.

**References:** Hassan BAR, Ghanim M.

# Dr Nikhil Agnihotri

Image	Delegate ID	Theme	Details
	YSC 10559	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Biology <b>Organisation :</b> SKJD Degree College Mangalpur Kanpur Dehat <b>Designation :</b> Assistant Professor

Water is probably the most important substance for preserving life. Our bodies need water to function properly. It is obvious that water is necessary for the sustenance of life. Though 71% surface of earth is covered from waterbodies, more than 20% of human population is facing serious water crisis. 97.3% of water present on earth's surface is saline or sea water. Only 2.7% of surface water is available for humans as potable. With growing population rates and such a small percentage of all the water on earth, it only makes sense that we must preserve and conserve this precious resource. In India, the recycling and reusing of water is more important because India owns a mere 2.42% of water resources which is only 1/45th of the total in the world, while it is home to about 17% of world's population which stands about 1/6th of the world. There are only 4% fresh water resources in the entire world which is only 1/25th of total available drinking water on earth. Conservation of water means using limited amount of water wisely and caring for it properly. According to Central Water Commission, approximately 40% population in India is facing serious scarcity of water. A number of cities such as Chennai, Hyderabad, Delhi etc. are leading towards Day zero. Since all of us depend on water to sustain life, it is our responsibility to learn more about water conservation and how we can help keep our sources pure and safe for generations to come. Though water conservation requires great effort, every little bit helps, so it will not be right to think that what individuals do does not matter. The present study deals with the importance of water conservation and vital measures related to the issue of water conservation in present times.

# Dr Misha Roy

Image	Delegate ID	Theme	Details
	YSC 10694	Water Crisis and Conservation (theme for special poster session)	<p><b>Category :</b> Others</p> <p><b>Organisation :</b> Vidyasagar University</p> <p><b>Designation :</b> Assistant Professor</p>

The river Ganga is considered to be one of the most important and sacred rivers of India. It provides sustenance to the environment and ecology. During the past few years, anthropogenic activities have generated huge transformations in aquatic environments. The present study reports the seasonal and spatial changes in water quality of river Ganga in W.B India. Surface water samples were collected from different ghats of river Ganga i.e Pilgrim ghats (Belur, Dhakhineswar, Tarakeshwar, Kalighat,) and Ferry ghats (Howrah, Shyamnagar, Konnagar, Babughat, Sheorapuli) both at high tide and low tide. They were then analyzed for different water quality parameters: temperature, pH, electrical conductivity, turbidity, total dissolved solids, total alkalinity, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand, free CO<sub>2</sub>, chloride, arsenic, hardness, NPK, and MPN. The results reveal that turbidity, BOD, COD and MPN results are higher during the post-monsoon season and above the recommended level. The TDS value is found to be a little high during the post-monsoon season (260 mg/l). No traces of arsenic and fluoride were detected during the whole study. However, the NPK load was quite high suggesting heavy discharge of both anthropogenic wastes and fertilizers in the river. The mean values of these parameters were used to assess the suitability of river water by comparing with the World Health Organisation (WHO) and Indian standards (ISI) for domestic purpose and Bureau of Indian Standards (BIS) for irrigation purposes. The result reveals that the water quality is not suitable for drinking and domestic uses and can only be applied for irrigation after proper treatment. There is an urgent need for proper management measures and suitable tools to restore the water quality of this river for a healthy and promising human society.

# Dr Maalmarugan Jayapalan

Image	Delegate ID	Theme	Details
	YSC 11440	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Electrical <b>Organisation :</b> Sri Ranganathar Institute of Engineering and Technology <b>Designation :</b> Professor

Water is an essential resource for all living things. Now a day's water requirement increases rapidly due to increment in population, it also causes pollution of water bodies as the result of human activities. water quality testing and distribution can be performed with the help of conventional methods which involves water samples gathering and different manual operations. similarly, man power is being wasted during distribution of water to the customer and also it has leakage identification and intimation problems.

To meet the various need of water quality checking and distribution, the proposed system involves different sensors like turbidity sensor, pH sensor, temperature sensor, water flow sensor, solenoid valves, micro controller and Wi-Fi module to improve the automatic operation. The information collected from various sensors can be transmitted to the respected authority through Wi-Fi module and Internet of Things (IoT). the distribution of water can be controlled by the operation of solenoid valve and DC motor through the web interface. leakage of water also being intimated. water quality monitoring and distribution control is performed in this system.

## Mr Palanivel D

Image	Delegate ID	Theme	Details
	YSC 11442	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Electrical <b>Organisation :</b> Sri Ranganathar Institute of Engineering and Technology <b>Designation :</b> Assistant Professor

Water is an essential resource for all living things. Now a day's water requirement increases rapidly due to increment in population, it also causes pollution of water bodies as the result of human activities. water quality testing and distribution can be performed with the help of conventional methods which involves water samples gathering and different manual operations. similarly, man power is being wasted during distribution of water to the customer and also it has leakage identification and intimation problems.

To meet the various need of water quality checking and distribution, the proposed system involves different sensors like turbidity sensor, pH sensor, temperature sensor, water flow sensor, solenoid valves, micro controller and Wi-Fi module to improve the automatic operation. The information collected from various sensors can be transmitted to the respected authority through Wi-Fi module and Internet of Things (IoT). the distribution of water can be controlled by the operation of solenoid valve and DC motor through the web interface. leakage of water also being intimated. water quality monitoring and distribution control is performed in this system.

# Ms RITU GOEL

Image	Delegate ID	Theme	Details
	YSC 10509	Water Crisis and Conservation (theme for special poster session)	<b>Category :</b> Agricultural Engineering <b>Organisation :</b> IIT BOMBAY <b>Designation :</b> Free lancer

The precise measurement of soil moisture can benefit in optimizing the irrigation process and in crop health. Soil moisture can be measured using different methods like manual, laboratory and sensors. The manual method is more accurate when compared to sensor based methods but it is labor-intensive and destructive as it needs to take soil samples whenever the measurement is carried out. However, the sensors can automate the process and provide real time monitoring of soil moisture. The accuracy of sensor highly depends on sensitivity penetration depth of and This paper covers the use of a novel design of capacitance based sensor to measure the soil moisture. It is a coplanar, fringing electric field based triangular design sensor. The electric field, penetration depth and sensitivity are some of the important performance measures for this kind of soil moisture sensor. It has been modeled and analyzed in COMSOL Multiphysics 5.3. The obtained results are compared with coplanar rectangular design of sensor. The proposed sensor has 55% more Fringing electric field and 11.6% more sensitivity than rectangular design of sensor.