

Souvenir of International conference on
**NOVEL SUSTAINABLE PRACTICES IN WASTE MITIGATION AND ITS INNOVATIVE
UTILISATION (NSWIU2023)**
03 to 04 February 2023

PAPER- 1

Utilization Of By-Products And Wastes Of Fly Ash As A Sustainable Construction Material

Madan Kumar, Vijay Kumar, Saurabh Kumar, Pawan Kumar

Abstract: Due to rapid growth in construction now-a-days, the suitable usage of the by-products produced in industries becomes very essential. If dumped in open landfills many of by-products may cause serious pollution to the water, air and land. If not managed these by-products properly, agro and municipal wastes which is also causes severe environmental issues and health issues to human being. By significantly reducing cement production, the use of supplemental cementitious materials (SCMs) obtained from medium and heavy- industrial, urban, agricultural, and natural sources can significantly reduce the consumption of fossil fuels. The use as SCM contributes to proper waste management. Additionally, SCMs can improve advantageous material characteristics such as flow ability, strength, and durability. The physical and mechanical properties of high volume fly ash cement paste have been studied through an experimental investigation. On the basis of weight, the OPC (Ordinary Portland Cement) was replaced by 0, 20, 30, 40, 50, 60 and 70 % class F fly ash. In this work, the water-to-binder ratio was maintained at 0.3 in each example. Results show that the utilization of fly ash to mixes decreases the compressive strength at 3, 7, and 28 days. This effect is most pronounced when the fly ash level is greater than 30%.

PAPER- 2

An Experimental Study on The Ratio of Tensile Strength to Yield strength of two different grades of Reinforcing Bars

Akshay Yadav, Hardik Singh, Harshit Upadhyay, Varshit Upadhyay, Rishabh Kashyap

Abstract: In order to study the effects of various tensile strength to yield strength ratio if they are less or more than the required value, this article provides an overview on several steel grades, namely Grades 500 and 550 MPa. The assessment of recent research on the causes, and effects of High TS/YS steel ratios have structural implications. Using high-strength steel bars has a number of benefits, including a decrease in the reinforcement ratio, lower installation costs, less congestion from reinforcement, effective concrete placement, and an increment of service life due to improved resistance against corrosion. Despite being far stronger than standard reinforcing steel, high-strength reinforcing steel has a clearly defined yield point. Ductility is defined as the capacity of a structure, elements, & its structural material to undergo inelastic deformations without losing its strength. Yield to tensile ratio serves as a measure of steel's ductility and ability to go through strain hardening. Thanks to improvements in steel production techniques over time, which were motivated by the need to use stronger structural steels, it is now possible to produce steels with higher strengths that have improved weld ability, high toughness, and atmospheric resistance against corrosion.

PAPER- 3

A Review Study on The Different Method of Manufacturing of Brick Through Plastic Waste

Sumit Batham, Prajjwal Raman Srivastav, Shyam Ji Kashyap, Adarsh Singh, Rishabh Kashyap

Abstract: In this paper we going to consider plastic waste. Plastic garbage is non-biodegradable and can persist in the environment for a very long time, according to existing statistics. Plastic is always recycled. It has the capability to harm habitats and weaken the life-supporting environment as a result of physical, chemical, and natural actions. The massive environmental issue brought on by the careless dumping of plastic trash boxes has increased the need for further study into possible management, disposal, and recycling options. This paper affords a present day evaluating of studies on usage of waste substances to provide bricks. Series of bricks have been produced in various ratios of 5%, 10%, 15%, 20%, 25%, 30% of the mass of fine aggregate. Huge sorts of waste substances were studied to provide bricks with one of a kind methods. And then we subjected to compressive test, water absorption test, hardness, soundness & efflorescence test. The ultimate result supported the prediction that plastic composite bricks would be more environmentally friendly than mud and concrete bricks.

PAPER- 4

Reuse of plastic waste as a partial replacement of fine aggregate in concrete blocks

Sumith Batham, Hrishikesh Kumar Singh, Rishabh Kashyap, Arstu Gautam, and Mukul Saxena

Abstract: Plastics are petroleum-based polymer made-up of long chain of hydrocarbons and most of the varieties are non-biodegradable in nature. This piece of materials widely used for storage and packaging of good and reduces weight in transportation thereby saving fuel costs. As plastic is ubiquitous, its waste management is pretty tedious as it often does not decay. Hence, the focus of the industry has been on reducing the environmental impact of plastic waste on nature either by recycling or reusing and promoting its efficient utilization. However, all plastic generated each day doesn't enjoy this process of recycling, due to sheer amounts of plastic and unavailability of recycling units across the country. The focus of this research paper is to reuse the plastic waste in concrete block by replacing some proportion of sand with plastic waste. Tests were conducted on the casted concrete blocks of M30 grade having size 150mm*150mm*150mm in which sand was replaced by varying percentage (4%, 5% and 6%) of fine aggregate plastic waste and the modified blocks were tested for 2 weeks and 4 weeks' compressive strength. Also, the concrete beams of 150mm*150mm*700mm dimensions were casted in similar proportion and tested for 2 weeks and 4 weeks' flexural strength. The obtained test results of modified blocks and beams were then compared with 14- and 28-days strength of standard concrete blocks and beams and it was concluded that a replacement of 4%, 5% and 6% sand by fine aggregate waste plastic in concrete achieves its strength in 2 weeks as well as 4 weeks while the other two lags behind the desired control concrete strength.

PAPER- 5**Smart Water Supply Management Using IoT Agriculture In Real-Time Monitoring System***Kalpana Singh, Manoj Kumar Singh*

Abstract: Today, smart and optimum use of water supply is needed in agriculture systems therefore for saving water, the Internet of Things (IoT) plays an essential place in smart agriculture. In this paper, we present an energy- efficient, stable, and highly scalable IoT Network. We used heterogeneous types of sensor nodes with respect to energy, power, water quality, etc, and deployed region-wise within the network. Due to the heterogeneous sensor node and region-based approach in our model, we are able to increase the throughput, lifetime of a live node, stability period, and scalability of the network. In a real-time water supply management system, we require fast data communication with the base station of the Network therefore for providing low power and a long range of data transmission over the Network we use Edge computing services. In our, case study we show the result for rice cultivation using Clouds software.

PAPER- 6**Water Supply in British India: Understanding Water Management and Canal Development during Colonial Rule***PRASHANT TRIPATHI*

Abstract: A transformation in water supply and drainage infrastructure paralleled a revolution in urban government that swept through Britain starting in the 1840s. The gravity scheme, which reforming municipalities aimed to construct, was the apex of that movement. Promoters thought that it would simultaneously transform urban ecosystems and civilizations. It included dramatically modifying the landscapes in the hinterlands of cities by damming rivers, elevating lakes, or flooding valleys and then pipe water under pressure to often far-off towns. In this paper, the British water supply systems and engineering in colonial India are argued, as well as the colonial period of the canal revolution in the nineteenth century. This paper reviews water research conducted in British India and groups them into three areas. The article makes the case that interest in the topic now needs to try to investigate big themes as well, while also presenting a general summary of some of the most significant arguments and conversations on the problem of colonial control and its hydraulic interventions. To this aim, it is suggested that exploring the conceptual idea of a “colonial hydrology”—the endeavour to characterise the British experience as encompassing an entirely different paradigm for hydraulic interventions—may yield a great deal of insight and theoretical traction.

PAPER- 7**Comparing The Performance Of Fall Cone Method In Relation To Standard Conventional Thread Rolling Method For Determining Plastic Limit Of Soil***Mukul Saxena, Akansha Swarnkar, Gaurav Maurya, Madhur Saini, Swati Arya & Vivek Chauhan*

Abstract: Plastic limit of soil plays an important role in determining the various properties of soil. From many years Plastic limit was determined using Standard Thread Rolling method but it doesn't give accurate results as it completely depends upon the intensity by which an individual rolls the thread and it vary person to person and hence gives in consistent results. This study was conducted to find a new method for the determination of Plastic limit to overcome the inconsistency in results generated using Standard Thread Rolling method. First we have obtained plastic limit using Standard Thread Rolling method of eight different soil samples and then after using fall cone of the same soil samples. Results after regression analysis shows that fall cone can be used for the determination of liquid limit.

PAPER- 8

Comparative Study of Sewage Treatment Plant of different capacity

Aakriti Singh, Anshuman Tripathi, Rishabh Kashyap, Mukul Saxena, Arstu Gautam

Abstract: The waste water generated from the household and industries known as the sewage. Sewage is very harmful for human lives and also for the environment. In order to reduce the harmful effects of the sewage a technique is developed to treat the sewage and this technique is termed as sewage treatment. There are several technologies available to treat the sewage. The sewage treatment is done by many processes like sedimentation, aeration, filtration etc. Sewage treatment plants are designed in a range of sizes of different capacity (ex.295MLD,500MLD) and the size of the plant is typically determined by the population of the area it serves. In general, larger sewage treatment plants are able to treat more wastewater and sewage than smaller plants, but there are also several others which play important roles in determining the capacity of the plant. Now a days few countries e.g., Germany is using such an advanced technology for treating the sewage which can be used for drinking purpose, but in our country India the STPs installed for residential and institutional buildings just make the solid waste (treated sludge) eco-friendly which can be easily disposed and water (treated water) which is used for irrigation, car washing etc. Our main objectives are to elaborate the process of working and operation of installed STPs for residential and institutional buildings. We also compared the working and operation of installed STPs with standard parameters.

PAPER- 9

Study On Effect Of Magnetic Water In Concrete

Vinay kumar Singh, Abhishek Singh

Abstract: Enhancing concrete durability and strength with locally available materials is the challenge in the concrete for the current construction industry. Water component in the concrete plays an important role for gaining strength and durability. Water contains a massive number of minerals and salts. These components of water cause concrete structures to be less durable, and it also shortens their lives. The concrete industry has been utilizing a new technology called magnetic water technology for the past 20 years. This study examines the impact of magnetic water, on samples that have been produced with magnetic water in terms of compressive strength, water absorption, porosity, and sorptivity. Passing through a magnetic field produced magnetic field treated water. In this process the surface tension of the water is reduced as a result of the breakup of the water cluster's large number of molecules into smaller ones, which also improves the workability and strength of concrete. The pH of the water rises, and it becomes softer as a result of the magnetic treatment's effect on the nature of hydrogen bonds between water molecules. Excessive corrosion resistance will be improved by lowering the salt and mineral content of the water.

PAPER- 10

The Effect Of Sewage Sludge Ash On Properties Of Cement For Use In Concrete

Vinay Kumar Singh, Jyotika Singh

Abstract: This manuscript presents how to determine the mechanical and durability characteristics of an environmentally friendly cement would change if dry municipal sewage sludge was used as one of the raw materials in the production of Portland cement (eco-cement). New approaches to reduce their environmental harm are sought as a result of the ever-stricter legal requirements pertaining to both sewage sludge (SS) and solid residues obtained during its thermal utilization operations. The samples were created using four different levels of dry sewage sludge as partial replacements for the four different levels of standard raw materials used as controls (5.0, 7.5, 10.0 and 15.0 percent). The studies conducted for this study revealed several physical, chemical, and mechanical properties of the eco-cement. In addition to the mechanical characteristics of construction materials, the SSA has an impact on variables including workability, product shrinkage, and setting time. Use of SSA in cement-based building materials is one strategy for reducing the risk posed by sewage sludge ash (SSA). The article includes a thorough analysis of the literature on the use of SSA in mortars and concretes, where it is explained as an addition to or a replacement for the primary binder. The findings showed that all specimens had fairly similar chemical compositions. Additionally, it was discovered that the specific gravity and fineness of the sludge-containing specimens were, respectively, higher and lower than the control specimens.

PAPER- 11

Use Of Sludge As A Building Material In Clay Bricks

Vinay Kumar Singh, Sapana Jaiswal

Abstract: In the manufacturing of soft mud bricks, sewage sludge is used as a raw material. The production of bricks from dried sludge gathered from a commercial wastewater treatment facility was studied. The most economical and environmentally responsible choice is to employ sludge in the construction sector. Due to clay and sludge from water treatment plant is similar mineral compositions, and the reuse of sludge in the manufacture of clay bricks was the focus of this investigation. The use of sewage as a partial replacement for clay in the production of bricks was the subject of the investigation. Water treatment facilities may have serious concerns about the sludge disposed of during the various water treatment operations. As waste-water treatment facilities continue to grow, the issue of sludge disposal will increase as the volume of sludge produced increases. Due to rising public knowledge of the current disposal methods, including their use of hazardous combustion emissions and the placement of sludge on agricultural land, it should be clear that sewage sludge recovery as a construction and building raw material is an option. Brick shrinkage, water absorption, and compressive strength all decrease as sludge content rises. The results also demonstrated that the weight loss of the bricks upon fire was primarily attributable to the burning off of the sludge's organic matter component.

PAPER- 12

Assessment for Physical Properties and Durability of Concrete using Recycled Coarse Aggregate.

Vinay Kumar Singh, Pawan Kumar Tiwari

Abstract: The rate of demolition increases day by day due to modernization and advancement of construction industry. For seeing that it is essential to effectively reuse the demolition waste in order to conserve the non-renewable natural resources. This review paper is one step for reuse the non-renewable resources. In this paper we tried to review the effect of Recycled Aggregate use in concrete replace from Natural Coarse Aggregate (NCA). In this paper we reviewed the physical properties of the recycled aggregate. In this paper also we review the physical and mechanical properties of the recycled aggregate concrete (RAC). The use of recycled aggregate in the construction industry is proves a mile stone for the sustainable construction. In this paper we found that when the CA incorporate in the concrete it decreases the compressive strength, flexural strength and tensile strength of concrete due to weaker Interfacial Transitional Zone (ITZ) of the RCA because residual of old mortar in RCA. The water absorption capacity of the Recycled Aggregate Concrete is increases with the increment in replacement level of RCA from NCA. This paper also reviews the durability properties of the RAC like water absorption, permeability and chloride ion penetration

PAPER- 13

A Case Study And Designing Of Sewage Treatment Plant Okhla

Ankit Kumar Gupta, Anuj Kumar Patel, Shanu Kumar, Shagun Pandey

Abstract: This paper presents the proposed design of the Sewage Treatment Plant, Okhla, based on their requirement of treating 124 million gallons of waste water per day, helpful for 40 lakh citizens of Delhi East, as given by Delhi Jal Nigam and public utility company SUEZ. The Yamuna River is being polluted by the waste water thrown by the industries installed in Delhi mainly, and the municipal sewage. Sewage Treatment Plant Okhla will be the biggest active sewage treatment plant in India. It will replace the four existing plants in Okhla, which have a combined capacity of about 124 million gallons of waste water. The paper analysis of the design of the sewage treatment plant has been done by us and might be similar to the one installed at the sewage treatment plant in Okhla. The two basic phases of treating wastewater are primary treatment and secondary treatment. The water's BOD (Biochemical Oxygen Demand) is lowered during primary treatment to lower the amount of suspended solids under 10 mg/L, preparing it for the following phase of waste water treatment. Various techniques can be used to carry out secondary treatment. There are two commonly methods for secondary treatment: the trickling filter and activated sludge. However, in our project, we have only being concentrated on activated sludge. This process reduces BOD to 10 mg/L. The water is thereafter chlorinated, essentially, before being discharged into seas or streams that are currently flowing. The sewage water can be treated to make it safe for drinking if necessary (or wanted). This designed STP will remove 41200kg organic pollutant loads per day and 61600kg solids load per day on the Yamuna. In this paper, a proposed design with dimensions and specifications of STP, Okhla has been done based on existing and required parameters of Yamuna River in Delhi region.

PAPER- 14

Comparison of Selection of Predictors for Statistical Downscaling of Temperature using Different Statistical Techniques

Keshav Kumar, Madan Kumar, Mansi Ranjan, Avinash Kumar

Abstract: For the optimum association to be established between the predictors (such as relative humidity, geopotential height, u-wind, specific humidity, etc.), the predictors must be carefully chosen for statistical downscaling (like precipitation, temperature etc). In this study, the most effective predictors for downscaling predict and are chosen using statistical methods (factor analysis, correlation coefficient, etc.). By carefully choosing suitable predictors, one may improve model outputs, computational efficiency, and performance. The most susceptible region to flooding is the Bagmati River Basin in Bihar, India. When it rains, the Bagmati river discharges a great deal more water than the channel can hold, and it also transports a significant amount of material and debris from the Himalayan mountain's erodible sides. As a result, the Bagmati River basin was chosen for the research to evaluate various statistical methods. The National Centers for Environmental Prediction/National Center for Atmospheric Research (NCEP/NCAR) reanalysis output data for 33 years (i.e., from 1988 to 2021) and 33 years of observed temperature data from the Indian Meteorological Department (IMD) Pune are used in this study for various predictors. Factor analysis outperformed other statistical approaches, according to a comparison of several statistical techniques.

PAPER- 15

Experimental Study And Mathematical Formulation Of Water Turbidity By Measuring Laser Light Scattering

Abhinav Pal , Swapnil Kumar, Prashant Pandey, Ravi Prakash Tripathi

Abstract: Measurement of turbidity involve various optical sensors. Light scattering due to suspended particles in water can result measurement of turbidity after proper experimental and mathematical calibration. Multiple turbidity samples have been created in lab. Laser light source is used to generate optical light and optical meter is used to measure scattered light at orthogonal location. Scattered light is calculated at each 30 o difference for ten samples. Actual turbidity of all ten samples is recorded from turbidity meter. Linear regression-based analysis is performed for all optical scattering-based data and actual turbidity. Relationship between optical scattering and turbidity is established. Good accuracy has been overserved by using laser for turbidity estimation. Turbidity measured by proposed sensor is found better than low-cost optical sensor available in market. This mathematical relationship can be further utilized for calibration of laser based optical scattering-based sensors.

PAPER- 16**A Review on Various Parameters Affecting Scouring Around Spur Dike***Shagun Pandey, Ravi Prakash Tripathi, S P Shukla*

Abstract: A spur dike is a hydraulic structure mainly constructed transverse to the bank of the channel. It is used for purposes like raising upstream water depth, bank protection, navigation, to maintain uniform flow and flood plain re-habitation. Due to its transverse orientation it creates a restriction to the flow which leads to complex flow pattern and aggressive scouring around it. The deviation caused by spur dike protect bank from erosion. It has significant use in river training. Restriction caused in flow by spur dike increases the water depth upstream, which enables uniform flow in downstream of the channel and the increased water depth helps in navigating the streamflow. River training has two types; high water training and low water training works. In high water training banks are protected from damage caused by high elevation water. Whereas low water training work mainly used to provide sufficient depth of water for inland water navigation. This review paper gives understanding of flow characteristics such as Flow field, velocity field, sediment transport, effect of geometry and orientation of spur dike in straight as well as meandering channel. This literature review also discusses various gaps in the study like local scour, optimum length, orientation and spacing between spur dikes etc.

PAPER- 17**Estimating The Compressive Strength Of Concrete Mixes By Non-Destructive Testing***Vinay Kumar Singh, Amit Kumar*

Abstract: A key solution for non-destructive testing applied to concrete structures is to provide a good estimate of materials quality. One of the newest methods of concrete strength testing is ultrasonic pulse velocity (UPV) non-destructive testing. During analysis, the ultrasonic pulse velocity testing was used as a non-destructive test of concrete to identify concrete mix designs & to demonstrate a Correlation between compressive strength along with UPV. The outcome of different type about materials (M35, M30, M25, M20 and M15) with water to cement factor (w/c) of 0.455 along with 0.50 was investigated. We observed that the M15 class cube had the shortest migration time (37.6 - 41.2 μ s) And the M35 class cube the longest (48.7 – 49.9 μ s), indicating the shortest propagation time and highest impact velocity concrete. Rice field generated with a shorter transit time. The M15 Class dice had a maximum heart rate of (3.03 km/s). the M15 cube own another minimum real compressive strength (34.6 – 36 N/mm²) and his M35 cube with grade had the highest actual compressive strength and UPV. Study also showed that UPV credible common exactly forecast the compressive strength of concrete. The percent deviation did not exceed $\pm 2.5\%$ for all type of concrete.

PAPER- 18**Willingness to Pay for Improvement in Service Attributes of Solid Waste Management***Saurabh Kumar, Madan Kumar*

Abstract: The assessment of the willingness to pay for better service quality in solid waste management in India is the main topic of the paper. Face-to-face interviews were conducted after randomly selecting respondents to approach. Using econometric software, the multinomial logit model was developed. In-person interviews were conducted after randomly selecting respondents to approach. The typical multinomial logit (MNL) model is developed using the behavioural data gathered from residents, and model coefficients are then utilised to calculate the WTP values.

PAPER- 19

A Review Paper on use of waste of ceramic tiles as replacement of cement and aggregate of concrete

Ayushi Kumari, Vipin Mahadeven, Dr. Anoop Narain Singh, Pushpendra Sonkar, Aditya Kumar, Dheerendra Pratap

Abstract: This study emphasises the benefits of Ceramic Waste in the Construction industry. The majority of waste generated globally comes from construction and demolition projects. The question of whether Ceramic Waste can serve as a pozzolanic material in the production of cement has been effectively investigated. The aim of this study was to investigate some of the mechanical and physical properties of a laboratory- produced concrete to which fine aggregate formed of white ceramic powder was added in a range of proportions from waste from demolition sites and the ceramics industry. Replacement of Cement or Aggregates should not be utilized where strength is the prime factor. Both structural and non-structural operations could make use of ceramic waste.

PAPER- 20

An Experiment Analysis on replacement of Waste Glass as Coarse aggregate of concrete using UTM

Vipin Mahadeven, Dr. Anoop Narain Singh

Abstract: Waste glass is a type of waste which cannot be decomposed only recyclable. The amount of Waste Glass is gradually increased over the recent years due to an ever-growing use of glass products. Most Waste Glass have been dumped into landfill sites. The land filling of waste glasses is undesirable because they are not biodegradable, which makes them environmentally less friendly. Our study on this topic examines the possible reuse of crushed waste glass into coarse aggregate as replacement in concrete. The variables here are both the fine and coarse aggregates cement and water proportion remain constant. The Mix proportion used was 1:1:2 (cement: fine aggregates: coarse aggregate) with water cement ratio 0.45. The study indicated that waste glass can effectively be used as coarse aggregate replacement (up to 30%) without substantial change in strength.

PAPER- 21

A Review on use of Pozzolana as Non OPC binder materials in Construction

Pushpanjali Verma, Vipin Mahadeven, Dr. Anoop Narain Singh, Mohit Maurya

Abstract: Natural, artificial, or waste materials can all be complementary materials. The cement industry has long utilized several pozzolanic ingredients that enhance cement characteristics. Concretes made with alkali-activated natural pozzolan (AANP) exhibit moderate to high mechanical strength, a high elasticity modulus, and significantly less shrinkage than concrete made with OPC. Pozzolan replacement percentages of 10%, 20%, 30%, and 40% are all considered partial. The findings showed that the FA: HL mix (FA: HL:: 90:10 by weight) with a NaOH concentration of 3.5% wt. by dry aggregate mass, a non-OPC binder, offered the most efficient mechanical qualities for a network of gel and needle-sharp cementitious products. The findings show that at 28 days, Non-cem mortar gains a compressive strength of 42.84 MPa (93.36 percent of OPC). Integrating both strength and resistivity results in a reliable and accurate assessment of pozzolanic reactivity. Strength can be increased to improve water transfer qualities. Durability was improved by increased resistance to sulphate and acid assaults as well as decreased chloride ion penetration. As improved sulphate, acid, and chloride ions penetration resistances were demonstrated, durability was also improved. The findings and analyses may be used to guide decision-makers in choosing affordable and environmentally friendly binders for concrete production.

PAPER- 22

Evaluation of SMAP Soil Moisture Change for drought assessment over Uttar Pradesh, India

Ashish Kumar Agnihotri, Shivani Gond, PKS Dikshit

Abstract: Drought dynamics are associated with variability in hydro meteorological factors such as precipitation, potential evapotranspiration, and soil moisture. The objective of this study is to investigate how the dynamics of soil moisture (SM) fluctuate in response to drought conditions at various timescales. This study assesses the effectiveness of satellite SM products, the Soil Moisture Active Passive (SMAP), in detecting and assessing drought in Uttar Pradesh, India, during the period 2015 to 2018. NASA'S Soil Moisture Active Passive (SMAP) mission has monitored near-surface soil moisture since April 2015, mapping the globe (between 85.044 ° N/S) using an L-band (1.4 GHz) microwave radiometer in 2–3 days based on location. The SMAP near-surface soil moisture monitoring tool provides probabilistic percentiles of dry and wet conditions for use in agricultural applications. SMAP soil moisture data from April 2015 to December 2018 at near-surface (5 cm) SPL3SMP, or Level 3, at ~36 km resolution was used in this study. Drought severity can be gauged by the direction of the soil moisture dynamics, which is given by the soil moisture difference between two time periods. Soil Moisture Change (SMC) calculated from Soil Moisture Active Passive (SMAP) satellite data were compared to multivariate drought indices the Standardized Evapotranspiration Index (SPEI) at the 3-month and 6-month timescales across 18 synoptic stations in Uttar Pradesh, India. Based on the results, it was concluded that monitoring changes in soil moisture could be an effective gauge of the progression of drought. This supports the idea that analysing soil moisture changes across a wide range of time periods can yield more accurate results when trying to detect drought. This indicated that a short-term decrease in soil moisture could be an indication of a lack of precipitation, while a consistent long-term decrease in soil moisture could be indicative of extreme dryness. The findings also show that the value of current drought-monitoring solutions will increase with the addition of soil moisture change. Preliminary results from this study show that SMAP soil moisture change has the potential to be used in drought analysis, and additional results show that soil moisture change can provide valuable information on the change in drought status as indicated by SPEI.

PAPER- 23

Impact of climate change in extreme events

Purushottam Kumar Mahato, Shashank Singh, Rachna Mittal

Abstract: The climate of the Earth is changing mainly due to various anthropogenic activities. The greenhouse gases are continuously increasing into the atmosphere that is driving the climate to a warmer i.e., global warming. Since the climate changes are not anticipated to be uniform across the planet due to global climate change, therefore impact also varies in regional scale. India Meteorological Department compiles disastrous weather events every year based on the inputs from various State India Meteorological Department (IMD) offices, State Government and Media in the publication "Disaster Weather events". Based on Disaster Weather events report, various studies indicate that the decade 2007–2016 reported an increase of 18% of annual Extreme weather events (EWEs) (Cold Waves, Heat Waves, Tropical Cyclones, Floods and Lightning) as compared to the earlier decade (1997–2006). In the past 50 Years, the annual average number of extreme events has been increasing continuously. The decadal analysis of the average EWEs per year indicates an increase from 20 events per year during the decade 1967-1976 to almost 227 in the last decade (2007-16). Frequency and magnitude of the extreme events are increased due to climate change as result probability of exceedance (return period) may change for the future climate scenario. Since currently we only consider the historical data for this analysis, this may impact the various design calculation and mitigation plan. In the view of the climate change various methodology should be explore for the prediction of the extreme events. To include the impact of climate change General (also referred to as Global) Circulation Models (GCMs) can be used to determine how the climate might evolve in the future, typically up to the year 2100, under different scenarios of emissions of greenhouse gases (GHGs) into the atmosphere. Given their computational requirements, the outputs from GCMs are provided at a coarse spatial resolution of approximately $10^{\circ} \times 10^{\circ}$ and, for this reason, it cannot readily be used in impact studies focusing at the regional scale where the need for projections at a higher spatial resolution is often required, notably in regions of complex topography. These datasets should be downscaled for regional scale in higher resolution. Climate change projections are available for the historical and future time-periods for the four latest GHG emission scenarios from the Intergovernmental Panel on Climate Change (IPCC): Shared Socioeconomic Pathways (SSP) 126, 245, 370 and 585. Once we have the projected future events, we can estimate probability of exceedance for various future scenarios such as GHG emission scenarios such as SSP 126, 245, 370 and 585 which include the impact of climate change in various design calculation and it reduce the risk of failure. Further these data set can be used to impact assessment on various sector such as agriculture industries infrastructure etc. by implementing the impact modelling (using various impact models 3D-CMCC FEM, ACEA). Results from the impact modelling can be help us in adoption strategies for climate changes.

PAPER- 24

GIS and River Water Quality Monitoring: Achievements, Constraints & Future Challenges

Surender, Padam Jee Omar

Abstract: Water is essential for human civilization, living organisms, and natural habitat. India is rich in water resources with a vast network of rivers. This river network caters to the variety of needs of the country. Due to increasing demand for domestic, industrial and, agriculture uses, most of the river basins are water-stressed in our country. The available water resources in many parts of the country are getting depleted, and the water quality has deteriorated day by day. In India, rivers have been the lifelines of growth and culture. India is drained by twelve major river systems with a number of smaller rivers and streams. Indian rivers are polluted due to the direct discharge of untreated sewage and industrial effluents. In the past few decades, the focus has been shifted towards managing River water quality. Also, lately, the application of GIS technology in the field of River water quality management has greatly enhanced various approaches. Some evaluated the impact of land use/land cover changes, seasonal, and location on water quality of streams within the River Basin. Some researchers used conventional graphical methods with multivariate statistical methods and Geographical Information System (GIS) techniques to study the controls on the hydrochemistry and the severity of the controlling factors at different locations in the flow system to monitor River water quality. Few of the approaches used GIS techniques integrated with water quality index (WQI) to evaluate spatial and temporal changes in the water quality of the river. Some used (GIS) support based Geo-morphological characteristics of the river basin to generate various parameters for River water quality monitoring. Different River water quality models have been used to simulate and predict the levels, distributions, and risks of various pollutants in a River basin system. To handle the complex interactions caused by the increased influence of human activities in a River basin, it is mandatory to couple, river water quality monitoring tools with other techniques, in which GIS technology can be a handy tool. This study focuses on the application of GIS technology, which nowadays became an important tool for River Water Quality Monitoring (RWQM). Going through previous GIS-based research related to River water quality monitoring, one can infer that many important pollution problems, as well as the numerical aspects of various river water quality model integration or parameter estimation which are either dealt with very briefly or completely ignored, can be easily analysed. The main objective of this study is to give insight into GIS technology achievements, constraints, and future challenges concerning River water quality monitoring (RWQM).

PAPER- 25

Importance of Circular Economy in emerging economies like India

Ayush Patel, Anish Kumar

Abstract: In the twenty-first century, developing countries, like India, must contend with several formidable difficulties, such as population increase, political unrest, fast urbanisation, food and water shortages, environmental pollution, infectious illnesses, and climate change. There is a need for resiliency at all levels in today's uncertain times, from the nuclear family in the countryside to the executive suites of major corporations and the halls of government. We contend that resilient communities need both progressive government policies and examples of adaptive social and environmental innovation. Such realistic first efforts might serve as role models for developing a more robust and sustainable economy in India. Efforts to reduce waste may be speed up by initiatives like those that aim to establish a "circular economy" which would provide novel channels for the recycling and reuse of unwanted products. This study seeks to improve clarity around how the term "circular economy"; is being used in practise. Based on our research, we know that the circular economy is often portrayed as a mix of reduction, reuse, and recycling efforts, but the fact that circular economy requires a societal transition is generally glossed over. Economic growth and environmental protection are seen as the two primary goals of the circular economy, although its potential effects on social justice and future generations are mostly ignored. Also, business model sand consumers are often mentioned as things that help the circular economy work. In this work, we analyse and evaluate a wide range of circular economy models. The importance the circular economy in India's efforts to reduce carbon emissions by promoting responsible consumption and sustainable resource management was also highlighted during the COP27 meeting. Overall, we hope that our research will help the circular economy idea become more coherent since we believe that considerably divergent meanings of the term might ultimately lead to the concept demise.

PAPER- 26

Assessment of the Groundwater Arsenic Contamination and its Removal using Low Cost Treatment Technology: A Review

Peyush Kumar Yadav, Ayush Singh, Asif Ansari, Anish Kumar

Abstract: The arsenic poisoning of groundwater has put the health of a great number of people in peril all over the world. Among the South-East Asian countries that are particularly heavily struck are India, Bangladesh, and China. In India, where people of the middle and lower Gangetic plains as well as some areas in Central and South India with hard rock terrain are afflicted, arsenic poisoning is particularly severe. There are many different sources, both manmade and natural, via which these pollutants might reach groundwater. On the pertinent subjects, a sizable body of literature has been published over the previous three decades. The study on arsenic pollution of groundwater is examined in this review. Included are studies on the incidence, co-occurrence, dissolution and health effects.

PAPER- 27**A comparative study on the Air Quality Index Method: A Review***Gaurav Modanwal, Asif Ansari, Hindal Shah, Amit Kumar, Srishti Baudh*

Abstract: The public is frequently informed of the severity of air pollution using the Air Quality Index (AQI) or Air Pollution Index (API). There are a number of techniques that have been established by different researchers and environmental organisations for determining AQI or API, but there isn't a single technique that is accepted worldwide. Each indexing technique has distinct advantages and disadvantages that influence whether it is appropriate for particular applications. An instrument for determining the current air quality situation is the air quality index. To compare the current ambient air quality in the research area, six different techniques for calculating the Air Quality Index (AQI) based on four pollutants—PM10, PM2.5, SO2, and NO2—were applied. The majority of the publications under consideration focus on the long-term forecasting of outdoor PM10, PM2.5, nitrous oxides, and ozone. The great majority of the recognised works almost entirely used source emission predictors and meteorological predictors. This essay aims to provide an overview of all the important air quality indicators developed to date.

PAPER- 28**Green Building : Sustainable Development Of India***Shubham Mishra , Anish Kumar*

Abstract: Green buildings have become a crucial aspect of sustainable development in India, with significant benefits for the environment and society. This paper aims to highlight the significance of green buildings in India and their impact on sustainable development. The paper will first provide an overview of green building practices, their benefits, and the current state of green building development in India. It will then discuss the government initiatives and the role of the private sector in promoting green buildings. Finally, the paper will explore the challenges and future prospects of green buildings in India, with a focus on their contribution to sustainable development. This paper will provide valuable insights into the importance of green buildings in India and their role in promoting a sustainable future.

PAPER- 29**Impact of different parameters and community responses to solid waste management in remote areas***Savendra Pratap Singh, Brihaspati Singh, Pankaj Yadav*

Abstract: Remote and isolated communities are struggling to manage solid waste and its implications on the environment, health, and land availability. Infrastructure, land availability, high collecting costs, inadequate economies of scale, and insufficient environmental awareness are the main reasons. A thorough and critical literature study is used to investigate the elements that contribute to this solid waste management dilemma and prevent more sustainable management in distant communities. The present unsustainable waste issue in distant villages is caused by a lack of trash collection and recycling infrastructure, increased commerce and local economic growth, poor environmental knowledge of consumer waste products and disposal, and inadequate financing. Water, land, and air pollution have been noted in literature. The literature lists six responses: technology advancements, waste avoidance and reduction, reuse and recycle, government assistance, inter-organization cooperation, and creative waste-to-value solutions. This suggest policymakers about current issues and circular economy solutions for sustainability

PAPER- 30

Critical Review on Obra Thermal Power Plant

Prince Kumar, Anish Kumar

Abstract: Infrastructure development is diverse and dynamic. To close the demand-supply gap, power supply must rise as demand rises. The Central Electricity Authority of India (CEA, 2016) recommends renovating and modernising over 70% of India's thermal power facilities, which were built in the late nineties and are losing efficiency (R&M). In 2013, CEA detected 36,000 MW of capacity over 25 years old, which should be restored or decommissioned. The CEA's 12th five-year plan included R&M works for 65 units totalling 17000 MW. However, investors and utilities experienced various obstacles throughout project design and implementation that delayed project goals, and only 37% of the projects were finished on schedule (CEA 2013). R&M projects began in the mid-1990s and improved plant efficiency, but their implementation has been unsatisfactory and the reasons for this have not been acknowledged or documented. Several studies have noted India's thermal power facilities' poor efficiency. None of these studies could increase plant efficiency or identify causes of deterioration. This inspired the researcher to explore Indian thermal power plant R&M. This study also provides a unique strategic framework for early reduction of risks associated with good planning, management, and implementation of R&M initiatives to help utilities easily manage such programmes. A thermal power plant is a power plant in which heat energy is converted to electric power. In most of the places in the world the turbine is steam-driven. Water is heated, turns into steam and spins a steam turbine which drives an electrical generator. After it passes through the turbine, the steam is condensed in a condenser and recycled to where it was heated; this is known as a Rankine cycle. The greatest variation in the design of thermal power stations is due to the different heat sources; fossil fuel dominates here, although nuclear heat energy and solar heat energy are also used.

PAPER- 31

Construction and Demolition Waste Management Practices in India

Aditya Pandey, Anish Kumar

Abstract: Recent years have seen a boom in Construction sector of India as a result of the country's emerging economy. Construction is essential to every country's economic growth, but it also creates a massive quantity of C&D trash. This increase has resulted in an increase in the quantity of trash left behind after destruction. The annual C&D trash produced in India is estimated at 150 million tonnes by the Building Material Promotion Council. Demolition waste management systems are crucial throughout the demolition phase of a building, and they have been developed thanks to certain existing efforts and the cooperation of major players. Some waste management solutions have been put into place during the demolition phase of a building as a result of the study conducted as part of the C&D and Awareness programme for C&D garbage. To that end, a waste mitigation strategy is crucial during the destruction of a structure. Zero-waste management practices are an excellent means through which the building sector may become more sustainable. The purpose of this research is to assess the efficiency with which the Indian construction sector manages both its circular construction waste and its present demolition garbage. This article presents an overview of the various wastes produced by building projects, as well as the obstacles encountered by the construction sector on the path to sustainability in the Indian context. In addition, the article highlights the many initiatives taken by the Indian government to realise the zero-waste goal in the building industry.

PAPER- 32

Role of Artificial Intelligence and Machine Learning in waste management in a decade study

Amit Bhaskar, Saurabh Kumar Singh, Vijay Kumar, Sambhram Srivastava

Abstract: One of the most pressing issues confronting modern societies is the proper disposal of waste. Technical, climatic, environmental, demographic, socio-economic, and regulatory elements are usually involved in waste management. Modelling, predicting, and optimising processes as complicated and nonlinear as these can be difficult to do using more traditional methods. In recent years, there has been a rise in the popularity of using artificial intelligence (AI) and machine learning (ML) as complementary computational strategies for addressing issues related to waste management. A lens-based bibliometric analysis was performed on 812 academic references linked to AI and ML in waste management in order to determine the expanding body of scholarly literature on this subject. The primary purpose of this study was to apply this analysis. As a result, the proposed research is to identify the impact that AI and ML techniques have on WM and to offer areas for further inquiry. According to the findings, AI and ML have made a significant contribution to the development of this sector.

PAPER- 33

Critical review on the working of Anapara Water Treatment Plant

Kalpna Verma, Anish Kumar

Abstract: Due to the planet's limited freshwater supply and the high demand for it, water treatment facilities are crucial to society and it requires a great deal of time and technology to treat surface water so that it is safe to drink. Before it gets to a consumer's tap, surface water goes through a number of procedures or treatment techniques which include coagulation, flocculation, sedimentation, filtration, and disinfection that shield people from different dangerous illnesses brought on by consuming contaminated water. In this study critical analysis of Water Treatment Plant at Anpara Thermal Power Station is done which encompasses the integrated study of various unit processes and unit operations involved in it. It also incorporates the analysis of various arrangements used for the smooth and productive functioning of different steps involved in the treatment process. By removing impurities including colour, turbidity, algae, and other microbes, a water treatment plant can improve the physical, chemical, and biological quality of impure or raw water so that it is safe to drink and this all can be done without even harming the environment.

PAPER- 34

Complex Adaptive Systems : A Mathematical Approach

Vineet Srivastava, Pramod Kumar Srivastava

Abstract: The mathematics of Complex Adaptive Systems (CAS) consists of mathematical linguistics, symbolic logic, and the physical laws of the system problem. CAS that can occur at every level of creation: including social, ecological, molecular, and quantum. CAS are dynamic systems able to adapt in and evolve with a changing environment. It is important to realize that there is no separation between a system and its environment in the idea that a system always adapts to a changing environment. Rather, the concept to be examined is that of a system closely linked with all other related systems making up an ecosystem. In order to understand CAS, understanding the interactions among entities. The understanding of these interactions is more important than understanding the entity features. When knowledge of other entities are shared or are observable and the decision making rules used by entities to make decisions can evolve, emergent behaviour's occur. Many examples of such complex systems are discussed, focusing on entities that are intelligent agents. Complexity results from the inter-relationship, inter-action and inter-connectivity of elements within a system and between a system and its environment. Many natural systems (e.g., brains, immune systems, ecologies, societies) and increasingly, many artificial systems (parallel and distributed computing systems, artificial intelligence systems, artificial neural networks, evolutionary programs) are characterized by apparently complex behaviour's that emerge as a result of often nonlinear spatial-temporal interactions among a large number of component systems at different levels of organization. The theoretical framework is based on work in the natural sciences studying CAS, e.g., physics, chemistry, biology). The analysis of CAS is done by a combination of applied, theoretical and experimental methods (e.g., mathematics and computer simulation).

PAPER- 35

Sustainable Waste Disposal Practices in our Society

Vibhooti Narayan Mishra

Abstract: This is time to go green at our society. The moment has come to go past recycling. We have the chance to increase eco-friendly society practices, minimize greenhouse gas emissions, and even cut operating expenses with sustainable trash management. It is required to locate the ideal disposal options for green garbage. For many societies, paper and ink make up the bulk of their waste. Efforts might be started by reducing the utilization of paper and ink. Go paperless and cut down on printing, documents that are utilized throughout the entire firm should be kept online or on a shared server. Look For Renewable Options in current practices, Coffee mugs and reusable water bottles should be used in place of disposable cups and to avoid using plastic are, provide enviro-friendly compostable cutlery. Donating extra products is a fantastic alternative to throwing them in the garbage. Recycling conserves energy, prevents waste from ending up in landfills or incinerators, gives raw materials for new product development and some food waste and paper goods can be composted as a green trash disposal method. With the aim of managing and controlling the ever-growing threat of e-waste to the environment, society, and human health, the e-waste issue places pressure on environmental agencies, governments, and OEM of developing countries like India to adopt, develop, and innovate environmentally friendly e-waste mitigation strategies. Infrastructures for sustainable practices cannot afford by individual body/organization beyond certain limit. Thus, there are requirement of Public-Private-Partnership (PPP) for waste management providing public infrastructure for large scale government including municipals corporations and private sectors. PPP implementation are value-for-money project, identifying risks and allocating them between the public and commercial sectors, techniques for assessing performance using quantitative performance indicators and affordable to users also. Developing infrastructures for waste mitigation are not profitable, hence large public welfare organizations such as World Bank, UN International Solid Waste Association (ISWA), JICA, IWWG, Danica European Investment Bank are main active players in PPP model with concern of society issues. Community based waste management (CBWM) may be categorized to distribute the responsibilities in three phases, community activism group CBWM set up to identify service provider, the private organization that offers community services and the services were planned and managed by CBWM-community activists.

**In case of any typographical errors, please contact anish@gecazamgarh.ac.in*