

5th NATIONAL CONFERENCE ON Water Environment & Society

04-06 June 2018

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Editor: Dr. M.V.S.S. Giridhar

Organized by

CENTRE FOR WATER RESOURCES

Institute of science and technology
Jawaharlal Nehru technological university hyderabad,
Kukatpally, Hyderabad, 500085

**Souvenir of 5th National Conference
on
Water, Environment & Society
(NCWES - 2018)
04 - 06 June, 2018
at JNTUH, Hyderabad, India**

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Institute of Science and Technology
Jawaharlal Nehru Technological University Hyderabad
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Preface

Water is so familiar in our daily life that we often forget its importance and uniqueness. Clean, safe drinking water is scarce. India is bestowed with good number of rivers, ponds and lakes but still, far too many people spend their entire day searching for it. It's hard for most of us to imagine that clean, safe water is not something that can be taken for granted. But, in the developing world, finding a reliable source of safe water is often time consuming and expensive.



The scarcity of clean water is from the result of multiple reasons like over usage of water, pollution, increasing demand of population, climate change etc. Water scarcity involves water crisis, water shortage, water deficit or water stress. Water scarcity can be due to physical water scarcity and economic water scarcity. Physical water scarcity refers to a situation where natural water resources are unable to meet a region's demand and economic water scarcity is a result of poor water management resources.

It is in this context and backdrop that the Centre for Water Resources, Institute of Science and Technology, JNTUH felt the need to organize a three day 5th national conference on Water, Environment and Society (NCWES-2018) to take stock of the current status of applications in water resources development and management and also to identify areas most relevant to ensure sustainable development of water resources and environment to benefit the society at large.

Researchers, engineers, site managers, regulatory agents, policy makers, Consultants, NGO's, academicians and vendors will all benefit from the opportunity to exchange information on recent research trends and to examine ongoing research programs in the areas of water and environment. The conference is expected to recommend suitable strategies and policy guidelines to operationalize the initiatives and dovetail them into various watershed development programmes appropriately. Keeping in view the importance and need of the hour, this issue of proceedings is brought out to coincide with the conduct of the national conference. The high value contributions by eminent speakers, Research scholars and participants have been overwhelming and encouraging.

The three day national conference on NCWES will focus its attention on various themes in the form of technical sessions such as

1. Hydrologic parameter estimation & modeling
2. Climate change and environment
3. Urbanization, Bio-diversity and EIA and Human Health
4. Groundwater Exploration, Development, Recharge, Modeling and Quality
5. Water quality, Water treatment, Pollution and Society
6. Water Conservation and Irrigation management
7. Water Management, Rainfall and Rainwater Harvesting
8. Geospatial Applications in Water resources

More than 150 delegates and about 60 technical papers are being presented in these eight technical sessions. I hope the present conference would serve as a link between technology, policy, practice and decision making in the quest for synergetic solutions for sustainable development of water resources and environment.

I wish and expect that the participants will find this conference useful and give their total participation to make it a grand success.

It is with this great pleasure; I extend a warm welcome to all the delegates, speakers and participants to NCWES- 2018.

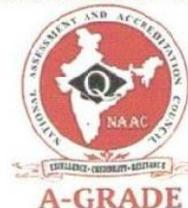
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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

Prof. A. Venugopal Reddy

Vice-Chancellor



MESSAGE

The National Conference on “**Water, Environment and Society-NCWES 2018**” has reached its 5th landmark. The convener and the faculty of the “Centre for Water Resources, Institute of Science and Technology, Jawaharlal Nehru Technological University Hyderabad are to be appreciated for organizing a three day 5th National Conference on “**Water, Environment and Society-NCWES 2018**” during 04 -06 June 2018.

Through history humans have affected the surrounding environment. While good deal of most valued about the environment is lost due to the actions of human. Though the humans are now trying to protect and preserve the environment that is left. The human relationship to the environment can be biological, economic, political, physical, cultural, chemical, or social. There is a realization that environmental problems are becoming more and more complex, especially when the issue is much more at the global level.

Interactions between human society and environment are constantly changing. The natural resources which were once abundant in nature have now become a more valuable commodity due to overexploitation by humans. The harm done to the environment is one of the important issues of our time and which will be in future. In order to face challenges, more than superficial knowledge or awareness of environmental issues is required. In situations where we trust we can contribute straight forwardly, I hope that this 5th National Conference on NCWES will be immense use for delivering measures of environment management.

In this context, I hope the conference will bring out important policy decisions and strategies to be adopted to meet pressing demands of this ever changing society.

I congratulate the Convener of this conference for taking up this topic and wish them all success.

Prof. A. Venugopal Reddy

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MESSAGE

It gives me immense pleasure to know that “Centre for Water Resources, Institute of Science and Technology, Jawaharlal Nehru Technological University Hyderabad is organizing a Three Day 5th National Conference on “ *Water, Environment and Society-NCWES 2018*” during 04 -06 June 2018.

The relationship between water, environment and climate is highly significant. If the balance among them fall out, then it jeopardizes food, water and energy security. There has been significant effect on fresh water resources due to this imbalance, with potential devastating effect on natural resources. As population increases and the impacts of climate change continue to constrain the availability of water, measuring and managing our environmental impact is most essential for the society. Conserving water, food and other resources is an important step towards reducing overall energy use, because everything that is made, transported and thrown away requires the use of fuel and water.

A conference on such topic is most appropriate to spread the message across all the section of the society. I believe that collaborations with others through this National conference would help us to learn, define and share best practices on the way to achieve our goals.

I congratulate the Convener and his entire team for their excellent work in conducting the Conference and I wish the Conference a grand success.

Dr. A. Govardhan

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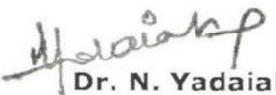


MESSAGE

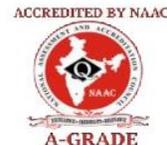
I am glad to know that Centre for Water Resources, Institute of Science and Technology, Jawaharlal Nehru Technological University Hyderabad is organizing the 5th National Conference on "**Water, Environment and Society-NCWES 2018**" during 04 – 06 June 2018.

It is evident that water resources are important to both society and ecosystem. We depend on a reliable, clean supply of drinking water to sustain our health. We also need water for agriculture, energy production, navigation, recreation, and manufacturing. Many of these uses put pressure on water resources, stresses that are likely to be exacerbated by climate change. On this note I would like to say we can contribute, in our small way, towards water conservation by implementing rainwater harvesting structures in our homes. I would like to appreciate centre for Water Resources for their continuous efforts on creating public awareness about rainwater harvesting structures in JNTUH.

I hope this conference provides a platform for the researchers, engineers, managers, policy makers and the academicians to discuss about the advancement in the field of water resources and environment and bring out new ideas among academic sections and educate every individual in facing this challenge effectively. On this occasion I wish the program a grand success.


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MESSAGE

It is a delight to know that “ Centre for Water Resources, Institute of Science and Technology, Jawaharlal Nehru Technological University Hyderabad is organizing a three day 5th National Conference on “*Water, Environment and Society-NCWES 2018*” during 04 - 06 June 2018.

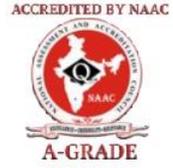
Climate change has both direct and indirect effects on ecosystem. The effect of climate change is seen in soils, biodiversity, fresh water and marine environment. The soil carbon storage can be related to change in the carbon dioxide concentrations, increased temperature and change in the precipitation patterns. Climate change also has leading impacts on biodiversity through changes of use of land and other resources.

With climate change, the water cycle is expected to undergo significant change. Water is a precious resource to us and to our future generations. The demand of the growing population and changing economy on river basins lowered the volume of water that supplied fountains and aqueducts, thus reducing the volume of water that transported waste from streets to rivers. The appearance of the rivers and the quality of their waters began to deteriorate, and citizens' health worsened. We must all use this resource more carefully and efficiently. Conservation will not only save our water supply, but also save money.

The theme of the conference being a thrust area in the society, I hope that the participants will be greatly benefited to enhance their technical knowledge and contribute to water resources and environmental engineering. I wish the conference a grand success.

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MESSAGE

I am very delighted to note that “ Centre for Water Resources, Institute of Science and Technology, Jawaharlal Nehru Technological University Hyderabad is organizing its 5th National Conference on “ *Water, Environment and Society-NCWES 2018* ” during 04 – 06 June 2018 with a mission to improve science and art of natural resource conservation.

Recent years have seen a huge increase in attention to the relationships between environment and society. Research in environmental science has become central to the wider scientific agenda as the implications of changes in climate and other environmental factors become actively charged. In this era of climate change, rapid urbanization, and resource scarcity, environmental studies has emerged as a crucial arena of study. Issues such as global climate change and the unsustainable use of resources are driving organizations to incorporate the principles of sustainable development into strategy and operations.

This conference explores diverse interests on environment, ecosystem and hydrology and probe alternatives and innovations that can lead to greater water use efficiency and environment conservation.

I wish a successful conference and fruitful discussion. I am confident that the conference on environment and society would provide good food for thought in designing its future. I congratulate the convener and wish the program a grand success.

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Dr. B. Venkateswara Rao, M.Sc (Tech), Ph.D.
Professor of Water Resources
DIRECTOR



MESSAGE

I am very pleased to note that “ Centre for Water Resources, Institute of Science and Technology, Jawaharlal Nehru Technological University Hyderabad is organizing the fifth National Conference on “ *Water, Environment and Society-NCWES 2018* ” during 4 – 6, June 2018 .

Water is an indispensable element in life. Water plays a crucial role in all aspects of life including environment, politics, economics and food security. Despite being an existential need for humans, it is one of the most over abused commodity. Many people are confronting daily the situation of an inadequate supply of safe water and the consequences of it.

Water is a major factor in each of the three pillars of sustainable development – economic, social and environmental. In this framework, it is understood that water must meet the needs of the present population and those of future generations of all societies. This is not solely in the economic realm but in the sphere of integral human development. Our Water policies should lead to sustainable development and promote enhanced environment.

In this perspective this conference recognizes the need to present some of the human, social, economic, ethical and religious factors surrounding the issues of water apart from science and technological issues.

I hope that the participants will avail this opportunity to enhance their technical knowledge greatly and also contribute to our existing knowledge of sustainable water management. I extend my best wishes for the success of the conference.

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Professor in Water Resources &

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MESSAGE

It is a pleasure to note that “ Centre for Water Resources, Institute of Science and Technology, Jawaharlal Nehru Technological University Hyderabad is organizing its 5th National Conference on “ Water, Environment and Society-NCWES 2018 ” during 04- 06 June 2018 .

The increase in population growth in India has lead to over utilization of natural resources. The degrading physical environment and growing scarcity of natural resources has lead to the sustainability of the resources. It is no coincidence that the poorest areas of the country are also the most environmentally-stressed regions, with eroded soils, polluted waterways, and degraded forests. This has lead to unleashing a greater public awareness and an unprecedented demand for the sound management of natural resources including air, water, forests, and biodiversity. Environmental sustainability is rapidly emerging as the next major development and policy challenge for the country.

I hope the 5th National Conference will bring out such issues we are facing and hope to find productive measures in water and environment management practices.

I congratulate the organizers of this conference for all their hard work and wish the National Conference would be a grand success.

(C. Sarala)

Acknowledgements

I would like to express their gratitude to all the people that have helped us during these months for the organization of the conference. The 5th National Conference on Water, Environment and Society NCWES-2018 has been made possible with the support of many technical experts, individuals and organizations both in man power and finance. This support is gratefully acknowledged.

I owe a deep sense of gratitude to **Prof. A. Venugopal Reddy**, Vice-Chancellor, Jawaharlal Nehru Technological University Hyderabad and Chief patron of the conference for his constant encouragement valuable guidance in organizing the conference in most efficient way.

I am very thankful to **Dr. A. Govardhan**, Rector, Jawaharlal Nehru Technological University Hyderabad for his precious support as Patron of this three day conference.

My sincere and special thanks to **Dr. N Yadaiah**, Registrar, Jawaharlal Nehru Technological University Hyderabad as the Patron of the conference for his cordial, time to time permissions and support.

I am deeply indebted to **Dr. B. Venkateswara Rao**, Director, IST, JNTUH and Chairman of this conference for having taken every responsibility for completing this task through various stages.

I would like to extend my grateful thanks to **Dr. K. Rammohan Reddy** and **Dr. C. Sarla**, Professors, Centre for Water Resources for their valuable support throughout the conference.

My sincere thanks to the officials of Technical Education Quality Improvement Program, Phase-III, IST for sponsoring this event. Without their help organization of this conference would not have been possible.

We have been very fortunate enough to be backed by a team of very motivated and dedicated experts of various committees in guiding us throughout the conference very meticulously. My sincere thanks to all the members of the Scientific and Advisory Committee, Technical Committee and Organizing Committee for their sincere advice and help from time to time.

I profusely thank all the Key note speakers, Chair persons and Co-chair persons of various technical sessions of conference have readily responded to our invitation to conduct the proceedings and to address the gathering and for their kind gesture in the conference.

My thanks are also due to various other Teaching and Non-teaching staff of IST and Engineering Staff of JNTUH who have cooperated on several occasions in organizing this Conference. I sincerely thank M/s BS Publications for bringing out the souvenir and pre-conference proceedings well in advance.

My sincere thanks to my students Ms. Shyama Mohan, Mrs. Rakhee Sheel, and Smt. P. Sowmya for their continuous day and night support for this conference.

Finally, I thank all the people and organizations who are directly and indirectly involved in organizing the conference, but I could not mention their names due to paucity of space.

I thank one and all

M.V.S.S. Girdhar
Convener

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SMART WATER MANAGEMENT SYSTEM (SWMS)**Veera Raghava Rao Atukuri^{1*} and Goli HemaLatha²**

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ABSTRACT

Water is the important resource on the earth. All the human beings and plants require water to survive their lives. In the same way, water is essential for healthy growth of cultivating crops and used in the making of several products. Now a days, in some areas the municipal corporation water department people releases the water in the late nights or irregular intervals (don't know specific times) to the public. With this the public was switching on their motor pumps and checking whether he released the water or not. If it is in late night the public switching on the motors and sleeping the whole night / checking the motors in the late nights whether the water released by the corporation people or not. With this the public they loses their valuable sleep and energy. Due, to this activity not only the public, the electrical energy and motor pumps get affecting that no. of times switching and switching off the systems and running of motors for the whole night. With this lot of electrical energy and motor capabilities were wasted a lot. If water comes at the late night, the public switching on the motor pumps and again going back to the sleep. Whole night the motor pump is kept on running even the tanks are filled with water. No automated switch off / cut off of motor pump is present. To overcome these problems, as a solution, our Smart Water Management (SWMS) is a smarter idea to save the public sleep, electrical energy and as well as the motor instrument lifetime. Generally, the water will be released by the water department people from the reservoirs to the hubs and then from those hubs the water will send to the distribution pipes of the houses of the public. Whenever they released the water by that time the public should switch the motors and check that whether the water is released or not. If releases no issue, otherwise he has to again switch on the motor and do check. This may happens multiple / no.of times. To overcome this, the wireless sensors and IoT applications are used to reduce the above said issues and make the motors and public smarter.

Keywords: Wireless sensor, IoT Applications, motor pumps.

ROLE OF ISOTOPE TECHNIQUES IN CHARACTERIZING THERMAL FLUID- INSIGHTS FROM GODAVARI VALLEY GEOTHERMAL FIELD, TELENGANA

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ABSTRACT

Geothermal energy is an indigenous source of energy and, if used properly, also a renewable one. Many countries (i.e. USA, Mexico, Italy, Iceland, Japan, and New Zealand etc.) are currently using these resources either for electric power generation or for direct use of the heat. Vast geothermal resources in the Pacific region exist and geothermal energy is harnessed by many countries not only for electrical power generation but for non-electrical applications in agriculture and industry as well. In India, significant amount of the resource, however, still remains untapped primarily due to lack of exposure to various technologies of geothermal exploration and exploitation. As most of the resources are situated in a complex geochemical environment and development is initially capital intensive, exploration activities demand in-depth data collection and interpretation to understand the characteristics, origin and movement of fluids. Applications of isotopes (both stable and radioactive) in conjunction with geochemical analysis are very useful in providing important information about the

Possible recharge area, Origin of geothermal fluid, Mixing with cold surface water, Rock-water interaction, Source of the solutes dissolved in the thermal fluids, Subsurface circulation time of the thermal waters and Estimation of subsurface reservoir temperature. Measurement of stable isotopes such as 2H and 18O helps to identify the recharge area and origin of thermal water. Radioisotopes such as tritium and carbon-14 are to be measured for dating of geothermal waters which in turn will predict the subsurface circulation time. Carbon isotopic composition of DIC ($\delta^{13}\text{C}$) indicates the source of dissolved inorganic carbon in the water. Tritium can also be used to quantify the extent of mixing with non-thermal waters. In this present submission the usefulness of these isotopic techniques in characterizing the thermal fluids from Godavari valley geothermal field will be elucidated.

Keywords: Geothermal Resource, Radioisotopes, Godavari Valley.

**STUDY ON GROUND WATER CONTAMINATION
IN AND AROUND VISAKHAPATNAM INDUSTRIAL AREA.**

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ABSTRACT

The city of destiny Visakhapatnam in Andhra Pradesh has been undergoing tremendous development in the form of industrialisation and consequent urbanisation. An amount of ground water has been contaminated due to industrial effluents making it miserable for the habitants. In most of the industrial regions, the ground water has been polluted due to the industrial effluents. These effluents in the course of reaching their sites of destination become hazardous not only to the surface soil but also to the surface and ground water régimes. As a result, the quality conditions of water resources in the region are subjected to rapid deterioration and have become a threat for the health of the human beings. Hence, in this context, a detailed survey has taken up on ground water contamination in and around industrial area of Visakhapatnam.

Keywords: Ground Water, Industrial effluents, Surface water.

**GHOGHA RAIN WATER HARVESTING SCHEME IN 82 VILLAGES OF
BHAVNAGAR, GUJARAT - A SUCCESS STORY 14 YEARS AFTER COMPLETION**

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ABSTRACT

The projects aimed at conservation of Water through Water Resources Management Structures through Rain Water Harvesting in 82 villages of Saurashtra, Bhavnagar district of Gujarat including development and construction supervision of WRM structures. About 300 WRM structures were designed and constructed successfully in entire project area that included construction of Check Dams, Development of village old ponds. The project resulted in Development and enhancement of ground water resources, Improvement in ground water quality due to dilution of dissolve impurities due to recharge, Checking salinity ingress near coastal area and increased greenery.

Keywords: Rain water Harvesting, Saurashtra, Water Resource Management, Check dams.

RURAL SANITATION FOR SUSTAINABLE DEVELOPMENT: A REVIEW**Munnoli P M^{*}, Mulla S A¹, Dafedar M², Madivalar P³ and Reddy G⁴***Professor, ^{1,2,3,4} students, S D M College of Engineering and Technology Dhavalagiri, Dharwad India 580002.

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ABSTRACT

The development of rural sanitation in India has been always occupied a back seat even though the sanitation plays a significant role in the quality of rural environment. The water borne diseases due to poor sanitation conditions, and haphazard disposal of liquid and solid wastes of live stock creating a feasible site for breeding hens and cockroaches makes the rural environment unhygienic with low level of quality of life. The paper presents the historical development of rural sanitation from conservancy system to water carriage system and available technologies for rural toilets like single pit, two pit, toilet with septic tank, toilets connected to biogas generation. The paper also presents rural toilet construction using local, new and waste materials to achieve economy in cost of construction.

Keywords: Water borne, liquid and solid wastes, live stock.**RURAL SANITATION: A CASE STUDY OF YARIKOPPA VILLAGE****Munnoli P M^{*}, Mulla S A¹, Dafedar M², Madivalar P³ and Reddy G⁴**

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ABSTRACT

Sanitation is the indicator of quality of life in rural and urban areas having highest priority given by engineers, designers, Architects, and public in general. The quality of living inside the house is governed by the cleanliness of toilets, bathrooms and kitchens and cowshed in a rural environment. Yarikoppa village situated in Dharwad taluka has 300 families living, with implementation of Swachh Bharat Abhiyan up to 2016, 210 i.e (70%) of families got toilets built; with 30% ie 90 families were yet to receive the benefits were still adjusted to open defecation. Out of 70% toilets built only 50% i.e 105 families were using toilets where as the remaining were using the toilets for storing agro materials or resting place for goats and sheep's. The interventions adopted by SDMCET direct with villagers and through GHSY students bore fruits in achieving the 100% utilization of toilets by the villagers. The girl child's responses to having toilets were of significance as now they have social security for nature's calls. The paper presents the details of participatory approach at various levels in interaction with people and students in bringing the acceptance of toilet culture by Yarikoppa villagers. The young minds trained in right direction through training programs on health and hygiene and dissemination of messages to public was the key to success of this societal change.

Keywords: Sanitation, Yarikoppa village, Agro materials.

GROUNDWATER POTENTIAL ZONING IN AMARAVATHI BASIN BY INTEGRATING REMOTE SENSING AND GIS

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ABSTRACT

The study deals with the integrated approach to remote sensing and geographic information system to delineate groundwater potential zone in Amaravathi Basin, Tamilnadu, in India. The various thematic maps were prepared for delineating groundwater potential zones with relevant data on geomorphology, geology, slope, lineament density, drainage density, soil characteristics and land use. The groundwater potential zones were obtained by overlaying all the thematic maps in weighted overlay technique using spatial analysis tool in Arc GIS 10.3. The weighted overlay analysis ranking has been assigned for each individual parameter of each thematic map according to the influence and movement of groundwater. The integrated map of the area shows different groundwater potential zones rated as good in 1% of the area, moderate in 79% of the area, and low in 20% of the area.

Keywords: Amaravathi Basin, groundwater potential zones, Arc GIS, remote sensing.

PRUNING: A NEW APPROACH FOR QUALITY PRODUCTION IN ACID LIME

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ABSTRACT

An experiment was carried out to evaluate effect of severity and time of pruning on yield and quality of hasta bahar in acid lime in Factorial Randomized Block Design with two factors, time with three levels viz., 1st September, 15th September and 1st October and severity with three levels viz., 5 cm, 10 cm and 15 cm with overall 9 treatment combinations and replicated three times. In time of pruning, pruning at 1st September found significantly superior in regards to average weight of fruit, volume of fruit and length / breadth ratio (Fruit index). While, pruning at 15th September found significantly superior in regards to fruits per tree, yield per tree, fruit juice per cent and TSS. In severity pruning, pruning with 15 cm found significantly superior in regards to average weight of fruit, volume of fruit and length / breadth ratio (Fruit index). While pruning with 10 cm found significantly superior in regards to fruits per tree, yield per tree, fruit juice per cent, TSS and ascorbic acid. Pruning with 10 cm severity at 15th September time was found significantly superior in regards to fruits per tree and yield per tree.

Keywords: Acid lime, severity and time of pruning, quality and yield.

APPLICATION OF SWAT MODEL WITH SUFI-2 ALGORITHM FOR AMARAVATHI BASIN OF TAMIL NADU, INDIA

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ABSTRACT

The purpose of the paper is to analyse annual hydrological components during wet and dry years of the Amaravathi sub-basin in Tamil Nadu, India and evaluate the stream flow using Arc SWAT – SUFI- 2 algorithm. SUFI 2 is robust and minimizes differences between the observed and simulated mean monthly flows of the sub-basin. The P-factor and R-factor from SUFI-2 give satisfactory results amounting to more than 25 per cent of the observed mean monthly flows. Losses in excess of 55 per cent in the sub-basin are from evapotranspiration. The SWAT Model thus gives good simulation results also for evapotranspiration for the wet and dry years and for evapotranspiration from rice and corn. When compared, the simulated evapotranspiration is very close to the observed evapotranspiration.

Keywords: Hydrological components, P-factor, R-factor, SWAT, SUFI 2.

MORPHOMETRIC ANALYSIS IN DROUGHT PRONE MANN RIVER BASIN, MAHARASHTRA, TO LOCATE GROUNDWATER RECHARGE ZONES USING GEOSPATIAL TOOLS

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ABSTRACT

Groundwater is a finite natural resource which is a vital source for sustenance of humans and different ecosystem especially in drought prone regions. Rapid growth of population has caused rise in water demand leading to severe water scarcity. Occurrence of groundwater in the Deccan Volcanic Province in Maharashtra is governed by the subsurface hydrogeological heterogeneity of basaltic lava flows and by the presence of subsurface geological structures. The present study area, Mann River basin, is located in the south-eastern part of Maharashtra encompassing the districts of Satara, Sangli and Solapur. The main focus of this study is to locate areas which are favorable for groundwater recharge involving morphometric analysis of Mann River basin, and its seven sub-basins which are derived using remote sensing and GIS. This technique is based on various thematic layers such as Land use and Land cover, Elevation, Geomorphology etc. Additionally, different morphometric parameters (bifurcation ratio, drainage density, drainage frequency, elongation ratio etc.) of the seven sub-basins were computed by adopting standard methods and formulae. Finally, twelve morphometric parameters are considered to prioritize the seven sub-basins using weighted sum analysis technique. This paper attempts to underline the sub-basins which are suitable for groundwater recharge based on prioritization index values and different influencing thematic layers by categorizing the study area into good, moderate and poor recharge zones.

Keywords: Groundwater, Mann River basin, Remote sensing, GIS, Land use and Land cover.

REMOTE SENSING AND GIS BASED SOIL LOSS ASSESSMENT BY USING RUSLE MODEL -A CASE STUDY OF BARELI WATERSHED, SEONI DISTRICT OF MADHYA PRADESH

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ABSTRACT

A quantitative assessment of soil loss was done using Revised Universal Soil Loss Equation (RUSLE) model, remote sensing and digital elevation model (DEM) in integrated raster based GIS in Bareli watershed in Seoni district of Madhya Pradesh. GIS data layers including rainfall erosivity (R), soil erodibility (K), slope length and steepness (LS), cover management (C) and conservation practice (P) factors were computed and integrated to compute average annual soil loss in the watershed. The study area has been delineated into very low (<10t/ha/yr.), low (10–25 t/ha/yr.), moderate (25–50 t/ha/yr.), severe (50–100 t/ha/yr.) and very severe (>100 t/ha/yr.) soil erosion classes. The study indicates that 38.5% of TGA is under very low followed by 25.3% of TGA and 14.3% is under moderate soil erosion class. The severe and very severe erosion classes constitute 21.9% of TGA which needs immediate attention for preparing strategies for soil and water conservation measures for sustainable management of land resources and improve the productivity of these lands.

Keywords: Remote sensing, GIS, Soil Loss, Bareli watershed.

WATER SUPPLY AND SANITATION APPLIANCES TO SAVE WATER: A REVIEW

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ABSTRACT

Water supply and sanitation appliances play a significant role in quality of life, right from the ancient civilization to till today man is being using appliances for sanitary purpose and there is a continuous improvement in the appliances and appurtenances, with abundantly use of water resources. The world scenario on water is becoming crucial for saving water and save water has become the world slogan. The human beings consume water for their domestic purpose and 80% of this water is being delivered out as sewage. Conserving water in all possible ways without affecting quality of life has now being thought by planners and engineers and enforcing law for wasting water unnecessarily. The paper presents the developments in the water supply and sanitary appliances in both for rural and urban environment and innovative technologies for water less toilets in urban environment leading to saving water.

Keywords: Water, Sanitation, Sewage, Conserving.

**INFERRING DOMINANT MANGROVE VEGETATION ALONG SALINITY
GRADIENT BASED ON IN-SITU MEASUREMENTS AND REMOTELY SENSED
IMAGERY**

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ABSTRACT

Mangrove ecosystems play a vital role in stabilization and protection of coast line. They are highly prone to changes in salinity, micro environment and also anthropogenic pressure. Their contribution to the global cycles of Carbon, Sulphur and Nitrogen are really note-worthy. The present study aims to model the dominant vegetation type of the Pichavaram mangroves, Tamil Nadu on the basis of their salinity with the aid of field measurements and remotely sensed data. A total of 18 quadrats, each of 20 m x 20 m were studied for vegetation composition and soil characteristics. Analysis revealed the presence of five dominant categories of mangroves coexisting with a class of mixed mangroves. Simultaneously spectral signatures of these species were collected from the satellite data. Maximum likelihood classification was carried out to deduce a Dominant Vegetation Map of the study area. The soil salinity measured from all the quadrats (point features) were interpolated over the entire Pichavaram mangrove region using kriging method to derive a spatial map of salinity. Further the salinity of the area was categorized into low, medium and high. Based on overlay analysis of dominant vegetation and soil salinity, Dominant Vegetation Map was generated that is correlated with salinity. Aerial estimates were computed to assess the area covered under each class. The study would be of utmost concern to policy makers where management practices and restoration activities are carried out on a large scale.

Keywords: Pichavaram mangroves, Remote sensing, Soil salinity, Dominant vegetation map, Maximum likelihood classification, Overlay analysis, Kriging.

**SUSTAINABLE WATER MANAGEMENT FOR VADODARA URBAN
DEVELOPMENT AUTHORITY (VUDA) AREA**

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ABSTRACT

Water allocation can be sustainable only when there is a successful trade-off amongst the priorities of the stakeholders, social equity, economic returns & profitability, reliability of water supply and sustenance of ecosystems. Economic efficiency depends upon the efficient strategies with which wealth can be generated from water resource systems. One such strategy suggests that allocate a unit of water where it generates the highest return. Moreover, by ignoring the opportunity cost of water use, water is undervalued, which can lead to significant errors in investments and water allocation decisions. Sustainable water resources allocation can be controlled by reasonable water resources allocation. The present study is about sustainable allocation of water for Vadodara Urban Development Authority (VUDA) area in Gujarat. At present, the paper discusses the laying out of new reclaimed water distribution network for VUDA area and the cost of the same. The cost of new pipe network is determined by using EPANET+WATERNETGEN software. The treated water from the present and proposed sewage treatment plants using proposed elevated storage reservoirs is to be supplied to various industrial, recreational and residential areas. The fresh and treated water will be distributed using QGIS, EPANET and WATERNETGEN software.

Keywords: Water Distribution Pipe Network, Sustainable Water Management, QGIS, EPANET, WATERNETGEN.

**MATHEMATICAL MODEL STUDIES FOR OPTIMIZING OUTFALL LOCATION
FOR HOT WATER DISCHARGE FROM POWER PLANT****Payal Chakote¹, A.K.Singh², L R Ranganath³ and P.R.Dixit⁴**¹*PG-Student, Civil Engineering, VIIT-University of Pune*²*ARO, CW&PRS, Pune* ³ *Scientist, CW&PRS, Pune*⁴ *Associate Professor, Civil Engineering, VIIT-University of Pune*

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ABSTRACT

The shoreline is widely used for siting electrical utilities, refineries, and other industrial processes that require substantial volumes of cooling water. This has led to large volume of thermal contamination of the sea. Thermal contamination has led to abnormal temperature changes in a natural body of water, caused by the release of industrial hot water. This is resulting to various changes on coral reef and also changes in chemical and biological properties of sea water. Hence it is necessary to have a proper idea of all these adverse effects before construction of any coastal infrastructure. The Present study aims at modelling of flow patterns in open coast near Udupi, Karnataka. Simulation was carried out to study the hydrodynamic behaviour. The model predicts Flow Field, Currents Speed, Surface Elevation at different location and cooling water re-circulation from source point. To meet the objectives The Flexible Mesh Flow Model HD of MIKE21 is used which are suitable. MIKE 21 is a comprehensive coastal modelling suite which simulates hydrodynamics, wave field, sand transport and advection-diffusion of hot water and industrial effluents. The spatial resolution of model is 20km x 10 km. The model results for hydrodynamic study were found to be good with observed current data. The predicted currents given by model are matches 80 to 85 % with observed value of currents. In the second part of the research, the advection dispersion studies are to be carried out to identify suitable outfall location for hot water discharge from thermal plant.

Keywords: Hydrodynamic, advection dispersion, Coastal process, Currents.

SIGNIFICANCE OF STRANGE TABLE AND SCS-CN METHODS IN ESTIMATING RUNOFF IN VARIOUS CATCHMENTS OF TELANGANA STATE, INDIA

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ABSTRACT

Hydrology has undergone an almost complete transformation over the past century, from its empirical origins in the early 20th century, to become a fully fledged and key component of Earth System science by the early 21st century. Many researchers have developed different methodologies for assessing water availability at ungauged locations. The accurate estimation of runoff is necessary for managing our limited water resources, in order to cater to the needs of all involved stakeholders for the sustainable growth of our ecosystem. However, it remains a challenge for hydrologists to estimate runoff accurately as it is influenced by physiographic parameters of catchment, hydro meteorological processes like precipitation, interception, evapotranspiration, infiltration as well as changes in anthropogenic activities like in landuse/landcover, construction of cross drainage structures, etc in the catchment. As a result, it becomes imperative to ignore few hydrological processes of lesser importance and by taking into account only crucial parameters influencing the flow processes in the catchment to simplify the methodology in computation of runoff. Researchers like Strange (1892) have followed the philosophy in arriving runoff based on experimental results with assumptions by limiting the time and space scales. With the advancements in the field of hydrology like ease of computation, availability of data, the methodologies for computation of yield have changed drastically to methods like SCS-CN method(1969) which depends primarily upon Curve Number (accounting more parameters like soil type, antecedent moisture condition, landuse/landcover). The objective of the present study is to compare runoff obtained by popular methods like Strange's table and SCS method in catchments with different physiographic characteristics like Himayatsagar, Osmansagar, Paleru of Krishna Basin and Swarna, Kaddam of Godavari Basin and to assess the performance of both the methods with key regional parameters influencing runoff and thereby yield in the above catchments.

Keywords: Table and SCS-CN method, Catchment, runoff.

GEOSPATIAL TECHNOLOGY TO MONITOR SPATIO-TEMPORAL CHANGES IN ICEBERGS IN EAST ANTARCTICA

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ABSTRACT

Ice bergs are masses of freshwater ice that have calved from a glacier or ice shelf and fallen into the ocean. Icebergs come in all shapes and sizes from ice cubed chunks to ice islands. Studies on icebergs act as the breakup for clues to the processes that cause ice shelf collapse. The rate at which the icebergs are produced is highly variable since it is influenced by the glacier velocity including the surge and the recession events. About 15 to 20% of the volume of the newly calved iceberg is above the waterline, because the upper part of the ice berg is less dense and the life time of the icebergs is strongly dependent on the ocean drift that carries it into the warmer waters. Most of the ice lost from Antarctic ice sheet is in the form of iceberg calving. Monitoring the position of the edge of the ice shelf gives information on its rate of growth and hence the iceberg discharge cycle. Remote sensing plays a critical role in allowing us to examine an area over a period of time to see what change has happened. This study aims to monitor the ice bergs and shoreline changes in the Larsemann Hills area located on the south-eastern coast of Prydz Bay, Princess Elizabeth Land, East Antarctica over a period of two years 2016 and 2017. Because of its ice free area of approximately 40 sq km, this hill region is environmentally, scientifically and logistically significant. The ice-free area consists of two major peninsulas (Stornes and Broknes), four minor peninsulas, and approximately 130 near-shore islands. Total of 939 icebergs were identified in the year 2016 whereas the icebergs identified in the year 2017 were 853. The variability in the number of ice bergs mapped in individual years is due to three major reasons. First reason is melting of small icebergs as the area is dominated by single year ice only. Second reason is the calving of icebergs which was observed in the year 2017 resulting in additional number of icebergs. It was observed that the calving took place at three places where the total area which was calved was around 3.02 sq.km. The third reason is drifting of icebergs away from study area. There were 59 icebergs found to be common in both the years. This study also aims to classify the icebergs based on the texture as smooth and rough and to detect the percentage of change occurred in 2017 with respect to 2016. The movement of icebergs was also analysed with respect to 2016 to know the general direction of movement of icebergs. It was observed that the rotational movement of icebergs was not pertaining to a specific direction. The maximum displacement observed was 2 Km.

Keywords: Icebergs, Shore line, Remote Sensing, Larsemann Hills.

WASTE WATER TREATMENT USING MORINGA OLEIFERA FOR BALANCED ECOSYSTEM

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ABSTRACT

Water is one of our basic human needs, and lack of potable water is a major cause of death and disease in our country. The purpose of this paper is to provide information on waste water treatment using seeds of the Moringa oleifera tree. Moringa Oleifera, also known as the “Tree of Life,” “Mothers Best Friend,” “Natures Medicine Cabinet.” Moringa happens to be the only genus in the family Moringaceae is rightfully named because of its potential to use everything from root to leaf to seed for many health benefits. it deposits organic matter back into the ground and over time actually can make the ground more fertile. Moringa Oleifera seeds acts as a natural coagulant, Study of flocculent, absorbent for the treatment of waste water. Moringa oleifera seeds were efficient as a primary coagulant in wastewater treatment for removal of suspended solids and microorganisms, and also removal of some metals. Nutrients and COD were not successfully removed. COD and nutrients were somehow increased by coagulation using Moringa oleifera seeds. Compared to alum, Moringa oleifera seeds produced 4 to 6 times less sludge volume. This paper examines the need for the waste water treatment with low cost water purification using natural coagulant like Moringa Oleifera for better water quality standards and usage.

Keywords: Waste Water Treatment, Moringa Oleifera, coagulant, water purification.

ORGANIC WASTEMANAGEMENT– AN APPROACH FOR CLARIFICATION OF INFERTILE LANDS

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ABSTRACT

In this method of research the major focus given on largest food waste generating industries and to create a green solution for poor countries by the management of waste. It has been estimated that as much as 30 percent of all food grown worldwide may be lost or wasted. The UN Food and Agriculture Organization (FAO) projects that, under current production and consumption trends, global food production must increase 60 percent by 2050 in order to meet the demands of the growing world population. Manure based compost is often about 45% organic matter, means adding 20 tons per acre of fresh compost would add 3.5 tons of organic matter that can be reused for the infertile land. The solution for the poor food producing countries is that a million tons of waste is processed in many developed and in some developing countries that may give at least 30 percentage of compost and is not ordinary one which may full fill the demands of needy and several acres of land can be turn to fertile land .

Keywords: Organic waste management, compost requirements, infertile lands in the world and poor countries statistics.

ATMOSPHERIC CHANGES DUE TO PHOTO CHEMICAL SMOG**M. Kavitha Yadav¹ and K. Sai Pradeep²**^{1,2}Assistant professor, mahaveer institute of science and technology, Hyderabad,
kavi.dhora@gmail.com, pradeepkarnati28@gmail.com**ABSTRACT**

Photo chemical smog is now a days it is a serious problem in Environment due to vehicular pollution, ultraviolet light from the sun reacts with nitrogen oxides in the atmosphere. It is visible as a brown haze, it is the main source of the photo chemical smog the peak time of photo chemical smog is between 6 a.m. to 8 a.m. It's heavily affect the environment and historical monuments in Delhi the percentage of the photo chemical smog is very high when compared to the other metro Politian cites and also create the human health disorder like lung cancer ,and skin disorders the smog is very thick heavy in weight and due to dust particles it cannot move upwards it form a layer like structure in atmosphere when the smoke particles like nitrogen oxide unburned carbon monoxide and Sulphurdioxide particles come to react with sunlight in the early morning to form the smoke the smoke present in atmosphere throughout the day and look like a dust form for controlling the photo chemical smog formation the vehicle outlets are covered with special type mesh the mesh made with chemicals having the capacity to observe or to attract the unburned carbon monoxide and sulphurdioxide and the dust particles which are emitted through vehicle the mesh is different from based on the type of vehicle and the life span of the mesh is different from capacity of the vehicle, the mesh is eco friendly in nature and cost is easily available to all type of people for every 30 days are 45 days of period to clean the mesh with water or dusting the attached carbon monoxide and sulphurdioxide substances dilute in the water that water can be enter into water recycling process after that the recycling water is used for gardening for purpose.

Keywords: Special type mesh, carbon monoxide, sulphurmonoxide, water dilution, photo chemicals smog.

**ENVIRONMENTAL RISKS TO AIR , WATER AND NOISE DUE TO THE COAL
MINING PROCESS IN AND AROUND MANUGURU AREA, BHADRADRI
KOTHAGUDEM DISTRICT, TELANGANA**

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ABSTRACT

Coal is the most polluting source which creates many environmental problems at various stages of its procurement from mining, transportation, stock piling, coal preparation and utilization stages of operation. Coal is mined by both open cast & underground methods. The environmental impacts of coal mining depends upon mining method, which include soil erosion, noise, dust and water. From the surface mining large areas of land will be disturbed. The types of mining large areas of land will be disturbed. The lower gondwana rocks consisting of Talchir, Barakar and Kamthi which are well developed in the area. The studies of Geological survey of India the attributes as much as 22206.96million tones of coal reserves in Godavari valley coal field. The inventory covers upto a depth of 1200meters and includes reserves. The coal exploitation and transportation, its combustion, and deposit of coal combustion products have adverse effects on soil, water and air. In addition to environmental degradation and pollution with uncontrolled utilization and overuse of the non-renewable energy sources we deprive coming generations' rights and possibilities to use them for their needs. Modern society has admitted its mistakes with respect to the environment. As a result we are accepting our responsibilities for environmental conditions in general. Nowadays, numerous coal mining - practices that enable environment protection are available. The effect of coal mining on vegetation cover is dependent upon the soil type and natural indigenous flora. Results of this investigation imply that mining activity has a greater effect on the vegetation of loess areas than at sandy sites.

Keywords: Coal, Environment, Pollution, Degradation.

DEVELOPMENT OF ARTIFICIAL NEURAL NETWORK TO FORECAST AIR POLLUTANTS IN PUNE CITY

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ABSTRACT

Air pollution is a major problem in metro- cities like Delhi, Mumbai, Pune. Forecasting of air pollutants in advance will help in controlling the air pollution which will in turn reduce the health issues of human being and living organisms. In the present study, models are developed for Pune City to forecast air pollutants using Artificial Neural Network. The Feed-Forward Back-Propogation Neural Network (FFBPNN) and Radial Basis Function Neural Network (RBFNN) are used to forecast one day ahead concentration of air pollutants like RSPM, NO_x and SO_x. Previous concentration of air pollutants and meteorological parameters like rainfall (RF), temperature difference (TD), relative humidity (RH), station level pressure & vapour pressure (SLP & VP), solar radiation (SR) and wind speed (WS) are used as inputs. The results when analyzed using evaluator parameters like correlation coefficient, root mean square error, mean absolute error etc. show that the RBF neural network works better than FFBPNN.

Keywords: RSPM; NO_x and SO_x; Feed-Forward Back-Propogation Neural Network; Radial Basis Function Neural Network.

ASSESSMENT OF LOSS OF STORAGE CAPACITY IN TUNGABHADRA RESERVOIR DUE TO SEDIMENTATION

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ABSTRACT

Reservoir sedimentation is a severe problem faced by dams caused due to soil erosion which is almost immeasurable at source and occurs in the catchment areas of the reservoirs. The present study describes the evaluation of sedimentation carried out for Tungabhadra reservoir situated in Karnataka, India. Tungabhadra reservoir nourishes the inhabitants through water storage and supply for irrigation and water power. Nowadays, capacity loss occurs in the reservoir due to sedimentation. As it is highly tedious and uneconomical to do hydrographic surveys, in this study, a remote sensing data based digital image processing technique was used to assess the sedimentation. Six dates of Landsat 8 satellite data from maximum to minimum reservoir level were used to assess temporal and spatial patterns of reservoirs. The water spread areas of the reservoirs were assessed by using a band rationing technique i.e. Normalized Difference Water Index (NDWI). Furthermore, the revised capacities of the reservoirs between minimum and maximum levels were computed using the trapezoidal formula. These sedimentation rates are comparable with the hydrographic survey analysis. This paper illustrates the prediction of sedimentation at Tungabhadra reservoir using remote sensing.

Keywords: sedimentation, remote sensing, reservoir, water spread area, capacity.

APPLICATION OF GENETIC PROGRAMMING TO RETRIEVE THE GROUND WATER LEVELS

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ABSTRACT

Groundwater is one of the fundamental parameters of hydrologic cycle and thus plays a vital role while estimating the overall water balance in hydrologic and hydrogeological processes. In India, near about 50 % of the agricultural sector depends upon groundwater. However, during recent past, the groundwater resources face acute shortage due to over exploitation, urbanization and population growth. The excessive pumping of groundwater leads to several negative environmental consequences such as land subsidence, water quality issues, etc. Hence, effective strategies should be developed for managing groundwater, and also to maintain balance of water resources. Recent advancements in computer techniques made it feasible to use soft computing approach for modeling groundwater and thus it is possible to concentrate the efforts for development and conservation of groundwater. Present study aims in retrieving groundwater levels in different wells of two Talukas namely Khed and Ambegoan in Pune district of Maharashtra. For this Genetic Programming (GP), a data driven technique is used to develop the retrieving models for groundwater levels. Different groups were prepared depending upon the geometrological conditions in these Talukas and previously measured data of ground water levels in the surrounding wells was used to estimate the unknown groundwater level in the next well in a group. Competency of genetic programming models for retrieving the water levels is judged by different error measures with scatter plots. With the good values of correlation coefficient and low values of error measures can be said that use of genetic programming is worth for groundwater modeling.

Keywords: Ground water, data driven approach, genetic programming, retrieving of groundwater levels.

FLOOD ROUTING: A COMPARISON OF THEORETICAL AND DATA DRIVEN TECHNIQUE

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ABSTRACT

Flood is a natural phenomenon which has become a crucial problem in recent days. Hence to avoid the heavy damages caused by flood, it is very necessary to know precise and prior information of the discharges at different downstream stations on any river. And thus 'routing the flow' is of utmost important. Flow (flood) Routing is the method by which discharge at downstream station is predicted (calculated) using the known discharge at the upstream station and ultimately will be helpful to avoid flood disaster. It can be done using physics based traditional methods like Muskingum, Muskingum-Cunge and Runge-Kutta method as well as using various data driven techniques like Genetic Programming, Artificial neural network, Model tree etc. Traditional methods require huge amount of measured data sets and complex calculations to give the results and generally these are time consuming whereas data driven techniques can work with the available data within less time to give more accurate results. Therefore in recent years, researchers tend towards the data driven techniques rather than the traditional ones. In this paper, routing is done by using Genetic Programming as well as Muskingum method for a reach of Shivade to Sangli on Krishna river of Maharashtra, India. To judge the performance of these two methods a comparison of results is done using different error measures and it can be said from the results that genetic programming performed better than the traditional Muskingum method. Details will be presented in the full text of paper.

Keywords: Flood, Flood routing, Muskingum method, Genetic Programming.

EFFECT OF COW DUNG ON BIOGAS PRODUCTION FROM CO-DIGESTION OF WATER HYACINTH AND SUGARCANE BAGASSE

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ABSTRACT

Biogas, a clean and renewable form of energy could very well substitute for conventional sources of energy such as fossil fuels, oil, etc. which are causing ecological–environmental problems and at the same time depleting at a faster rate. Water hyacinth (WH), sugarcane bagasse and cow dung can be used to generate energy which could save on the fossil fuels conventionally used as source of energy. In this study, the possibility was explored to mix water hyacinth with sugarcane bagasse and cow dung in different combinations for anaerobic co-digestion, so that energy can be generated as biogas. In this work, different proportion of water hyacinth, sugarcane bagasse and cow dung are used for anaerobic digestion. This investigation helps to find the optimum ratio which will produce maximum biogas yield.

Keywords: fossil fuels, Water hyacinth, sugarcane bagasse, cow dung, co-digestion.

REMOVAL OF HEXAVALENT CHROMIUM (Cr VI) IN WASTEWATER BY USING MORINGAOLEFIERA (DRUMSTICKS)

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ABSTRACT

Water is a resource that is essential for life. Water is becoming very limited in its pure state due to the contamination which arises from the different industrial advancements made over the years. Water pollution is a serious problem for the entire world. Water pollution has contributed to negative environmental and human health impacts. This polluted water needs to be treated properly before let into any other source of water body for dispersion. In this era, water treatment plant are not easy to install it requires many purification stages. There are various methods to treat this industrial waste water containing heavy metals. Each method has its own advantages and disadvantages in applications. One of the cost effective method to treat heavy metal is use of Moringaoleifera (MO) seeds. Moringaoleifera, a cosmopolitan tropical, drought-tolerant tree, available throughout the year. The powdered seed of the Moringa.oleifera has coagulating properties that have been used for various aspects of water treatment such as turbidity, alkalinity, total dissolved solids and hardness. This study is carried out to investigation, the performance of a laboratory-scale MO seed absorption column for removal of hexavalent chromium from synthetic wastewater containing 40 mg/l of Cr(VI). In the absorption column MO seed activated carbon was used and Cr(VI) was fed at the rate of 8 ml/min.

Keywords: Moringa Oleifera , Cromium , Adsorption Column.

APPLICATIONS OF WORLDWIDE FREE AND OPEN SOURCE SOFTWARE IN NUMERICAL COMPUTATION “SCILAB (SIMILAR TO MATLAB)” IN WATER, WASTEWATER AND IRRIGATION ENGINEERING: CERTAIN EXAMPLES

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ABSTRACT

Numerical computation to solve complex mathematical equations is essential in all branches of engineering. The present paper attempts to create awareness about the application of worldwide free and open source software “Scilab (similar to MATLAB)” in numerical computation in water, wastewater and irrigation engineering. Scilab codes are written for three examples of the design of filtration plant for water supply, the design of sewers for wastewater disposal and the design of check Basin Irrigation method. These Scilab codes are executed in Scilab Cloud.

Keywords: Water, waste water, Scilab software, Basin irrigation method.

**INTEGRATING HYDROCHEMISTRY WITH GEO-STATISTICAL MODELING
STUDIES FOR THE ASSESSMENT OF FLUORIDE ENRICHMENT IN
GROUNDWATER FROM THE HARD ROCK TERRAIN OF NORTHERN
TELANGANA, SOUTH INDIA**

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ABSTRACT

Groundwater is only the primary source for drinking water in the northern Telangana, South India, where a number of people suffer with fluorosis. With this concern, 34 groundwater samples were collected and studied to identify the occurrence, hydrochemical distribution of fluoride groundwater, geo-statistical tools such as principal component analysis, saturation indices (SI), and correlation analysis were executed in this study. The concentration of fluoride ranges from 0.06 to 4.33 mg/L, with a mean of 1.13 mg/L and 30% of groundwater samples having above the maximum acceptable limit of 1.2 mg/L fluoride for drinking purposes. Fluoride shows a considerable relation with pH, and TDS, while fluoride also demonstrates an insignificant relation with Ca^{2+} . Moreover, alkaline nature, elevated HCO_3^- , Na^+ and $\text{Na}^+\text{-HCO}_3^-$ water type were also influenced to enhance the fluoride concentration in the groundwater. The two components from the principal components (PC) analysis reveal that chemical variables account for above 67% of the total variance of the groundwater chemistry. The PC-1 and PC-2 have high positive loadings, which reveals that the dissolution of fluoride-bearing minerals like apatite and biotite are the chief sources for larger concentrations of fluoride in the study region groundwater. Further, geochemical modelling of groundwater also obviously approves the over-saturation with respect to calcite, fluorite, and dolomite as the major factors that uphold the enrichment of fluoride concentration, while the geogenic activities are also principal controlling factors to influence the groundwater chemistry in the study region.

Keywords: Groundwater, hydrochemistry, fluoride content, Saturation index, PCA analysis, Northern Telangana.

ASSESSMENT OF FUTURE CLIMATE CHANGE IMPACT ON RIVER FLOW USING SWAT MODEL

Geetha

ABSTRACT

Increasing water demands from different sectors of the society coupled with increasing population and socioeconomic development are causing extreme pressure on our water resources, especially in the river basins. The consequent global warming is expected to have major implications on water resources management. So optimum utilization of land and water requires an effective management of them. An effective management of land and water can only be achieved through a complete understanding of their characteristics. This study involves hydrological modeling using Soil and Water Assessment Tool (SWAT). ArcSWAT is a tool in ArcGIS software which is used for watershed modeling. The Soil and Water Assessment Tool (SWAT) is a commonly used, semi-distributed hydrological model for different water resource applications and has been widely used in different parts of the world. Also climate variability and change are expected to alter regional hydrological conditions and result in a variety of impacts on water resource systems throughout the world. According to IPCC, AR5 (Fifth Assessment Report), future climate will depend on committed warming caused by past anthropogenic emissions, as well as future anthropogenic emissions & climate variability. Vellarbasin is more prone to flood and drought. This is mainly due to the periodical high intense rainfall for short duration, topography and improper measures. This study examines the performance of the streamflow parameters using SUFI2 algorithm and assess the impacts of climate change under RCP 4.5 scenarios on the stream flow of the Vellar river basin. This study also includes the assessment of impact of climate change by questionnaire survey.

Keywords: SWAT, streamflow, climate change, SUFI2 algorithm

STUDY OF MAJOR ION GEOCHEMISTRY OF GROUNDWATER IN AND AROUND ALLADURG AREA, MEDAK DISTRICT, TELANGANA STATE, SOUTH-INDIA**Sanda Rajitha¹*A. Narsimha²and Praveen Raj Saxena³**¹Department of Applied Geochemistry, Osmania University, Hyderabad, India²School of Environmental Science and Engineering, Chang'an University, Xi'an, China³School of Applied and Natural Sciences, Adama Science and Technology University, Adama, Ethiopia

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ABSTRACT

The present study main objective was undertaken to assess major ion geochemistry of groundwater to understand the groundwater quality for promoting sustainable development of groundwater resources. Thirty Groundwater samples were collected from the Alladurg area during the period of August 2016 and analyzed for different major elements like pH, Electrical Conductivity, Total Dissolved Solids, Total Hardness, Calcium (Ca^{2+}), Magnesium (Mg^{2+}), Sodium (Na^+), Potassium (K^+), Bicarbonate (HCO_3^-), Chloride (Cl^-), Sulfate (SO_4^{2-}), Nitrate (NO_3^-), Fluoride (F^-) as for the using standards methods recommended by American Public Health Association (APHA, 1995). The pH values of the groundwater varied from 6.7 to 7.8 with an average value 7.1, indicating an alkaline nature of water. The Total Dissolved Solids ranges found 256 mg/L to 1664 mg/L, belongs to fresh water and slightly saline type. Total Hardness ranges varied from 85 mg/L to 540 mg/L, with an average of 267 mg/L, none of the samples exceed the limit. The Fluoride has a minimum 0.3 mg/L to 2.8 mg/L maximum with an average of 1.1 mg/L, around 23% of samples exceed the permissible limit prescribed as 1.5 mg/l by World Health Organization 2012. The nitrate concentration in groundwater collected from the study area ranged from 8 mg/l to 84 mg/l with mean value of 73 mg/l, total samples are within the permissible. In the study area, most of the groundwater samples are suitable for drinking and irrigation purposes except for few locations.

Keywords: Major ion chemistry, Groundwater, Alladurg, Medak District, South-India.

**HYDROGEOLOGY AND DRAINAGE MORPHOMERIC STUDY FOR
GROUNDWATER POTENTIAL ZONES IN JOYTIBA HILL AREA IN KOLHAPUR
DISTRICT, MAHARASHTRA, INDIA-USING REMOTE SENSING AND GIS.**

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ABSTRACT

The present study area is the part of water divide between two easterly flowing rivers Panchaganga and Warna in Kolhapur district, Maharashtra. Geologically, present study area comes under Deccan Volcanic Basalt (DVB) of upper (late) Cretaceous to lower (early) Eocene age. The laterite rock also occurs on the top of the hills belonging to Pleistocene age. The present research is concentrated on the demarcation of the Groundwater Potential Zone (GPZ) with reference to Remote Sensing and Geographical Information System (GIS) along with adequate ground truth. Geological structures in Basalt and Lateritic rocks are observed during the field work. Drainage morphometric parameters such as linear, areal and relief aspects in different ways, such as whole study area is classified into eleven sub-basins, relationship of drainage with the Basaltic lava flows in the area, drainage pattern, slope analysis and lineament analysis. Geomorphology of the study area is divided in six morpho-units such as alluvial plain, peniplain, moderately dissected plateau, highly dissected plateau, denudational hill and Lateritic upland. For present study, the Survey of India (SOI) toposheets on 1:50000 scale, Landsat 5 satellite image and SRTM DEM (Downloading from USGS) are used for preparation of base map, drainage map, slope map, lineament maps and data generation. It is observed that the movement of groundwater depend on the secondary porosity developed in the basalt rock due to the presence of joints/fractures and lineaments. Alluvial plain and peniplain are found to be with good groundwater potential, while moderately dissected and highly dissected plateau, denudational hill and lateritic upland area show moderate to poor groundwater potential.

Keywords: Joytiba hill, GIS, Groundwater, Panchaganga river, Warna river.

NON-REVENUE-WATER ASSESSMENT AND REDUCTION STRATEGY IN URBAN WATER DISTRIBUTION

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ABSTRACT

Supplying safe and adequate drinking water has become crucial in India. Water losses in water distribution network are an important issue and challenge for water utilities in urban water supply. In India 50 to 60 percentage of treated and supplied water is lost during transmission from water service reservoir to customer service connections. Non-Revenue-Water (NRW) is the portion of water placed by a water utility into the distribution system but could not generate revenue for utility. It consists of sum of Un-Billed Metered, Un-Billed Un-Metered consumption, Apparent Losses and Real Losses. Water utilities are losing revenue because of these high levels of NRW and in turn affecting their financial viability. The overall objective of any water utility is to deliver wholesome water to consumers in sufficient quantity at adequate pressure, continuity and maximum coverage by reducing losses. In this regard a study was conducted at KapraMunicipality water utility by using water audit software Water Balance developed by International Water Association (IWA). This study implemented District Metered Area approach by isolating a small area of water distribution network and conducted Minimum Night Flow Analysis to determine the flows of water. This paper provides a review on assessment of present levels of NRW and a strategy to be implemented for reducing NRW. This paper also discusses about the necessity of targeting appropriate performance indicator which is a benchmark for any water utility.

Keywords: Non-Revenue-Water; Apparent Losses; Real Losses; Water Balance; District Metered Area; Minimum Night Flow Analysis; performance indicator.

**NEGLECTED REALITY OF MANUAL SCAVENGING - PROHIBITED YET
PRACTICED- A CASE OF HYDERABAD**

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ABSTRACT

It has been 25 years of prohibition through commencement of legal framework, yet scourge of manual scavenging in India continues. The manual scavenging practices has evolved from caste system and sanitation requirements and is still a prevailing practice managing and maintaining our sanitation solutions developed over a period. The objective of this paper is to act as an advocacy article to strengthen the policy dialogue and advocacy activities leading to local innovations in abolishing manual scavenging. Through this paper, an attempt has been made to understand manual scavenging scenario in today's context and briefly review existing practice of manual scavenging in terms of its role, form, socio-economic aspects, living conditions & occupational hazards, with a specific case of Hyderabad. In addition to this the impact of the programmes and amendments taken up towards eradication of manual scavenging till date is also reviewed. The study is carried out with exploratory approach with primary data obtained through informal semi-structured interviews with stakeholders related to manual scavenging practice in distinct levels, clubbed with secondary information from published market research reports and government publications. Exploring the facts against the existing law, presence of manual scavenging is evident in Hyderabad and is observed to spread in new avenues of sanitation systems in addition to already established bases like pit latrines, septic tanks, toilet cleaning etc. In conclusion, the paper reflects on the factors that can that can enable the city government to achieve the goal of eradication of manual scavenging, balancing the city needs in the purview of existing policy and legislative environment.

Keywords: scavenging practices, socio-economic aspects, hazards, eradication

FLOW CHARACTERISTICS OVER BROAD CRESTED WEIR AND DAM SPILLWAY**¹Bhukya Ramakrishna, ²CH.Shivakumargoud, ³Myakala Prasad ⁴Jallewar
Praveenkumar and ⁵Bollam Shivakumar**

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ABSTRACT

A control section is defined as a section in which a fixed relationship exist between the discharge and depth of flow broad crested weirs, spillways are some typical examples of structures which give rise to control sections. The critical depth is also a control point. However when the flow changes from supercritical flow to subcritical flow, A hydraulic jump is usually formed by passing the critical depth as a control point. So in this connection Laboratory flume experiments are carried out in the hydraulics laboratory to investigate the head-discharge Relationships and computation of coefficient of discharge for different hydraulic structures with different slopes (horizontal, and 1 in 500). In additionally study also carried out on energy dissipation and specific energy computations between upstream and downstream of hydraulic structures. Results of experiment shows that this average value of coefficient of discharge for different types of broad crested weirs(i.e stream lined broad crested weir, sharp cornered broad crested weir, broad crested weir with raised crest) and dam spillway with toe, ski jump and Baffle blocks are 0.38, 0.35, 0.37, 0.80, 0.70 and 0.80 Respectively. The variation of Cd with h/a was linearly Related and there was power Relationship between discharge and head with R2 ranging from 0.60 to 0.99 for all structures under study. On the other hand, the classification of jumps based on froude number, and sequent depths is studied and favorable conditions for different hydraulic structures are proposed for energy dissipation.

Keywords: Coefficient of discharge, Head-Discharge relationship, Hydraulic Structures.

TREND ANALYSIS OF EXTREME TEMPERATURE DATA OF INDIA USING NON-PARAMETRIC METHODS AND EMPIRICAL MODE DECOMPOSITION**Anand Vishnu^{1*}, Drisya S Dharan¹, Adarsh S², Anuja PK¹ and Govindan Unnithan¹**

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ABSTRACT

This paper performs the in-depth trend analysis of All India extreme temperature datasets (T_{max} and T_{min}) considering the updated long-term data of 1901-2016 period. First, the overall trend of monthly, seasonal and annual T_{max} and T_{min} datasets are determined using Mann-Kendall (MK) test. All of the monthly, seasonal and annual maximum temperature series and three of the seasonal (monsoon, post and pre-monsoon) T_{min} series displayed a significantly increasing trend. Then the sequential change in trend of seasonal T_{max} series determined by Sequential MK test (SQMK test) showed an early commencement of significant increase in trend with differences in commencing year. Similar analysis of T_{min} series showed a consistent significant trend only in the recent past (since 2000). The non-linear trend analysis by Empirical Mode Decomposition (EMD) method showed a monotonically increasing trend in annual and different seasonal T_{max} series, the nature of which is in line with the linear trend of respective series. The EMD analysis portrayed a non-linear asymmetric variation of different T_{min} series with differences in transformation year. The non-linear trend analysis captured the 'true' decreasing trend of minimum temperature of May which is masked by the linear trend analysis. The analysis performed in the study presents a broad overview of temperature variations of the country which eventually help in non-stationary modeling of hydrological variables under the changing climate scenario.

Keywords: Temperature, EMD, Non-Linear Trend, Mann-Kendall.

**CLIMATE CHANGE ADAPTATION IN URBAN WATER AND SANITATIONS:
HIGHLIGHTS FROM KOCHI, KERALA, INDIA**

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ABSTRACT

It is a known fact that the cities play a key role in the achievement of the Sustainable Development Goals especially Goal 6 of the 2030 Agenda concerning to universal access to water and sanitation. Climate change intrudes many challenges to water resources in cities in the form of high variability, seasonal scarcity, and water pollution. This results into minimization of sanitation facilities of a city. The massive speed and scale of urbanization in the global south indicates the pressing need of the fill the gaps in current knowledge in the role of urban government in adapting to the impacts of climate change on water and sanitation sector. Hence this paper aims to investigate the adaptive capacity of local governments to the impacts of climate change on drinking water and sanitation sector, with a case study of Kochi Metro city, Kerala, India. The research is mainly based on a critical literature review, policy analysis, observation and reflections of various authentic sources. The study indicates that drinking water supply in Kochi city is under severe stress due to climate variability, rapid surge of urbanization and poor urban water governance. There are many limitations prevailed in the urban water sector in the state of Kerala that the high degree of uncertainty in predicting the impacts of climate change on water sector, absence of strong leadership and resources to deal with the insurmountable challenges of climate change. The study highlighted the need to reframe the relationship between citizens, policy makers and scientists to bring out the effective solutions to the problem of urban water supply and sanitation adapting to climate change.

Keywords: Sustainable Development Goals; Climate Change; Urban water and sanitation.

**USE OF GIS AND WATER QUALITY INDEX TO ASSESS GROUNDWATER QUALITY
IN TIRUCHENGODE BLOCK, NAMAKKAL DISTRICT, TAMIL NADU, INDIA****¹A. Ravikumar* and ²S. M. Mazhar Nazeeb Khan**

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ABSTRACT

Water quality assessment has always been a dominant part of environmental quality management. The present study involved the WQI evaluation and mapping of WQI using GIS. A total of 75 samples were collected from 25 different villages in the study area and these water samples were further analyzed for physical and chemical characteristics on the basis of which different indices were developed. Water quality index was calculated for overall water quality quantification from the perspective of human consumption. Eleven water quality parameters have been selected for WQI computation. The results showed that during the summer season, 2.66% of groundwater samples represent excellent water, 84% indicate good water, and 13.33% shows poor water during the winter season, none of the groundwater samples represent excellent water and 85.33% indicate good water, and 14.66% shows poor water category. It was also found that the areas which contain WQI of status good in post-monsoon season got into WQI status of excellent in pre-monsoon season. GIS and WQI have been applied to visualize the spatial pattern of groundwater quality in the study area. The WQI map indicates that the safest zone is in the Northeast and the center part of the study area, where nearly most of the WQI values of the samples are in good class for drinking consumes. This result has shown that the great combined use of GIS and WQI in providing a valuable tool for managers to monitor and assess groundwater quality.

Keywords: WQI, GIS, Tiruchengode, Post-Monsoon, Groundwater.

INVERSE GEOCHEMICAL MODELING OF GROUNDWATER IN A HARD ROCK AQUIFER SYSTEM OF TELENGANA

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ABSTRACT

The study area, Maheshwaram watershed (53 km²) is located in Rangareddy district of Telengana. The area falls in semi- arid zone where surface water resources are limited and water-demand is mainly met by groundwater pumpage. The aquifer system is lying on fractured biotite granite rock where spatial variations of hydraulic parameters as well as water chemical parameters are high. Inverse geochemical modeling and multivariate statistical methods were used to define the variation and the genetic origin of chemical parameters of groundwater in this area. For this study hydrochemical data from 17 sampling points over a 15 -year time period were used. Q-mode hierarchical statistical analysis was performed to partition the water samples into three hydrochemical facies also known as water groups or water types. The resulted three groups were classified as recharge area waters (Group1: Ca-Mg-HCO₃ water), transition zone waters (Group2: Ca-Na-Cl-HCO₃ water) and discharge area waters (Group3: Na-Ca- HCO₃ water). Spatial plot of the three groups showed that the samples belong to the same groups are located in close proximity to one another suggesting same hydrochemical processes are involved for the samples classified in one group. Moreover the three water groups that located from recharge zone through transitional zone to discharge zone are taken as flowpaths to perform the inverse geochemical modeling to explain the chemical reactions controlling water chemistry between these three water groups. By using PHREEQC, the inverse geochemical modeling result demonstrated that in a broad sense the four reactions (1. precipitation of calcite, amorphous silica and clay, 2. silicate weathering reactions, 3. ion exchange and 4. Dissolution of salt) are responsible for the hydrochemical evolution in this watershed.

Keywords: Hardrock aquifer, Watershed, Ground water pumpage, Chemical parameters.

A CONSOLIDATED STRATAGEM TOWARDS DEFENESTRATION OF COKE OVENWASTEWATER USING VARIOUS ADVANCED TECHNIQUES - AN ANALOGOUS STUDY.

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ABSTRACT

Coke oven wastewater contains principal compounds like phenol, ammonia, cyanide, thiocyanate, sulphide, etc. in high amounts. The presence of such chemicals makes it toxic and recalcitrant in nature. Conventional methods like activated sludge process are utilised for the treatment of coke-oven wastewater, but the effluent generated by this process doesn't comply with the effluent quality standards. Simulated coke-oven wastewater pertaining to effluent characteristics discharged by industrial sector was synthesized. Initially treatment of wastewater was performed with ozone which was used in combination with activated carbon (AC) and H₂O₂ to increase the degradation of COD. The maximum degradation achieved in the O₃/AC was 76.8% while in with O₃/H₂O₂ the COD removal was 75.8%. The O₃/AC process was found more acceptable in terms of fast rate of COD degradation, time and economy efficiency suitable for handling large volume of wastewater. However problems of sludge disposal and process hazards diverted the adoption towards microbial treatment using bacterial strain *Alcaliegenes facaelies* where phenol and cyanides were degraded up to 80.67% and 77.58% in 76 hours respectively. Due to the high toxicity level of coke oven wastewater, only biological treatment also fails to treat them effectively. Combined microbial treatment as well as membrane based separation process (thin film composite reverse osmosis membrane) for wastewater purification was also applied. Thin Film Composite (TFC) RO membrane was used to treat this solution at pressure of 200 and 300 psi respectively and at different pH of 5, 7 and 8 respectively. The maximum quantity of phenol removed by TFC RO membrane at 300 psi pressure and pH of 7 was 76%. Thus an amalgamated approach of bioremediation and reverse osmosis was sustainable.

Keywords: Coke Oven wastewater; Ozone; Activated carbon; *Alcaliegenes facaelies*; Reverse Osmosis.

OPTIMUM ALLOCATION OF SURFACE AND GROUND WATER RESOURCES OF APPAPURAM CHANNEL COMMAND IN KRISHNA WESTERN DELTA

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ABSTRACT

The sustainability of water resources is a critical issue against the backdrop of rising water demand for agricultural, industrial, and domestic uses as the world needs about 60% more food to feed the 9.5 billion people in 2050 (United Nations, 2012). The issue has become more challenging in the light of shrinking water resources due to urbanization, contamination, and climate change impacts. A research was conducted in Appapuram Channel command with 9 branches in Krishna Western Delta of Andhra Pradesh state using LINDO optimization software. Based on the ground water salinity, for branches 1, 2, 8 & 9, only surface water was used and the areas under different crops were allocated by the model to maximize the profit. Similarly, with a hypothesis of additional ground water 10%, 20%, 30% and 40% along with 100% canal water for branches 3,4,5,6 &7 model gave both areas under different crops to be followed along with benefits. Though the Central Ground Water Board recommended for the use of conjunctive use, hitherto implementation is lacking in the district.

Keywords: Surface water, ground water, LINDO.

CONJUNCTIVE USE OF SURFACE AND GROUND WATER RESOURCES OF PT CHANNEL (PERALI-THIMMARAJU) COMMAND IN KRISHNA WESTERN DELTA

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ABSTRACT

The sustainability of water resources is a critical issue against the backdrop of rising water demand for agricultural, industrial, and domestic uses as the world needs about 60% more food to feed the 9.5 billion people in 2050 (United Nations, 2012). The issue has become more challenging in the light of shrinking water resources due to urbanization, contamination, and climate change impacts. A research was conducted in Perali-Thimmaraju Channel command with 7 branches in Krishna Western Delta of Andhra Pradesh state using linear programme software. Based on the ground water salinity, only surface water was used and the areas under different crops were allocated by the model to maximize the profit. Similarly, with a hypothesis of additional ground water 10%, and 20%, along with 100% canal water the model gave both areas under different crops to be followed along with benefits. Though the Central Ground Water Board recommended for the use of conjunctive use, hitherto implementation is lacking in the district.

Key words: Surface water, Ground water .Linear programme, water requirement.

**ROOFTOP RAIN WATER HARVESTING FOR WATER SELF-SUFFICIENCY:
A STUDY IN DHARWAD AND HUBBALLI CITIES OF DHARWAD DISTRICT****¹Jeevitha K M and ²Veena S. Jadhav**

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ABSTRACT

Water is one of the vital natural resource, supporting human life, economic development and ecological diversity. Karnataka state is a land of versatile weather and receives unpredictable rainfall pattern. Rapid urbanization and environmental pollution has resulted in Climate change. As a result, the state is experiencing untimely and inconsistent rains, reduction in infiltration of rain into ground water resource and also many regions have continued to experience drought conditions with an alarming consistency. If water management is not conferred, then drinking water resources will be critically threatened. With this concern the present study was conducted in Dharwad and Hubballi cities, Dharwad district of Karnataka state. Rooftop Rain water harvesting (RRWH) is gaining wide acceptance in Dharwad and Hubballi city as a sustainable domestic rainwater harvesting technique. The study analyzed the motives behind adoption and non-adoption of rooftop rain water harvesting system and examined different purposes the harvested rainwater was utilized. Through purposive random sampling technique 60 adopters and 60 non-adopters of rooftop rain water harvesting system were selected for the study. The findings of the research revealed that, all the respondents belonged to upper middle socio economic status. The respondents self-interestedly adopted RRWH system for their residential buildings because of drying up of surface and underground water resources, convenient to at homestead and low quality of other water resources. The adopter used harvested rainwater for recharging borewells, recharging aquifers and also used it for domestic purposes such as drinking, cooking, personal hygiene etc. Non-adopters quoted reasons such harvested rainwater will not be sufficient for them, entry of fauna into the contaminates water, have piped water supply and hence they did not adopt RRWH system. The research findings conclude that adopting RRWH system will undoubtedly sort water scarcity and indeed make residences self-sufficient.

Keywords: Roof Rain Water, Dharwad, Hubballi, Aquifers, surface and underground water resources.

**ESTIMATION OF PHYSICO-CHEMICAL PARAMETERS OF GROUNDWATER IN
APRUPA WATERSHED, SANGOLA TALUKA, SOLAPUR DISTRICT,
MAHARASHTRA.-A CASE STUDY**

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ABSTRACT

In the State, 90% of rural population draws its water from the ground water assets. The amount of ground water utilized for the agricultural purpose is 85%. Out of the total water available for irrigation purpose, 69% comes from ground water sources. Some 10% of the ground water is utilized for industrial purpose and only 5% is used up for drinking. With the present population of India, there is an increasing demand for food, fiber and fuel, resulting in tremendous pressure on our finite land resources, especially soil and water. India is blessed with monsoon for rains and that we can do little to alter the nature's gift. The study area shows the basaltic lava flows which represent the peripheral portions of the Deccan traps. They occupy the western, central and southern India. In the present study various parameters determined are pH, electrical conductivity, solids, total alkalinity, carbonate, bicarbonate, chloride. The water quality assessment may give clear information about the subsurface geologic environments in which the water is presents (Raju et al, 2011). The present study was carried out for quality analysis based on physico-chemical parameters of groundwater. Hydrogeochemical data was analyzed to understand the relationship of groundwater chemistry to soil and rock composition and further to decipher its quality to safeguard the human health. For most of the parameters it has been observed that their value exceeds WHO (2004) and ISI (1983) tolerance limit.

Keywords: Hydrogeology, Groundwater, Physiochemical parameter, Watershed.

**CORRELATION BETWEEN LAND SURFACE TEMPERATURE (LST) AND NDVI
USING IMAGE PROCESSING TECHNIQUES**

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ABSTRACT

Vegetation index provides massive information in transmutation of green canopy through spectral analysis. It has a significant influence on the land Surface Temperature (LST) distribution. The objectives of this study are to retrieve the LST and investigate the relationship between LST and NDVI. Urban agglomeration leads to decline of vegetation, since it is as major aspect related to urban environment in terms of thermal exertion. Remote sensing Imageries has several indices to analyze the vegetation in which NDVI is common and widely used index having two different bands .USGS earth explorer Landsat –V,VIII satellite imagery used to study 650sq.km of GHMC Hyderabad Urban Area to contemplate the Surface temperature with vegetation indices. Finally, It was found that the Land surface temperature (LST) was significantly affected by the health of vegetation, water bodies degradation and a negative correlation was observed between them.

Keywords: NDVI, LANDSAT.

MODELLING SPATIO-TEMPORAL VARIABILITY OF AGRICULTURAL DROUGHT IN SEMI-ARID TRACT OF NORTHERN TAMIL NADU, INDIA USING REMOTE SENSING AND GIS TECHNIQUES

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ABSTRACT

Drought is a complex hazard caused by the breaking of water balance, and it has always an impact on agricultural, ecological and socio-economic spheres. Although the drought indices derived from remote sensing data have been used to monitor meteorological or agricultural drought, there are no indices that can suitably reflect the comprehensive information of drought from meteorological to agricultural aspects. In this paper, the synthesized drought index (SDI) is defined as a principal component of vegetation condition index (VCI), temperature condition index (TCI) and precipitation condition index (PCI). The synthesized drought index (SDI) derived from multi-source remote sensing data from moderate resolution imaging spectroradiometer (MODIS) and tropical rainfall measuring mission (TRMM), and it synthesizes precipitation deficits, soil thermal stress and vegetation growth status in drought process. Therefore, the SDI method is favorable to monitor the drought. In our research, a heavy drought process was accurately explored using SDI in Northern Tamil Nadu from 2000 to 2016. Finally, a validation was implemented and its results showed that SDI was not only strongly correlated with 1-month scales standardized precipitation index (SPI1), but also with the variation of crop yield and drought-affected crop areas. It was proved that this index is a comprehensive drought monitoring indicator, and it can contain not only the meteorological drought information but also it can reflect the drought influence on agriculture.

Keywords: Drought, Synthesized drought index, Moderate resolution imaging Spectroradiometer, Tropical rainfall measuring mission.

RESERVOIR SEDIMENTATION ANALYSIS: A CASE STUDY**Zeenat Ara* and Mohammad Zakwan**Assistant Professor, MANUU, Hyderabad
Email:zeenatiitd@rediffmail.com**ABSTRACT**

Sedimentation in reservoirs across the world has led to loss of reservoir storage capacity thereby reducing the useful life of dams. Storage reservoirs built across rivers or streams tend to lose their capacity progressively with the passage of time on account of sedimentation. After the designated life of a reservoir, sediment affects the regulating capacity of reservoir / dam as the function of water intakes may get affected. It is therefore necessary to make an assessment of reservoir sedimentation and plan for a specified full service time of the reservoir. In the present study sedimentation analysis has been done for Dab reservoir which is primarily a part of hydropower project in Kunar basin. The Full Service Time and Feasible Service Time are considered as 50 and 100 years respectively as per BIS 12182-1987 which is based on international practices. A suitable rate of sedimentation based on siltation rate observed on river Kunar has been considered for assessing the area/capacity for the reservoirs after their Full and Feasible service time. The revised areas and capacities were used for assessing the Minimum Drawdown level of the dam, to meet the desired objectives. Based on m factor Dab reservoir was classified as Type-III. The annual sediment rate inflow works out to 0.045 Ha-m/sq km/yr. The ratio of annual sediment volume and storage has been calculated as 1.12 %. Sediment inflow, trap efficiency obtained sediment deposition rates have also been calculated for the reservoirs.

Keywords: Reservoir Sedimentation, reservoir capacity, sediment inflow, trap efficiency.

ROOFTOP RAIN WATER HARVESTING: A SUSTAINABLE TECHNIQUE FOR DOMESTIC WATER SUPPLY

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ABSTRACT

Water scarcity has become a major concern in urban areas, predominantly in cities the rainwater is turning into runs off, which eventually do not infiltrate into soil and accumulates in low-lying areas. Groundwater resource is presently meeting the demand of domestic water supply for growing population, which is ultimately diminishing. Hence rainwater is the ultimate source of fresh water. The Rooftop Rain Water Harvesting (RRWH) has been proven as a sustainable water supply system for residential buildings all along the year, and is the only solution for the domestic water scarcity problem. Thus this study was conducted in Dharwad and Hubballi cities of Karnataka state, with an aim of assessing knowledge about rain water harvesting and calculating the its potential in relieving their demand for domestic water. Almost all the residents discard the rainwater accumulated over their roofs into sewage considering it worthless for human use. All the respondents shared their experience of monthly water scarcity and consumed approximately 1 lakh liters of water per annum. The family size showed high significance ($r= 0.99$), while monthly income negatively correlated ($r= -0.025$) with the quantities of water consumed daily. Further a simple technique called “Rooftop Rain Water Harvesting” was imparted through capacity building program to the owners of residential buildings. The impact was gain in knowledge about various aspects and subsequently 70.00 per cent of the respondents became ready to adopt rooftop rain water harvesting. Both the cities received an average annual rainfall of 713 mm between 2011-2016 and its efficiency was calculated to be 85.00 per cent. The calculated potentiality was nearly 30 lakh liters per annum which can be used for domestic purpose or for recharging their own bore wells. Consequently, if all the selected residential buildings adopt the rooftop rain water harvesting, they can fulfill about 80.00 per cent of their annual water demand.

Keywords: Domestic Water Supply System, Groundwater resources, Residential buildings, Rooftop Rain Water Harvesting and Water consumption pattern.

ECO FRIENDLY APPROACH TOWARDS MITIGATION OF MERCURY CONTAINING WASTEWATER

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ABSTRACT

Water is one of the indispensable assets for the mankind. With increase in urbanization and population, environmental pollution of water and specifically groundwater contamination is a matter of rising concern. Mercury is one of the heavy metals well known for its detrimental effects on the biosphere. It persists indefinitely and cause environmental pollution. In recent years heavy metal pollution have become one of the prime environmental concerns due to their toxic effects on the living beings. Mercury is released from various anthropogenic sources like pesticides, batteries, electrical gadgets, dental amalgam fillings, paints etc. Mercury containing effluents from these sources are potentially toxic, and if discharged untreated can pose critical health hazard to flora and fauna. The permissible limit for mercury in drinking water is 0.001mg/l. Wastewater treatment is required to reduce the heavy metal level in various industrial effluents before it is discharged into the water bodies. Also mercury is a major constituent in pesticides, fertilizers and herbicides which when added to the soil tend to percolate down and reach groundwater thereby causing groundwater contamination. In our research work, we have studied mercury biosorption by a bacterial strain isolated from a chlor-alkali industry. Biochemical test and morphological examination revealed that the isolate is gram negative cocci. It was found to exhibit an appreciable mercury removal efficiency of greater than 95% of 25mg/l HgCl₂ in 96 hours of incubation time under optimized conditions of pH 7 and temperature 35^oC. The specific growth rate and doubling time of the isolate were found to be 0.0847h⁻¹ and 8.18 hours respectively.

Keywords: Biosorption, Chlor-alkali, Mercury.

APPLICATIONS OF GREEN MATERIALS FOR THE PREPARATION OF ECO-FRIENDLY BRICKS AND PAVERS

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ABSTRACT

The most basic and primary building material for construction of houses is the conventional brick. The rapid growth in today's construction industry has obliged the civil engineers in searching for more efficient and durable alternatives far beyond the limitations of the conventional brick production. A number of studies have been made and serious steps have been taken in manufacturing of bricks from several waste materials. However, the traditional mean of bricks production which has brought hazardous impacts to the context has not yet been changed or replaced by more efficient and sustainable one. The current trend in bricks manufacturing is emphasising majorly on the use of post-consumer wastes and industrial by-products in the production process. Most of the researches went through enhancing the clay brick quality and properties by mixing the clay with various recycled wastes as foundry sand, granite sawing waste, harbour sediments, perlite, sugarcane, baggase ash, clay waste and fine waste of boron, sewage sludge, waste glass from structural wall and other different wastes. Compile this state of the art work of manufacturing bricks in the past and the current trend in the bricks industry with respect to the raw materials, ways of manufacturing and the out- comings. Moreover, the hazardous impacts from the manufacturing of conventional brick will be covered as a whole as well as the attempts of the previous researches in treating the problem properly will be studied. This project presents an experimental study on the utilization of waste materials which replaces clay with (Plastic covers, Ceramic Powder, Egg Shell Powder, GGBS, Silica Fume, Rice Husk Ash and Lime Powder) and Fine Aggregate with (Recycled glass, Dry Grass, Dead Leaves, Tree barks powder, Sugar cane powder, crumbed rubber) to produce eco-friendly Bricks. This project is an attempt to fill the gap of the past studies and suggest more sustainable and sophisticated methods of brick manufacturing in the future. 40 percent replacement of fine aggregate with crumbled rubber and dry grass in mortar bricks have given encouraging results, also the replacement of cement by egg shell powder at 20% has given a considerable result.

Keywords: Eco Friendly Materials, Waste Plastic, Ceramic Powder, crumbed rubber, sugar cane powder, Dry Grass, Dead Leaves etc.

ENVIRONMENTAL-FRIENDLY CONCRETE FOR SUSTAINABLE CONSTRUCTION OF THE BUILDINGS

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ABSTRACT

There has been a considerable imbalance between availability of conventional building materials and their demand in the recent past. For environmental protection and sustainable development, extensive research has been conducted on production of eco-friendly products from waste materials. Concrete is a sustainable material because it has a very low inherent energy requirement, is produced to order as needed with very little waste, is made from some of the most plentiful resources on earth, has very high thermal mass, can be made with recycled materials, and is completely recyclable. Sustainable design and construction of structures have a small impact on the environment. Use of “green” materials embodies low energy costs. Their use must have high durability and low maintenance leading to sustainable construction materials. High performance cements and concrete can reduce the amount of cementitious materials and total volume of concrete required. This paper presents an experimental study on the utilization of waste materials which replaces Fine Aggregate with Glass Powder and Coarse Aggregate with (Paper Wax Aggregates, Plastic Papers Aggregates, Plastic Coal Aggregates to produce ecofriendly concrete. So, this concrete is eco-friendly were it can be used waste materials as their filler materials. At present glass bottles, paper plastic, coal plastic, paper wax was used in replacing coarse aggregate in various proportions like 50% and 100%. Glass powder was used in replacing fine aggregate with 50% and 100%. Based on the test results the following conclusions were made. The compressive strength of concrete with 50% replacement of fine aggregate with glass powder is 43.44 N/mm². It is almost equal to the strength of conventional concrete (45.63 N/mm²) on 28th day. The compressive strength of concrete with 50% replacement of coarse aggregate with glass aggregate is 37.15 N/mm². It is almost equal to the strength of conventional concrete (45.63 N/mm²) on 28th day. From the test results, it is found that the compressive strengths of eco-friendly concrete are applicable for Reinforced Cement Concrete (RCC) works for slabs, beams, columns and so on as M-20 normal grade of concrete is suitable.

Key words: Eco Friendly Materials, GHG, GPC, PPA, PWA, PCA, Compression Strength.

FORECAST OF GROUNDWATER QUALITY IN INDUSTRIAL REGION OF KABILARMALAI AREA, TAMIL NADU USING STATISTICAL ANALYSIS

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ABSTRACT

The present study was attempted to evaluate the extent of pollution of Kabilarmalai regions and nearby open well, bore well and groundwater are highly contaminated due to discharge of wastewater without any treatment. Water quality index was then calculated to find the suitability of water for drinking use, the result shows 89% samples are unfit for drinking purpose. Principal component analysis (PCA) was carried out and identified five components, which are responsible for the data arrangement. PCs of these areas (PC1 – PC4) can be attributed to both weathering and leaching of host rocks and manmade activities. Agglomerative cluster analysis (CA) was performed for delineating and grouping the similar pollution causing locations. From cluster analysis three clusters have been identified, three samples are identified as less polluted sites, two of them in moderate polluted sites and ten are in relatively high polluted regions. Difference in groundwater quality among the sampling sites may be explained in terms of groundwater flow direction, land use patterns, bore well depths and industrial blow.

Keywords: Groundwater, Kabilarmalai, Cluster analysis.

A REVIEW OF PHARMACEUTICAL INDUSTRIAL WASTEWATER MANAGEMENT

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ABSTRACT

The rapid growth of human population increases the usage of pharmaceuticals to prevent and treat the diseases in human. In many worldwide areas, the environmental problems are increased and create severe risks to water resources from pharmaceuticals. The drugs create a threat to the aquatic system. Products like chemotherapy drugs, antibiotics, hormones and others. The human beings are affected directly or indirectly by the disease causing organisms. When the untreated content released into the water bodies it significantly risks the life of humans. Characteristics like pH, colour, alkalinity, COD, BOD are some of the physical, chemical and biological characters of pharmaceutical industrial wastewater. The primary, secondary and tertiary treatments are used to treat the wastewater. A study of characteristics and different biological treatment methods of wastewater treatment is performed followed by the water treated used for the various purposes.

Keywords: pharmaceutical effluent water, characterization, biological treatment.

RESERVOIR SEDIMENTATION AND CATCHMENT AREA TREATMENT WORKS ON TUNGABHADRA PROJECT IN KRISHNA BASIN

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ABSTRACT

The Tungabhadra Project is a multipurpose project constructed across river Tungabhadra, which is a confluence of two separate streams Tunga and Bhadra. The project is the life line for both states of Karnataka and erstwhile Andhra Pradesh .The project was constructed with a capacity of 132.473 Tmcft with a design rate of sedimentation of 0.431 Tmcft/year. The project was commissioned in 1953 and it has been serving the intended purposes fruitfully. The catchment area of the project is 28,180 Sq km in TUU upper sub basin in Krishna Basin. The necessity to have more insights into sedimentation aspects of the project is the need of the hour as the rate of sedimentation is more than the designed rate .If the problem is left unattended to without keeping efforts to fix the issue, the situation will become still worse and performance of reservoir will be poor and life gets reduced.To arrest erosion and hence siltation, some catchment area treatment works like afforestation, assisted natural regeneration works, Grazing of land, Forest infrastructure development works and some engineering measures such as Check dams, Bench terracing works need be undertaken .This paper aims to present estimated sediment production in all watersheds of the catchment area, identifying watersheds contributing more erosion. The study is carried out as a collaborative work with the field engineers of Tungabhadra Project, RS, GIS experts. It is carried out to propose mitigating measures to reduce sedimentation of Project. The estimated sedimentation parameters are found close to the reality.

Keywords: Reservoir, Sedimentation, Krishna Basin, RS, GIS, Siltation.

ADVANCED SPECTRAL CLASSIFICATION METHODS FOR HYPERSPECTRAL DATA - A CONCISE REVIEW

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ABSTRACT

Classification of Hyperspectral image requires certain special algorithms that can handle its huge volume, redundancy and reduce the processing time. Various factors like atmospheric correction method, spectral response of the target material, parameters used for classification, training sample size etc. play an important role in obtaining an accurate classified map. The spatial resolution of the hyperspectral data also plays a vital role in imparting mixed pixels in the data and thus bringing challenges like data redundancy and ambiguity in processing and classifying the datasets. Many advanced classification methods have come up that can aid in overcoming these limitations and accurately classifying the voluminous hyperspectral datasets. Few per pixel classification methods like Support Vector Machines, Angle Mappers, Random Forests, Artificial neural networks and sub pixel unmixing classifiers, Deep learning, morphological profiles etc. are discussed along with few other techniques.

Keywords: Hyperspectral data classifications, per pixel methods, sub pixel methods, ensemble classifiers, deep learning meth.

**RECONNOITERING HYDROCHEMICAL BACKGROUND USING LOG-
PROBABILITY DISTRIBUTION IN A CHANNEL ISLAND, ANDHRA
PRADESH**

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ABSTRACT

It is hypothesized that hydrochemical parameter can be employed to reconnoitre its background value in any hydrogeological set up. This hypothesis was tested using log-probability distribution on a Channel Island of Andhra Pradesh. From empirical data collected during pre-monsoon season, it was found that the cumulative probability distribution of hydrochemical parameter did not form a linear distribution. This parameter was considered to be affected by more than one process. For such a case, each process was differentiated by the intersection point(s) of two neighboring linear population (s) as well the first segment of the intersection point had been assumed to be the hydrochemical background value. The background values of EC, Na⁺, K⁺, Ca²⁺, Mg²⁺, Cl⁻, HCO₃⁻, CO₃⁻, SO₄²⁻, NO₃⁻ and F⁻ in the study area were estimated and their ranges were from 652 to 2000 μ S/cm, 31 to 95, 2 to 15, 26 to 119, 10 to 56, 52 to 260, 108 to 296, 12 to 40, 3 to 60, 0.9 to 53.0 and 0.12 to 0.20 mg/l, respectively. This information helps to demarcate the occurrence of pollutant and assign background level for the mass transport modeling.

Keywords: Groundwater, Major ions, Probability distribution, Intersection, Hydrochemical background, Channel Island, Andhra Pradesh.

**STEREO MAPPING OF MINING LAND WHICH IS INTERRUPTING BETWEEN
NEW CORRIDOR MAPPING OF NATIONAL HIGHWAY****Jafar Parvez**M-Tech, Karnataka State remote Sensing Application Centre (KSRSAC), Bangalore,
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The recent development and proliferation of unmanned aerial vehicle (UAV) has made it possible to examine environmental processes and changes occurring at spatial and temporal scales that would be very difficult or impossible to detect using conventional remote sensing platforms. As per this review article highlights new developments in UAV-based remote sensing it focus mainly on small UAV whose weight is less than 25kg. Because this type of UAV is generally less expensive and more versatile than larger systems. The use of small UAVs for civil, commercial, and scientific applications is expected to expand considerably in the future. To highlight different environmental applications, we provide an overview of recent progress in remote sensing with small UAVs such as photogrammetry, multispectral and hyperspectral imaging, thermal, and synthetic aperture radar and LiDAR. We also need to do literature review and research to identify some key research challenges, including limitations of the current generation of platforms and sensors, and the development of optimal methodologies for processing and analysis. While much of the potential of small UAVs for remote sensing remains to be realized, it is likely that the next few years will see such systems being used to provide data for an ever-increasing range of environmental applications. Unmanned Aerial Vehicle (UAV) platforms are nowadays a valuable source of data for inspection, surveillance, mapping and 3D modeling issues. Here Drone had flight from Mangalapuram to Balarampuram about 45km which is known as corridor mapping of National Highway by Kerala government. Around 14.6Km chainage Venkode village a Mining Land arise which is interrupting between the highway. So, in this project we are supposed to do stereo mapping of that mining land using UAV images and such that we will extract all the feature in it or connecting to it like paved road, unpaved road, buildings, ponds and brakelines. Digital Terrain Model (DTM) points play a very important role in generating contours and TIN with respective to its elevation.

Keywords: Photogrammetry, Drone, Unmanned Aerial Vehicle (UAV), Stereo Mapping, Mining Land, National Highway.

IMPACTS OF SOLID WASTE DUMP SITE ON GROUND WATER QUALITY (LEACHATE)

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ABSTRACT

Land filling is the preferred method of Municipal Solid Waste (MSW) disposal. However, poorly designed land fill leads to contamination of ground water, soil and air. Leachate is generated in a landfill as a consequence of the contact of water with solid waste. Leachate tend to migrate in surrounding soil may result in contamination of underlying ground water and soil. The peri-urban areas face severe problem of ground water contamination from MSW dumpsites. Owing to the importance of the topic, the present work has been carried near Kapuluppada dumpsite in Visakhapatnam, Andhra Pradesh. Visakhapatnam is the largest city in Andhra Pradesh with a population of 20 lakhs. An area of 100 acres at Kapuluppada village was selected as the dumpsite in 2004 for Landfilling located 15 Km away from the city. Visakhapatnam city generates 980 tonnes of garbage every day. The landfill site is located at a distance of 15 km to the west of the city, spread across 100 acres of land having an elevation of 45 m. The leachate from the dump is likely to contaminate the ground water table. In order to examine whether the ground water is contaminated in the nearby areas, the present study has been taken up in the vicinity. The water quality was tested in six stations, the parameters studied were: pH, Total Dissolved Solids, Chlorides, Total Hardness, nitrates, sulphates, phenols, cyanide, lead, Iron, zinc, nickel, copper, chromium and cadmium. The values of the parameters were expressed as mg/l except where specifically stated. Standard methods were used for analysis of various parameters. The results of the present study revealed that the total dissolved solids, total hardness and chlorides were in very concentrations. These parameters, though not directly affect the human health, indicate the increase of ions in the ground water through leachate contamination. The Kapuluppada dumpsite is a landfill and not scientifically designed. Hence, to prevent future contamination of heavy metals and organic and inorganic materials, few following recommendations are made in this paper.

Keywords: Dumpsite, MSW, Parameters.

SPATIAL DISTRIBUTION FOR GREEN AND BLUE WATER USE OF GROWING CROPS IN KINNERASANI CATCHMENT AND COMMAND AREA

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ABSTRACT

This study provides the green and blue water use. Blue water use is the amount of productively or unproductively evapotranspiring water originating from river segments, aquifers, lakes and reservoirs. Green water use refers to water from rain that enters the soil root zone and is transpired by the plants directly. Green water use was higher for *kharif* crops. The blue water use (m^3/ha) and the green water use (m^3/ha) were calculated for the crops grown in Kinnerasani catchment and command area for a period of 11 years (2003 -2013). From these 11 years dry and wet years were pointed and calculated water use for these both years. Among the *kharif* crops, paddy utilized rainwater most efficiently with maximum green water use of 581.3 mm in Tekulapalii mandal which is in catchment. Blue water use was varied from 39.3 to 113.5 mm for paddy in the area. Blue water use was zero for maize, red gram, cotton, greengram, chillies and vegetables in Palvancha, Gundala and Tekulapalli except in Burgampadumandal. For most of the crops, green water accounts for more than two thirds of the consumptive water use. Blue and green water use of different crops grown in Kinnerasani basin have been computed separately for the dry year 2009 also in order to study the effect of deficit rainfall on the consumptive use of crop. Green water use was high for all the crops in the dry year.

Keywords: Evapotranspiration, Consumptive use, Blue water use, Green water use.

FEASIBILITY OF ENERGY PRODUCTION FROM BIO-DEGRADABLE WASTE

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ABSTRACT

Municipal Solid Waste management constitutes a serious problem in many world cities. Most cities do not collect all the wastes generated and of the wastes collected, only a fraction receives a proper disposal. The insufficient collection and inappropriate disposal of solid wastes represent a source of water, land and air pollution and poses risks to human health and the environment. Over the next several decades globalization, rapid urbanization and economic growth in the developing world tend to further deteriorate this situation. In early days people were not facing such big problems of disposals because of availability of space and natural materials but now a day's congestion in cities and use of non-biodegradable materials in our day life create many problems. So, proper management of solid waste has become unavoidable. The quantity of MSW generated in India is increasing rapidly due to increasing population and change in lifestyles. Land is scarce and public health and environment resources are precious. In Kadapa District according to 2011 census 206.21 M. Ts of solid waste is being generated. These waste is collected and dumped resulting wastage of precious lands hence a method of recycling of those waste is to be employed. Hence a part of solid waste is such as vegetable waste and fruit waste is recycled to create biogas. This project deals with various topics related with solid waste such as its quantity, performance of solid waste management practiced in Kadapa Municipal Corporation and also to recycle the vegetable waste and fruit waste for generation of bio gas by biomethanation by the process of anaerobic digestion. This methane gas that has been produced can be used as a bio fuel in generation of electricity or to use it as a fuel which in turn can save the fossil fuels that has been in a declination state in today's world.

Keywords: Municipal Solid Waste, Projections, Paper, Plastic, Bio-degradable, e-waste, Biomethanation and Anaerobic Digestion.

**ANALYSIS ON GREEN BUILDING
(Case study: GRIET, Hyderabad, India)
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ABSTRACT

The idea of green building has made an enormous significance in a creating nation like INDIA. The hypothesis suggests of minimizing the wastage and the expense of development. With expansion in urbanization the normal assets were utilized as a part of ill-advised ways which drives us towards the usage of green structures and the idea helps in making ideal utilization of regular assets. The green building is an eco-friendly segment, since it depends on the essential tenet - "REDUCE, REUSE and RECYCLE". In the long run, the green structures manage the cost of an abnormal state of financial and building execution, which drives us to the advancement of future era. The point of a green building configuration is to minimize the interest on non-renewable assets, amplify the use effectiveness of these assets when being used and boost reduce, reusing and usage of renewable assets. It amplifies the utilization of effective building materials and development hones; enhances the utilization of local sources and sinks by bio-climatic design; utilizes least vitality to power itself; utilizes productive gear to meet its lighting, aerating; cooling and different needs; boosts the utilization of renewable wellsprings of vitality; uses proficient waste and water administration hones; gives agreeable and hygienic indoor working conditions. With regards to the expression "Green Buildings," we may simply characterize it as an extraordinary sort of working without knowing the subtle elements and foundation behind it. Really, Green Buildings comprise of a wide range of sorts of material and gear. Their appearances additionally vary from other typical structures. Green structures regularly incorporate measures to lessen vitality use. To expand the productivity of the building envelope (boundary amongst molded and unconditioned space), they may utilize high-proficiency windows and protection in walls, roofs, and floors.

Keywords: Green Building; Resource efficiency; Energy efficiency; Waste reduction; Passive design; GBC; GRIET

ESTIMATION OF RESIDENTIAL BUILDING USING LOW COST MATERIALS

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ABSTRACT

Affordable housing mainly deals with effective costing and following of sustainable building techniques which helps in reducing the cost of construction without sacrificing the strength, durability and performance. The plan of 2 BHK have been considered for Residential building. The total residential building is divided into two parts i.e., Structural and non Structural. As the cost of cement takes major part of total building cost, so we adopted fly ash by replacing cement with percentages of 30%, 40%, 50% for structural elements. The strength tests such as compressive, split test, flexural test have been calculated. From the test results, 40% replacement of fly ash gave required strength for single storey building. For Non- structural elements, the low cost materials such as concrete frames, hollow concrete blocks etc were adopted .This project recommends plan and sustainable materials adopted for a single storied building. After assigning low cost materials for structural and Non- structural elements of building, the quantity and cost is estimated. The overall cost is reduced up to 30% compared to conventional building cost.

Keywords: Sustainable building techniques, Building material, Estimation.

NEED OF NEW WATER GOVERNANCE STRATEGY IN CHHATTISGARH STATE: A ROBUST AND SUSTAINABLE APPROACH TO SOLVING WATER RELATED ISSUES IN 21ST CENTURY

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ABSTRACT

Chhattisgarh state is one of the rapidly growing state of India in terms of socio-economic development. A state specific action plan (SSAP) for water sector has been prepared under the guidelines of national water mission (NWM)to assess the impact of climate change on water sector of Chhattisgarh state. As the water is state subject, keeping in view, constitutional provisions, some ideas and suggestions have been put up under consideration to review and restructuring the existing water laws, rights, ownership issues and state water resource policy in the Chhattisgarh state. In this context, a robust and sustainable approach has been taken to review and restructuring existing water governance. Suggested new water governance strategy is based on international, national and regional priorities and future obligations which would be beneficial for sustainable development and integrated water security plan. The suggested new water governance strategy is derived from socio-economic survey and scientific study of all the influencing factor of water resources and its expectable outcomes.

Keywords: State specifics action plan (SSAP), National Water Mission (NWM), Water Governance.

ELECTRICAL RESISTIVITY TOMOGRAPHY TO PREVENT LAND SLIDE IN A OPEN CAST LIGNITE MINE

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ABSTRACT

Land slide in open cast mines is major environmental issues. It not only incurs heavy economic losses resulting as a cost of the removal of debris to facilitate mining operation but some time loss of human lives. This is mainly due to movement of groundwater. The only solution to this problem lies in the delineation of potential groundwater zones and their dewatering by pumping out groundwater from these zones away from the mine. Electrical Resistivity Tomography is an advanced technique of electrical resistivity method which provides 2D surface images. These images are used to identify groundwater potential zones even in complex hydrogeological setup for different purposes such as groundwater exploration, selection of suitable sites for waste disposal, identification of geothermal reservoirs, monitoring of leakages from industrial units etc. Tadkeshwar lignite mine is an opencast mine operated by Gujarat Mineral Development Corporation (GMDC) Ltd. Land slide in this mine is a recurring phenomenon which is attributed to the groundwater movement. Purpose of the present work is to demonstrate the efficacy of Electrical Resistivity Tomography in delineation of groundwater bearing zones for the purpose of dewatering to secure safe mining with the help of field example of Tadkeshwar lignite mine. For this purpose electrical resistivity tomography has been carried out at several locations which have revealed the presence of several potential zones of ground water in the mine lease area in which open cast mining will be extended in the near future. This work can serve as a role model to solve the problem of land slide in similar problematic mines.

Keywords: Electrical Resistivity Tomography, Land slide, Tadkeshwar lignite mine, Dewatering.

OPTIMAL WATER MANAGEMENT MODELLING FOR WATER SUPPLY AND HYDROPOWER

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ABSTRACT

This paper presents the reservoir operation study using simulation model for the reservoir operation under two operational strategies for the multipurpose single reservoir project namely, Sardar Sarovar Project, Gujarat. The monthly inflows data from year 1948 to 2017 have been analysed. Strategy one considers the releases for riparian rights at priority then the releases for water supply and then after surplus water be diverted for hydropower generation. While, strategy 2 considers the riparian rights at priority then water supply releases into the canal and then after firm power releases for firm power generation and consequently surplus water be diverted for hydropower generation. The performance indicator parameters evaluated over the operational horizon/period of simulation are: Reliability to fulfill the water supply demand, Annual Hydropower energy produced Firm power.

The results are obtained for strategy 1 considering historical monthly inflows data series of 70 years i.e. 1948-2017 and monthly inflows data series of 15 years i.e. 2002-2017. Strategy 2 is evaluated for historical monthly data series of 15 years i.e. 2002-2017. The trade-offs have been generated between total energy produced through riverbed power house and water supply reliabilities for various values of firm power releases for strategy 2, and the optimal value of the firm power releases have been obtained for strategy 2. It is found that the firm power produced through riverbed power house increases significantly under strategy 2 in comparison to strategy 1, without compromising the water supply reliability. The model so developed for these strategies and their results under each strategy will be useful for the project authorities for planning and decision making process for releases for various purposes.

Keywords: Simulation model, canal, Hydropower energy.

**DESIGN OF SEWAGE TREATMENT PLANT (STP) FOR ANANTHAPURAMU
GREATER MUNICIPALITY, ANDHRA PRADESH, INDIA: A CASE STUDY.****¹G.Vannur Swamy and ²Meda Kalyan Kumar**^{1,2} Department of Chemical Engineering
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kalyankumarmeda.chemengg@jntua.ac.in**ABSTRACT**

Ananthapuramu, is a developing city in the 'Rayalaseema' region of Andhra Pradesh, South India. Ananthapuramu Municipal Corporation is facing great problem for sewage treatment and disposal because of increased generation of domestic sewage due to the steady increase in city population over the years. Unfortunately till date, there is no sewage treatment plant. There is an urgent need to design a sewage treatment plant with sufficient capacity to treat the generated sewage. The ultimate goal of any waste-water treatment facility is protection of the environment in a manner commensurate with public health and socio-economic concerns. Treatment of sludge and disposal of sludge is another great challenge. Sewage/wastewater treatment operations are done by physico-chemical and biological methods in order to reuse its water and organic content. The sewage treatment design plant is designed in accordance with Indian Standards (IS) codes. The paper focuses on the design of sewage treatment plant considering the sewage generation in the city of Ananthapuramu. The sewage generation rate was estimated at 100 MLD considering the population of Ananthapuramu city for the next 30 years. The sewage treatment consists of various components viz. screening, grit chamber, primary sedimentation tank, biological reactor, secondary clarifier, activated sludge tank, and drying beds. The sewage treatment plant solves the problem of sewage disposal and the treated effluent yields water suitable for irrigation saving the ground water and sludge useful for increasing the soil fertility.

Keywords: Sewage, domestic waste water, Ananthapuramu, treatment, sludge, groundwater.

GEOELECTRICAL CHARACTERIZATION OF GROUNDWATER SALINIZATION IN PARTS OF COASTAL AQUIFERS, MAHARASHTRA**Khan Tahama¹, S.K.G. Krishnamacharyulu¹ and Gautam Gupta²**¹School of Earth Sciences, SRTM University, Nanded- 431 606, Maharashtra²Indian Institute of Geomagnetism, New Panvel (W), Navi Mumbai- 410 218, Maharashtra

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ABSTRACT

The study area encompasses the western coastal parts of Redi-Vengurla-Kudal-Malvan in Sindhudurg district, Maharashtra, bounded by coordinates Latitudes 15.7° to 16.15° and Longitudes 73.50° to 73.8°. A total of 84 vertical electrical soundings (VES) points using Schlumberger electrode arrangement with a maximum separation AB of 200 m is considered in this study. The present geophysical study is carried out to understand the structural trends, groundwater contamination via saline water ingress in the coastal aquifers and to delineate potential groundwater zones. One-dimensional inversion results reveal that the top layer is comprised of laterites followed by a mixture of clay/clayey sand and granulites/fractured granulites as basement rocks. Several NNE-SSW and NW-SE oriented major lineaments and its criss-crosses have been reported in this region and the source of groundwater appears to be contained in weathered/semi-weathered layer of laterite/clayey sand at depth of 10-12 m from the surface. Geoelectric parameters for interpretation included curve type, longitudinal conductance, transverse resistance and coefficient of electrical anisotropy. The electrical anisotropy varied from 1 to 3.95 in the study area. Aquifer protection capacity suggests that only 15% of the study area is rated as good to excellent. High S values (> 2S) have been observed at a few coastal sites, indicative of saline water ingress. These are expected to give the spatial extent of saline water ingress leading to contamination of coastal aquifers. Further, the water quality from few dug wells from the coastal region is validated with the geophysical results. Geoelectric modeling results over four E-W and four N-S profiles suggest widespread saline water ingress, at least up to 4 km inland. The results demonstrate that these parameters give better understanding of subsurface particularly for saline- freshwater contamination.

Keywords: Geo electrical, Aquifers, Salinization, groundwater,

GROUNDWATER PROSPECTS AT CRITICAL AREAS: AN EXAMPLE OF KOLANS RIVER WATERSHED, DIST. BHOPAL, M.P.

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ABSTRACT

The Deccan traps occupy an area of about 500 000 km² including several agro-climatic and hydrogeological regions. During the last two decades digging and drilling of irrigational wells was encouraged in the basaltic terrain. These work is helpful for providing irrigation for up three crops per year resulted in over-exploitation of the resource in some sub-basin. Sustainable groundwater supplies in the Basaltic terrain require lineament analyses much useful technique for proper sitting of boreholes. This study was carried out to illustrate the application and importance of Remote Sensing techniques for efficient groundwater resource exploration and management. The study shows the use of LANDSAT 7 ETM+ imagery, digital elevations models (DEMs) and analyses of lineaments in Kolans River Watershed, District Bhopal, M.P. Geologically it is mainly covered by deccan traps. Digital image processing techniques involving linear / edge enhancements and directional filtering were applied on the image to enhance the edges of the linear features using Erdas imagine. The enhanced image, normalized difference vegetation index (NDVI) image and hill shaded relief were visually interpreted through GIS overlay operations for lineaments extraction through on-screen digitizing using ArcGIS 10.1. The extracted lineaments were statistically analyzed to determine their lengths, densities and intersections. The results obtained were used to generate lineament density, lineament intersection map and rose diagram. The lineament / fracture analyses indicated that the area has numerous long and short fractures whose structural trends are mainly in the N-S, NE-SW and E-W directions. The zones of high lineament density are feasible zones for groundwater prospecting in the study area. The study has led to the delineation of areas where groundwater occurrences is most promising for sustainable supply and hence, further geophysical survey can be concentrated. In order to mitigate this over-exploitation, efforts were made on the positive side i.e. recharge augmentation.

Key words: Groundwater pattern mapping, lineament trend distribution, Landsat 7 ETM, NDVI.

CHANGES IN LAND USE LAND COVER USING GEOSPATIAL TECHNIQUES: A CASE STUDY OF KOYNA RIVER BASIN, MAHARASHTRA, INDIA

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ABSTRACT

The Earth's land cover characteristics and its use are key variables in global change. Over the last few decades, there has been a significant change on land use and land cover (LULC) across the globe due to the climatic changes and over demand of the growing inhabitants. Now a days remote sensing data, along with increased resolution from satellite platforms, makes these technologies appear poised to make better impact on land resource management initiatives involved in monitoring LULC mapping and change detection at varying spatial ranges. As the demand for quantity and quality of information and technology continues to improve, remote sensing is becoming more significant for the future. In this study, it is aimed to explore the temporal and spatial characteristics of Koyna river basin by using RS integrated with GIS. An attempt has been made to detect land use and land cover changes of Koyna river basin of 1985 and 1995 by using Landsat 5 satellite images of USGS. It is found that in the study area there are two times increase in the built-up area. The cropland and vegetation increased due to enhancement of water bodies. However, shrubland and barren land decreased in the same duration.

Keywords: Land use, land cover, Koyna river basin, Landsat 5, remote sensing.

HYDROGEOCHEMICAL STUDIES IN AND AROUND KISTAPUR AREA, MEDCHAL DISTRICT TELANGANA

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ABSTRACT

Access to safe drinking water remains an urgent necessity in the world as it is directly related to health. Groundwater account for more than 80% of the rural domestic water supply in India. Assessment of suitability of groundwater for domestic and irrigation purposes was carried out in and around kistapur area region which is located location kistapur (vi) Medchal is a northern suburb of Hyderabad, India. The study area covers an area of 20 km. Groundwater is the major source for domestic and agricultural activities in this area. The study emphasized on groundwater for physical and chemical characteristics, to assess the potability of samples collected from one surface and seven Bore wells during pre-monsoon period for the year 2018. The analytical parameters of data were compared with the standard guidelines recommended by the (WHO, 1984) and (I.S.I). The hydrochemistry of the groundwater of the study area indicates the calcium and magnesium exceeds the limits.

Keywords: Hydrgeochemistry, Dissolved Oxygen, BOD, COD.

GROUNDWATER DEVELOPMENT THROUGH DRAINAGE LINE TREATMENTS IN VIDARBHA REGION OF MAHARASHTRA

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Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola (M.S.)

ABSTRACT

Availability and storage of water in reservoirs and lakes depends ultimately on yearly rainfall. Natural conservation of water and efficient use of this natural storage and at the same time making arrangements for additional recharge of groundwater aquifer by one way or other, to replenish the used groundwater becomes our responsibility. Thus on drainage line networks the rainwater harvesting is possible by constructing suitable structures. The project CRP on Water was initiated at Kajaleshwar - Warkhed watershed which is situated in Barshitakli taluka of Akola district in Maharashtra state between 20°13'59"N latitude and 77° 13'23" E longitude and at an altitude of 337m above M.S.L. with an average annual rainfall of 815mm. The work of nala widening and deepening has been done under this project and the existing CNB was repaired. The surrounding 35 wells along the vicinity of the widened and deepened nala were monitored for groundwater levels. Based on the observed data it was inferred that the average groundwater levels in the 35 wells during the year 2017 was increased by 1.12m as compared to the groundwater levels of the year 2015. This is due to the storage of rainwater in the widened and deepened nala for longer duration. It was also possible to utilize the recharged water for protective irrigations to different crops.

Keywords: Crop, CNB, Groundwater, Recharge.

IMPACT OF CONSERVATION AGRICULTURE TREATMENTS ON RUNOFF AND SOIL LOSS IN SOYBEAN CROP UNDER RAINFED CONDITION

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ABSTRACT

Conservation agriculture is normally based on soil tillage as the main operation. Mechanization of soil tillage, allowing higher working depths and speeds and the use of certain implements like ploughs, disk harrows and rotary cultivators have particularly detrimental effects on soil structure. Excessive tillage of agricultural soils may result in short term increases in fertility, but will degrade soils in the medium term. Soil erosion resulting from soil tillage has forced us to look for alternatives and to reverse the process of soil degradation. The logical approach to this has been to reduce tillage. The experiment on Conservation Agriculture was undertaken during 2016-17 at AICRP for Dryland Agriculture, Dr. PDKV, Akola. The results obtained are presented in this paper. The highest total runoff of 36.29 mm was observed in conventional tillage treatment (T1) and lowest total runoff of 22.62mm was observed in zero tillage with herbicide treatment (T3). The total runoff of 29.68mm was observed in reduced tillage with herbicides treatment (T2). Increase in runoff was observed to be 60.43% in conventional tillage treatment (T1) over zero tillage with herbicide treatment (T3). Also the treatment zero tillage with herbicide (T3) has less soil loss (1.18tons ha⁻¹) as compared to conventional tillage treatment (T1) and reduced tillage with herbicide treatment (T2).

Keywords: Conservation, tillage, treatment, soil loss.

HYDROLOGICAL WATER BALANCE ASSESSMENT OF A MICRO-CATCHMENT USING PHYSICALLY BASED MODEL

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ABSTRACT

Water balance techniques are a means of solution of important theoretical and practical hydrological problems. On the basis of the water balance approach it is possible to make a quantitative evaluation of water resources and their change under the influence of man's activities. Knowledge of the water balance assists the prediction of the consequences of artificial changes in the regime of streams, lakes, and ground-water basins. An understanding of the water balance is also extremely important for studies of the hydrological cycle. With water balance data it is possible to compare individual sources of water in a system, over different periods of time, and to establish the degree of their effect on variations in the water regime. Due to its multiple benefits and the problems created by its excesses, shortages and quality deterioration, water as a resource requires special attention. For this purpose every piece of land should be treated as a micro-catchment and *in-situ* rainwater conservation techniques should be adopted and actual assessment in terms of water balance has to be done for accurate planning. Hydrological models are useful tools for quantification of water balance components. MIKE SHE model set up was developed and used for simulation of hydrological components in treated as well as untreated micro-catchment at the experimental field of AICRP for Dryland Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola in Vidarbha region of Maharashtra state. The results of the hydrological water balance of treated and untreated catchment are presented here. During 2017, the annual rainfall was 518mm out of which 49mm (9.46%) surface runoff + losses were occurred in untreated micro-catchment. The evapotranspiration losses of 303mm and 276mm were occurred in treated and untreated micro-catchments respectively. Around 180mm and 162mm recharge was observed in treated and untreated micro-catchments.

Keywords: micro-catchment, model, water balance.

CROP RESIDUE CUTTING MECHANISMS FOR DIRECT DRILLING IN AGRICULTURE CONSERVATION

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ABSTRACT

Conservation Agriculture involves practices such as minimum or zero mechanical disturbance, crop residues retention and permanent organic soil cover. The major problem in direct drilling under no-tillage condition is the high amount of residues of previous crop, which hinder operation of no-till machine. The crop residue cutting devices were developed and evaluated for rice crop residue cutting ability in the soil bin. The crop residue cutting mechanisms were operated on a wide range of straw densities from 3000 to 5000 kg/ha at forward speed of carriage 2.5 km/h and at rotational speed of straw cutting mechanisms of 150 to 250 rpm and speed ratios from 5.20 to 8.67 and evaluated their performance in the soil bin laboratory of Central Institute of Agricultural Engineering, Bhopal. The relative effect of the variables of speed ratio, pair of press wheels, straw density and type of disc blades on the responses of horizontal force (F_h), vertical force (F_v), power consumption and straw cutting percentage were studied. The horizontal force (F_h) requirement of toothed blade was observed to be higher by 19% than that for the plain blade disc at all speed ratios and straw density levels. On an average 34% higher vertical force (F_v) was found for straw cutting by toothed blade disc than that for the plain blade. The power requirement of plain blade with a pair of twin press wheel assembly was estimated to be 192.66, 280.23 and 356.33 W at 3000, 4000 and 5000 kg/ha straw density, respectively at 5.20 speed ratio, whereas it was found to be 262.82, 396.00 and 585.83 W for toothed blade disc for the same straw density and speed ratio. The quantity of straw cut with plain blade was 100% for all straw densities and speed ratio however, it was found to be 91.00, 90.33 and 92.00% for toothed blade at 3000, 4000 and 5000 kg/ha straw density level, respectively. The developed crop residue cutting mechanism performed better under no-till conditions and recommended for no-till sowing under heavy crop residue conditions.

Keywords: Conservation agriculture, no-till, crop residue and straw cutting mechanism

BIO-CHAR PRODUCTION FROM AGRICULTURAL CROP RESIDUE USING HORIZONTAL REACTOR

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ABSTRACT

A reactor was developed for bio-char production from agricultural crop residue of pigeon-pea stalks. The horizontally oriented reactor of 1.5 kg capacity was developed in Central Institute of Agricultural Engineering, Bhopal. The study was conducted at three levels of predefined temperature of 450, 500 and 550°C and residual time duration of 60, 120 and 180 min for optimization of temperature for obtaining the better quality of bio-char. The average recovery of bio-char prepared from pigeon-pea stalk was found to be 40.30%. Total carbon (TC), total organic carbon (TOC), and total inorganic carbon (TIC) of pigeon-pea stalks of sized $\emptyset \leq 5$ mm (D₁), $\emptyset = 5$ to 7 mm (D₂) and $\emptyset \geq 7$ mm (D₃) was found in the range of 45.1 to 45.8, 41.6 to 42.3 and 2.6 to 4.1%, respectively. Similarly, these value were determined at three temperature levels of 450, 500 and 550°C and found to be 68, 67.03 and 3.5%; 81.51, 69.11 and 6.5%; 68.4, 65.18% and 6.7%, respectively. Fixed carbon in bio-char was found to be 80% higher than that of its stalk and around 40% of total carbon was found higher in bio-char than that of the pigeon pea stalks. The pH value of bio-char prepared at 450, 500 and 550°C was found in the range of 6.1 to 6.8, 7.7- to 8.5 and 7.7 to 9.5, respectively.

Keywords: Pigeon pea stalks, bio-char, fixed carbon and horizontal reactor.

BIO-ENERGY UTILIZATION THROUGH THERMO EFFICIENT BIOMASS COOK STOVE FOR RURAL HOUSEHOLDS

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ABSTRACT

The thermo efficient biomass cook stove was designed using scientific principles, to assist better combustion and heat transfer, for improving efficiency performance. The goal of a development of a thermo efficient biomass cook stove was to improve upon the shortcomings of the existing improved cook stoves and traditional stoves, while still ensuring lower cost and ease of use. The performance of the cook stove was evaluated viz., fuel burning rate, power output rating, thermal efficiency and carbon monoxide concentration in laboratory and actual cooking test at user's site. The thermal efficiency of the thermo efficient biomass cook stove was found to be 31.34%, which was 20.56% higher than traditional biomass mud cook stove. It saved 39% cooking time over a traditional biomass cook stove. The CO concentration in flue gas emit by the thermo efficient cook stove was found to be 2.97g/MJ, whereas, the CO concentration was found to be 73.15% higher in traditional biomass mud stove cook stove than that of the thermo efficient cook stove. The cook stove is a relatively clean burning device, fuel efficient and easy to operate. User friendly and low cost thermo efficient biomass cook stove is recommended for cooking in rural households using cotton stalk as fuel. From the study, it reveals that use of thermo efficient cook stove would be perspective for rural households over the conventional cook stove.

Keywords: Crop residue, cotton stalk, thermo-efficient and thermal efficiency.

STUDIES ON BIOGAS PRODUCTION FROM SOYBEAN AND COTTON STRAWS SUBSTRATE

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ABSTRACT

Studies on biogas production from agricultural crop residue inoculated with cattle dung was undertaken for utilization of biomass as bio-energy generation. The six plastic bottles i.e. digesters of 2 liter capacity was arranged in such a way that the first digester contained ratio of 25:75 (Soybean straw : Cattle dung), the second digester contained ratio of 50:50, third bottle contained ratio of 75:25 for soybean straw. Similarly, fourth digester contained ratio of 25:75, fifth digester contained ratio of 50:50, sixth digester contained ratio of 75:25 substrate of cotton. Seventh digester content only cattle dung. 8th and 9th digester content soybean and cotton straws alone, respectively. In proximate analysis of soybean straw the average moisture content, volatile matter, ash content and fixed carbon and was found to be 6.87, 71.13, 5.44 and 16.56 %, respectively and it was found to be 7.43, 67.60, 4.50 and 20.47 %, respectively in cotton straw. The calorific value of soybean and cotton straw was found to be 3694.93 and 3342.56 kcal/kg, respectively. The optimum biogas production of 40,320 ml was observed in the proportion of substrate of soybean straw mixed with cattle dung (25:75 ratio) and it was 32,445 ml while using cotton straw with the same ratio of substrate. The highest percentage of methane was observed to be 66.17% using soybean straw mixed with cattle dung (25:75 ratio) and it was found to be 65.05% in case of cotton straw with the same ratio of substrate.

Keywords: Bio-Methanogenesis, anaerobic digestion and crop residue.

A PRELIMINARY STUDY OF WATER DISTRIBUTION SYSTEM IN ADHAINAGAR, HYDERABAD

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ABSTRACT

Under guidance of Hyderabad Metropolitan Water Supply and Sewarege Board, there are 21 divisions and 10 sections are working to supply water to the different regions in Hyderabad. In Audhah Nagar, pumping system is used to supply the water to the elevated region and as well as the overhead tank which further supply water to the Audhah nagar colony. The layout of the water distribution system is tree system. Sluice valves and air valves is important in supplying water through pipes. Hence it is complicated to supply water unlike the planned townships and residential areas which has grid system and more feasible in its way. Elevated reservoirs are constructed using prestressed R.C.C. Water distribution network uses ductile iron and cast iron pipe material. Pipe joints such as spigot and socket joint are used for joints. Before the water reaches the consumer, the water goes various treatment methods to make the water safe for consumption. Even though after all the treatments once the water reaches the tank, chlorination has done to kill any bacteria and other microorganisms. The water is treated with Gaseous chlorination before distributing to households.

Keywords: water distribution system, tree system, sluice valves and air valves, spigot and socket joint, elevated reservoirs.

SOLAR ENERGY OPERATED CABINET DRYER FOR DRYING TOMATO SLICES**A. K. Kamble^{1*}, Ramesh L. Dombale² and M. B. Nagdeve³**

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ABSTRACT

The solar cabinet dryer coupled with heat storage system has been developed and evaluated its performance for drying tomato slices. The loading capacity of the dryer was about 10 kg of tomato slices per batch. The drying characteristics of the dryer were compared with open sun drying method. The temperature developed in the dryer was recorded at three positions viz., lower, middle and upper tray and it was observed in the range 34.2 to 52.6, 33.5 to 49.7 and 33.2 to 51.1°C, respectively. Drying time for drying tomato slices from initial moisture content of 94 to 6% (wb) was observed to be 12 h in solar dryer whereas, 15 h was observed in the open sun drying. The benefit cost ratio and payback period for drying of tomato slices in solar dryer worked out to be 1.36 and 4 month 24 days, respectively.

Keywords: Solar cabinet dryer, heat storage system, flat plate solar air heater, natural convection.

ENERGY AUDIT OF COTTON CROP PRODUCTION SYSTEM**^{1*}A.K. Kamble and ²M. B. Nagdeve**

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ABSTRACT

The study on energy audit of cotton crop production was undertaken to estimate energy input and output involved in cotton crop production in cotton growing areas of Vidarbha region (M.S.). Three types of energy were considered for quantification of requirement of energy for performing various agricultural operations in cotton viz., mechanical energy used by mechanical devices in field operation, animal energy and human energy. The consumption of fuel was collected for the various field operations. The total estimated energy was determined in MJ/ha by multiplying with standard energy equivalent of the particular parameters. The important farm operations like land preparation, sowing, intercultural operations, irrigation, fertilizer application, picking etc. were considered in the cotton crop production. Similarly, human energy used in the field operations was determined by considering the number of labours requirement for field operations. Field operation wise and source wise energy input utilization for cotton crop production and output energy from cotton was workout. Total energy input was workout to be 12577.76 MJ/ha and output energy was workout to be 17275 MJ/ha and net energy was workout to be 4697.24 MJ/ha. The highest energy consumption of 7253 MJ/ha was observed for fertilizer application followed by ploughing (1562 MJ/ha), cotton stalk uprooting (893.281562 MJ/ha), harrowing (703.881562 MJ/ha) and picking (628.321562 MJ/ha). The energy output-input ratio, specific energy, energy productivity and net energy for cotton crop production was worked out to be 1.37, 8.59 MJ/kg, 0.12 kg/MJ and 4697.24 MJ/ha, respectively.

Keywords: Energy audit, crop cultivation, energy productivity and net energy.

IMPACT OF MUNICIPAL SOLID WASTE DISPOSAL ON SURFACE WATER QUALITY IN AND AROUND THE MUNICIPAL DUMPYARD: A STUDY IN SILCHAR, ASSAM

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ABSTRACT

Silchar is the headquarter of Cachar, one of the three districts of Barak Valley, Assam. River Barak is the major river flowing through the town of Silchar. The town has a population of 172,830 (Census report, 2011). The solid waste generated and collected from the town is dumped in the dump yard located in Meherpur at distance of about 2.0 kms away from the Municipal town boundary. The total area of the dump yard is 9.22 hectares and is demarcated by a “khal” along the North-West side. Management of solid waste is a major challenge these days and one of the critical issues for the environmentalist, administrators, engineers and planners. Silchar town does not have proper solid waste management system; the waste collected is simply dumped in the open dumpsite (called Municipality Trenching Ground) at Meherpur without any segregation and treatment. The study was carried out to understand the impact of improper solid waste disposal on the quality of surface water in and around the dump yard and to suggest remedial measures for better management practices. Samples were collected from five different sampling points and three control points (all surface water bodies). Affected sites were selected near dumping yard and control sites about 500m away from the dump yard and a point was selected from upstream and downstream of a stream. Various physico-chemical parameters like air temperature, water temperature, pH, electrical conductivity (EC), free carbon-dioxide (CO₂), total dissolved solids (TDS), chemical oxygen demand (COD), Dissolved oxygen (DO), total alkalinity (TA), total hardness (TH), calcium hardness (Ca²⁺), magnesium hardness (Mg²⁺), chloride (Cl⁻), nitrate (NO₃⁻), phosphate (PO₄³⁻), sulphate (SO₄) were analysed for two seasons (Monsoon and Post-monsoon). The water quality parameters are showing higher concentration in water bodies near to the dump yard compared to control sites except Dissolved Oxygen. Sample site (S4) showing highest concentration of TDS 460.8(±4.56) mg/L in Monsoon season and whereas control site (C3) showing lowest concentration of TDS 25.97(±0.8) mg/L in Post-monsoon season. Concentration of DO is lowest at sample site 2.47(±0.63) mg/L in Monsoon season and highest at control site (C3) 5.20 (±0.65) mg/L in Post- monsoon season. All the values of parameters are within permissible limit in conformity with WHO (2012) except EC in samples sites. Sample site (S4) showing highest concentration of EC 824.8(±1.40) mg/L in Post-monsoon season whereas control site (C3) showing lowest concentration of EC 47.4(±5.15) mg/L in Post-monsoon season. The study showed significant difference in values of parameters in sample sites and control sites.

Keywords: Municipality solid waste, Dump yard, Control site, Water quality.

**GRASS ROOT LEVEL INVENTORY OF SKILLS AND WOMEN
EMPOWERMENT THROUGH GEOINFORMATICS****Swathi R**M.Tech Geoinformatics, KRSAC
Email id: swathi20dwz@gmail.com, 9591490237**ABSTRACT**

As a developing country, we know India is facing the problem of poverty & unemployment like any other under developed country. With the initiation taken by NABARD in 1986-87, Self Help Group formation and linking SHGs to banks in rural areas to generate micro credits, became viable unit to support various activities related to agriculture, dairy, cattle grazing, rural enterprises & the like. SHGs enhance the equality of status of women as participants by empowering them and now society is considering women as opinion leaders. Providing economic support or loans to the rural women helps them to empower, not only economically but also socially, further this strengthens the whole society in general. Geospatial technology can be used as support segment in the context of decision making for national, state and local levels. Especially 80% of the government data has geospatial component and data processed are useful in decision-making and provides answers to 'who', 'what', and 'when'. The applied GIS provides a high quality low cost platform for intelligent business and marketing logistics. The overall objective of the present root level study is to analyse the spatial distribution of SHGs and to connect the SHG products to market through GIS. This study mainly focuses on SHG groups in Karnataka, their location based analysis and spatial distribution. In addition, the spatial distribution of products manufactured by the women involved in SHGs and demand analysis of each product using GIS market intelligence towards connecting the products to off-line and on-line markets using network analysis. Also the population dynamics study and the financial benefits provided by the government towards empowering these SHG groups is pictured. The results obtained are distribution maps (of SHG groups, products, and supply demand maps), optimum route and optimum market analysed, and thus the results will be useful for the decision support system governing the resources and empowerment of women.

Keywords: Grass root, Geospatial technology, GIS.

GEOSPATIAL TECHNOLOGY BASED TRAFFIC HOTSPOT PREDICTION: A STUDY IN BENGALURU CBD

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ABSTRACT

With growing population, Urban sprawl in the cities like Bengaluru is at highest, the study found a whopping growth of 632% in urban areas, especially greater Bengaluru, in the last few decades (since 1990's). Reports say an average citizen of Bengaluru spends around 240 hours in traffic jam every year. These statistics prove that this city is risking citizen's lifestyle and health in its continuous rapid growth. And as city is sprawling, road networks are expanding, so are the vehicles and traffic. Which draws the attention to study the contributing factors of traffic flow in this region which will help in future survey planning, decisions and planning of the current scenario in better way. It is well known that peak hours will have highest traffic volumes and the concept of peak hour is not constant throughout the city, since study of traffic flow is of continuous pattern it demands better understanding of the phenomenon through the factors which directly or indirectly contribute to it, and that can be a better input in its management system. Conventional road and traffic surveys provide statistical data in terms of number of PCUs and V/C ratios which quantify the scenario but with proper visualization of the same can prove better usage of surveyed data and to analyze the severity of the situation. This is a one of a kind study aims to establish relationship between socioeconomic factors like population, no. of vehicles registered, Land Use, etc., on the traffic accumulation. This study utilizes applications of regression models like Ordinary Least Squares (OLS) and Geographic Weighted Regression (GWR) on GIS platform is used to assess significance of each factor on traffic accumulation. Each factor were analyzed based on its behavior towards the vehicle count parameter to arrive at hotspot recognition and hence to prepare a Traffic Zonation Map of Bengaluru Central Business District.

Keywords: Hotspot, Geospatial technology, OLS, GIS, GWR.

**APPLICATION OF GIS AND REMOTE SENSING FOR WATER CONSERVATION
PLANNING AND MANAGEMENT OF THE PURNA WATERSHED IN AKOLA
DISTRICT OF MAHARASHTRA**

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ABSTRACT

The aim of the study is to develop a water conservation plan and management with the help of GIS and remote sensing support. Watershed management is the process of creating and implementing plans, programs, and projects to sustain and increase watershed functions that affect the plants, animal and human communities inside watershed boundary. The GIS and remote sensing support us for giving a fast and cost effective study of different applications with accuracy for water conservation planning and management of the Purna watershed. The results of this study gives a good quality perspective for understanding the problems of water conservation management and development and therefore useful for policy planners evolve a better result for water conservation development and management using remote sensing and GIS techniques. This study demonstrates the role of remote sensing and GIS technologies, in the identification, delineation of drainage network within watersheds, generation of slope and flow direction maps from digital elevation models (DEMs). The results include the DEM, slope, flow accumulation, and flow direction maps for visualization of topographic characteristics of the watershed as tools for informed decision making by managers during the water conservation plan and management process. Conclusions appreciate and recognize the importance of spatial technologies in watershed conservation and management and recommend their use in developing watershed conservation and management tools.

Keywords: Conservation, DEM, slope, Watershed.

**SPATIAL VARIATION OF ONSET AND WITHDRAWAL OF MONSOON IN AKOLA
DISTRICT OF WESTERN VIDHARBHA REGION**

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ABSTRACT

The knowledge of onset of effective monsoon (OEM), its withdrawal and distribution of seasonal rainfall during monsoon months are essential for better crop planning and management of farming in rainfed area. Daily rainfall data for the period 1998 to 2015 were analyzed for different talukas of Akola district according to Ashok Raj (1979) for the study of OEM, withdrawal of monsoon and spatial variation maps for both of these parameters were developed. The average monsoon seasonal rainfall in different taluka of Akola district varied from 713.91 mm to 852.26 mm with the coefficient of variation of 26 to 38 per cent. The mean dates of onset and withdrawal of effective monsoon varied from 20th to 30th June and 20th September to 1st October respectively at different taluka places in Akola district. Spatial variation maps for mean dates of onset and withdrawal of effective monsoon in Akola district were prepared which can be used for crop planning of the region. The mean date of starting of different category critical dry spells (CDS) varied in different monsoon months from 18 to 22 June, 16 to 22 July, 15 to 17 August and 12 to 16 September at different taluka places in Akola district. This information regarding OEM, withdrawal of monsoon and dry spells can be very much useful for selection of crop varieties in different villages of various talukas of the district.

Keywords: Onset of effective monsoon, Withdrawal of monsoon, Spatial variation.CDS.

**GEOSPATIAL TECHNOLOGY BASED ASSESSMENT OF CROP WATER
PRODUCTIVITY USING PYSEBAL MODEL: A STUDY IN
TUNGABHADRA COMMAND AREA**

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ABSTRACT

India invests heavily on building new irrigation systems and upgrading existing ones. There is always a need to determine priority interventions areas due to constraints in resources. The concept of WP helps irrigation managers, agricultural extension workers, and policy makers to better understand whether water resources in agriculture are used efficiently. WP is a simple and attractive indicator to assess whether intended processes go well. More irrigation related performance indicators are needed to make a first diagnosis on how irrigation systems function. In order to better assess the current conditions and develop more appropriate indicators to measure the performance of irrigation water management, the concept of crop water productivity (CWP) and use of remote sensing technology for assessing the same is being developed. The CWP indicator, together with yield, and ET_a (actual crop water consumption), are a simple and attractive set of indicators to assess how well the limited irrigation water are used for its intended purpose i.e. to produce more food. The computations of crop production and crop evapotranspiration requires an energy balance model that converts available radiation from sun and earth into water and carbon fluxes. The updated Surface Energy Balance Algorithm for Land (SEBAL) model with automated calibration process was used for this purpose. This so called pySEBAL model is programmed in python language. pySEBAL was applied on freely available high-resolution data from the Landsat satellites. The study is an attempt in using the tools of geoinformatics, which describes the application of pySEBAL (Python based Surface Energy Balance Algorithm of Land), a remote sensing approach to assess rice CWP for a particular period in the Tungabhadra irrigation system. Baseline conditions were established by means of mapping the crop type, water consumption, crop water deficit, crop yield, and the crop water productivity in the reference period of the 2016 rice Kharif season at resolution of 30 m by 30 m using freely available imagery (Landsat 8&7). The pySEBAL analysis reveal the crop water consumption and yield. The conversion from accumulated biomass production to fresh crop yield requires a map with the major crop types because every crop has its own harvest index. Image analysis complemented by smart phone-based field surveys facilitates to prepare a crop classified map. Factors such as irrigation infrastructure, canal and field water management practices, soil, cropping pattern, fertilizer and seeds all have direct effects on water consumption, yield and CWP. Hence remote sensing is excellent for detecting local situations, but follow-up field investigation should be initiated to define a package of measures that could generate location and factor specific interventions.

Keywords: crop water, remote sensing, pySEBAL Landsat 8&7, Soil, fertilizer

URBAN MUNICIPAL SOLID WASTE MANAGEMENT –ENVIRONMENTAL IMPLICATIONS AND SOLUTIONS

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ABSTRACT

Increasing demand for water, higher standards of living, depletion of natural resources, pollution on the environmental medias complemented by industrial expansions have caused intense environmental, social, economic, and political predicaments. The municipal solid waste management is one of major environmental problem in Indian cities. Presently the country is producing around 60million tonnes of municipal solid waste annually and only 15% of the waste is being processed and disposed. The open dumping of waste is predominantly practiced in India leading to contamination of land and water resources systems, due to migration of leachate. The problem arising out of generation of huge volume of municipal solid waste is passing through a critical phase in India due to non availability of suitable facilities and due to lack of technical knowhow for cost effective processing and disposal of waste. Today all the nations including India are striving very hard for a reduced carbon foot print specifically through the concept of sustainable waste management. In view of the prevailing situation, present study focused on the results of the field investigations carried out at Mayiladuthurai town of Nagapattinam district of Tamil Nadu for assessment of actual situation and for availability of infrastructure facilities for municipal solid waste management. Relevant data's were collected; composition analyses and characterization of solid waste samples were also carried out. Analysis on surface water and ground water samples indicate that the water resources are vulnerable and susceptible for contamination due to migration of leachate. The paper also discusses the results of the questionnaire survey carried out in the town and identifies practical and viable solutions for sustainable solid waste management.

Keywords: Municipal solid waste, Open dumping, Sustainable solid waste management, Environmental predicaments.

**ASSESSMENT OF WATER QUALITY FOR DRINKING AND IRRIGATION PURPOSE
IN ALLADURG MANDAL OF MEDAK DISTRICT, TELANGANA STATE, SOUTH
INDIA**

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ABSTRACT

Groundwater is widely used for drinking and irrigation purposes in the Alladurg mandal. In view of this thirty groundwater samples were collected during the post-monsoon period 2015 and analysed major ions. Results indicated that calcium (Ca^{2+}), magnesium (Mg^{2+}), sodium (Na^+), potassium (K^+), chloride (Cl^-) and sulphate (SO_4^{2-}) were within the acceptable limits. However, fluoride (F^-) and nitrate (NO_3^-) were ranged from 0.25 to 2.8 mg/L and 7.83 to 484 mg/L, which are 1.86 and 9.68 times larger than the maximum allowable limit of 1.5 mg/L for fluoride and 50 mg/L for nitrate respectively. The major hydrochemical facies were $\text{Ca}^{2+}\text{-HCO}_3^-$, $\text{Ca}^{2+}\text{-Cl}^-$ types and, HCO_3^- and Ca^{2+} found in the study region. Sodium adsorption ration (SAR), sodium percentage (Na%), residual sodium carbonate (RSC), and Kelly's ratio (KI) were also computed to better understand the groundwater quality for irrigation usages. Based on the US Salinity Laboratory diagram, groundwater samples were classified 80% of the groundwater samples fell under the C3-S1 category (high salinity with low sodium), and 16.6% few samples were fell under C2-S1 category (medium salinity with low sodium), and remaining samples shown C4-S1 category (very high salinity with low sodium). Therefore, the study unveils that most of the groundwater samples fit for drinking and irrigation purposes.

Keywords: Groundwater quality, drinking & irrigation water quality, Alladurg mandal, South India.

MORPHOMETRIC ANALYSIS IN DROUGHT PRONE MANN RIVER BASIN, MAHARASHTRA, TO LOCATE GROUNDWATER RECHARGE ZONES USING GEOSPATIAL TOOLS

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ABSTRACT

Groundwater is a finite natural resource which is a vital source for sustenance of humans and different ecosystem especially in drought prone regions. Rapid growth of population has caused rise in water demand leading to severe water scarcity. Occurrence of groundwater in the Deccan Volcanic Province in Maharashtra is governed by the subsurface hydrogeological heterogeneity of basaltic lava flows and by the presence of subsurface geological structures. The present study area, Mann River basin, is located in the south-eastern part of Maharashtra encompassing the districts of Satara, Sangli and Solapur. The main focus of this study is to locate areas which are favorable for groundwater recharge involving morphometric analysis of Mann River basin, and its eight sub-basins which are derived using remote sensing and GIS. This technique is based on various thematic layers such as Land use and Land cover, Elevation, Geomorphology etc. Additionally, different morphometric parameters (bifurcation ratio, drainage density, drainage frequency, elongation ratio etc.) of the eight sub-basins were computed by adopting standard methods and formulae. Finally, twelve morphometric parameters are considered to prioritize these sub-basins using weighted sum analysis technique. This paper attempts to underline the sub-basins which are suitable for groundwater recharge based on prioritization index values and different influencing thematic layers by categorizing the study area into good, moderate and poor recharge zones.

Keywords: Groundwater, remote sensing and GIS, Land use and Land cover, morphometric parameters.

KINETICS AND ISOTHERM STUDIES ON CATIONIC DYE ADSORPTION ONTO ACTIVATED CARBON FROM SUGARCANE BAGASSE

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ABSTRACT

Activated carbon was prepared at 500°C by using Sugarcane Bagasse as a precursor. The heating was provided at rate of 10°C min⁻¹. In order to introduce different functional groups the prepared activated carbon was treated with 0.1N HNO₃ and labelled as SCB_{HNO3}. To find the nature of activated carbon characterised by analyses viz. XRD, BET, SEM, TGA, TPD, FTIR and XPS. Batch mode experiments were conducted to know the adsorption capacity of SCB_{HNO3} for the removal of a cationic dye Basic Red 9(BB9) from aqueous solution. The linear regression was used to determine the most fitted model among Freundlich, Langmuir, Temkin and Dubinin- Radushkevich isotherms. To identify the rate and kinetics of sorption of BB9 onto SCB_{HNO3} five simplified kinetic models namely pseudo-first-order, pseudo-second-order, Weber and Morris intra-particle diffusion model, Bangham's pore diffusion model and Elovich equations have been discussed. In the study of effect of temperature on SCB_{HNO3}, the dye adsorption was increased from 94.36 to 99.16%.

Keywords: Sugarcane Bagasse, activated carbon, BET, TGA, Basic Red 9.

FLOW CHARACTERISTICS OF LABORATORY FLUMES IN FREE AND SUBMERGED FLOW CONDITIONS**¹Bhukya Ramakrishna, ²Baddam Gangadher, ³Hechu Swathi, ⁴Mudhigonda Chandramouli and ⁵Rapolu Sravani**

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ABSTRACT

Use of the water resources in an efficient and economical manner, place a vital role in domestic, agricultural and industrial needs are concerned. Measurement of water in an open channel is very much important in collection, distribution, safe delivery of water resources. It is necessary to know how to measure water in open channel. For this purpose the flume which we use are one of the equipment. Flumes will give best results by eliminating major problems like reducing the head loss and removal of sediment. And we can measure accurately by this and in an easy manner also. Free flow is nothing but where the flow in downstream is not affecting the upstream and submerged flow is downstream flow is affecting the upstream flow. With this connection experiments are conducted on laboratory flumes like venturi, Parshall (3"), WSC (2", 45 degrees) on 5m. Tilting Flume. In Venturi and Parshall flume, surface profiles which are drawn along the channel bed shows that the depth of water in upstream is not affected by backwater depth in free flow, where as in submerged flow it was influenced by backwater depth. And drawn the standard profiles for rough estimation of profile in different conditions like Bed slope(-0.005, 0, +0.01), discharge(5l/s, 7l/s, 9l/s, 11l/s), back water depth. The discharge relations in Venturi, Parshall flumes, between actual and theoretical values shows that they are in linear relation. In Parshall flume the channel bed slope, discharge and backwater depth are mutually independent. And in WSC flume, comparison of standard curves in different flow conditions says that, submerged flow is affecting the curve position.

Keywords: Flumes, Free flow, submerged flow, Surface profiles.

LABORATORY STUDY OF BITUMINOUS MIXES USING SISAL FIBER**Kandlagunta Mounika¹, Akula Prakash² and Rathod Ravinder³**

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ABSTRACT

Generally a bituminous mixture is a mixture of coarse aggregate, fine aggregate, filler and binder. A Hot Mix Asphalt is a bituminous mixture where all constituents are mixed, placed and compacted at high temperature. HMA can be Dense Graded mixes (DGM) known as Bituminous Concrete (BC) or gap graded known as Stone Matrix Asphalt (SMA). SMA requires stabilizing additives composed of cellulose fibbers, mineral fibers or polymers to prevent drain down of the mix. In the present study, an attempt has been made to study the effects of use of a naturally and locally available fiber called SISAL fiber is used as stabilizer in SMA and as an additive in BC. For preparation of the mixes aggregate gradation has been taken as per MORTH specification, binder content has been varied regularly from 4% to 7% and fiber content varied from 0% to maximum 0.5% of total mix. As a part of preliminary study, fly ash has been found to result satisfactory Marshall Properties and hence has been used for mixes in subsequent works. Using Marshall Procedure Optimum Fiber Content (OFC) for both BC and SMA mixes was found to be 0.3%. Similarly Optimum Binder Content (OBC) for BC and SMA were found to be 5% and 5.2% respectively. Then the BC and SMA mixes prepared at OBC and OFC are subjected to different performance tests like Drain down test, Static Indirect Tensile Strength Test and Static Creep Test to evaluate the effects of fiber addition on mix performance. It is concluded that addition of sisal fiber improve the mix properties like Marshall Stability, Drain down characteristics and indirect tensile strength in case of both BC and SMA mixes. It is observed that SMA is better than BC in respect of indirect tensile strength and creep characteristics.

Keywords: Bituminous Concrete (BC), Stone Matrix Asphalt (SMA), Sisal Fiber, Marshall Properties, Static Indirect Tensile Strength, Static Creep.

A STUDY ON PHYTOPLANKTON BLOOM AFTER THE DUST STORM**S.Lavanya^{1*}, and M.Viswanadham²**^{1*}Ph.D Scholar, Centre for Earth Atmosphere and Weather Modification Technologies(CEA&WMT), IST, Jawaharlal Nehru Technological University, Hyderabad-85, India, email : lavanya.kusa@gmail.com.²Professor of civil, and Director of DUFR, J.N.T.U, Hyderabad-85, India, email: maviswa14@gmail.com.**ABSTRACT**

Dust Storm is a meteorological event common in arid and semi-arid regions. Deserts Surrounding the Arabian Sea are the dominant source of the dust aerosols. Desert dust is rich in nutrients, which is beneficial for the growth of the Phytoplankton's over the Arabian Sea. This paper highlights the effect of dust storm on chlorophyll concentrations of phytoplankton, which occurred on 23February 2015 over the Arabian Sea. Results from observation of satellite images revealed that due to dust storm of 23February 2015there was increase in chlorophyll concentrations of Phytoplankton's.

Keywords: Dust storm, Chlorophyll concentration, MODIS Ocean color data, Suomi NPP.

STUDY ON COMPRESSIVE STRENGTH OF CONCRETE ON PARTIAL REPLACEMENT OF CEMENT WITH GROUND GRANULATED BLAST FURNACE SLAG (GGBS)

Rathod Ravinder¹, K. Sagarika², K. Deepthi³, P. Alekya Reddy⁴, R. Spandana⁵and S. Sruthi⁶¹ Asst. Prof, ^{2,3,4,5,6} Student (GRIET) Gokaraju Rangaraju Institute of Engineering and Technology, Bachupally Hyderabad.**ABSTRACT**

Concrete is mixture of cement, fine aggregate, coarse aggregate and water. Concrete plays a vital role in the development of infrastructure.viz, buildings industrial structures, bridges and highways etc., leading to utilization of large quantity of concrete. As cost of concrete is attributed to the cost if its ingredients which is expensive, this lead to usage of economically alternative materials in its production.This leading to usage of economically alterative materials in its production. This requirement is drawn the attention of investigators to explore new replacements of cement with ground Granulated Blast Furnace Slag (GGBS) at a different proportions. GGBS is by-product of steel manufacturing industry and it is a fine powder of iron slag. Compressive strength of M30 grade of concrete with 0.45 water to cement ratio was investigated; in which, to determine compressive strength with 50% replacement of cement with GGBS. In our experimental investigations, it is observed that, the compressive strength of concrete has been increased by 5%. The concrete mix of M30 prepared was tested at 7, 14 & 28 days. GGBS being a by-product serves as an eco-friendly material. The use of GGBS overcome pollution problem in the environment and it helps in the durability of concrete.

Keywords: Granulated Blast Furnace Slag, economically alterative materials, Compressive strength, concrete mix.

**WATER CONSERVATION AND SOIL RESOURCE INVENTORY SURVEY USING
GEOGRAPHICAL INFORMATION SYSTEM AT BIO DIVERSITY PARK,
RAJENDRANAGAR, HYDERABAD**

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ABSTRACT

Ground water is a precious resource and the most widely distributed resource of the earth. It plays a major role in the livelihood of mankind by providing water for drinking, irrigation and industrial purposes. In many countries, the decline of water level indicates that the resources are depleted very fast. It is, therefore, necessary to assess the available subsurface resource in a more judicious scientific manner and then apply it for evolving optional utilization purposes. In the present study soil samples were collected based on topography from various physiographic units identified in Bio Diversity Park of Rajendranagar, Hyderabad. All the samples were processed for physico-chemical and chemical characteristics. The results showed that variation in soil properties strongly influenced by land form and topography. The analysis of soils indicated that the pH is neutral to moderately alkaline (6.5 to 8.04), low to high in organic carbon (0.18 to 0.96 %), low to medium in CEC (11.5 – 26.5 c mol (p+) kg⁻¹). The base saturation indicated that non-fertile to very fertile. The soils are low to medium in available Nitrogen (N) (92.3 to 351.5 kg ha⁻¹), low to medium in available Phosphorus (P) (6.22 to 28.2 kg ha⁻¹), low to high in available Potassium (K) (93.1 to 293.4 kg ha⁻¹), deficient to sufficient in available Sulphur (S) (7.1 to 21.2 mg kg⁻¹). Two sites were identified for the construction of check dams with an ultimate objective of conservation and management after preparing of contour map at 0.5 contour intervals. The soil resource inventory for identifying the soil related constraints has been prepared based on field survey and laboratory investigation. Further the major constraints like erosion, runoff and drainage resulting in soil material loss must be controlled with a combination of various practices in a system approach especially with trees, crops and an abiotic component may be integrated for the restoration and conservation of soil and land resources including native flora and fauna insitu. Hence appropriate soil and water conservation practices needed to be undertaken simultaneously to conserve and preserve the native flora and fauna.

Keywords: Groundwater, Contour Map, Check Dams, Run off.

MODELING OF ROAD ACCIDENTS Akula Prakash¹ and Kandlagunta Mounika²

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ABSTRACT

The rapid growth in the personalized vehicles leads to increasing in the traffic congestion. And also it leads to increasing in number of accidents. So Road safety is considered as one of the most important problem facing in the modern society. Accidents are major socio economic problem in the world. Accidents are causing loss to the nation in terms of GDP, which is the important indicative factor of development of the nation. Most of the accidents are caused due to a multi factor events and are not only due to driver's fault, on account of driver's negligence or ignorance of traffic rules and regulations, but also due to many other related factors such as changes in the road condition, traffic flow characteristics, road user's behavior, weather conditions, visibility and absence of traffic guidance, control and management devices, lack of necessary awareness among the people accessing the facility and absence of strict monitoring enforcement over it. If the major causal factors of road accidents are collected, then the systematic road safety program would require special attention, as up gradation of total road network would be time consuming apart from requiring huge financial resources, which may be difficult to mobilize. The quick and cost effective step in improving road safety may be to identify accident prone locations and improve them instead of improving the complete network. Therefore the present study is mainly focusing on the effect of the road traffic parameters on the accidents. Models are developed based on the dependent variable such as accident rate and independent variables are such as road traffic parameters like traffic volume, speed, pedestrian volume, width of carriage way, V/C ratio, number of lanes etc. The models can be useful to determine expected accident reduction if improvement measures are carried out in future.

Keywords: Traffic flow, Road Accidents, Road Safety, Traffic parameters.

WATERSHED ANALYSIS A CASE STUDY OF NIZAMPET AREA AND PROPOSED RAIN WATER STRUCTURE

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ABSTRACT

Water management is very critical for the growth and development of any economy, more so in developing countries like India. Therefore, we need to conserve this precious resource while benefiting from it. The prime objective of the study is to identify the potentiality of rainwater for recharging shallow Groundwater in the Nizampet area (320 hectares). Other objective is to propose various rainwater harvesting structures at the appropriate places and checking the ground water quality. GIS offers integration of spatial and no spatial data to understand and analyze the watershed processes and helps in drawing a plan for integrated watershed development and management. We have identified stream directions using DEM and calculated runoff in the study area 2016 MI/day. Ninteen rainwater harvesting structures are proposed in the study area (Nizampet)

Keywords: Water management, rainwater harvesting structures, GIS

CORRELATION BETWEEN LAND SURFACE TEMPERATURE (LST) AND NDVI USING IMAGE PROCESSING TECHNIQUES

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ABSTRACT

Vegetation index provides massive information in transmutation of green canopy through spectral analysis. It has a significant influence on the land Surface Temperature (LST) distribution. The objectives of this study are to retrieve the LST and investigate the relationship between LST and NDVI. Urban agglomeration leads to decline of vegetation, since it is as major aspect related to urban environment in terms of thermal exertion. Remote sensing Imageries has several indices to analyze the vegetation in which NDVI is common and widely used index having two different bands .USGS earth explorer Landsat –V,VIII satellite imagery used to study 650sq.km of GHMC Hyderabad Urban Area to contemplate the Surface temperature with vegetation indices. Finally, It was found that the Land surface temperature(LST) was significantly affected by the health of vegetation ,water bodies degradation and a negative correlation was observed between them.

Key words : NDVI, LANDSAT.

ASSESSMENT OF WATER QUALITY INDEX FOR THE GROUNDWATER IN CHIRALA TEXTILE CLUSTER, ANDHRA PRADESH STATE, INDIA

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ABSTRACT

Ground water from Chirala, Andhra Pradesh, India, was collected and analysed to study the impacts of dyeing industrial effluent on ground water quality. Physico-chemical parameters, namely EC, pH, TDS, COD, Nitrates, Chlorides, Sodium, Sulphates were analyzed with standard analytic methods and compared with drinking water standard. The concentrations for analysed parameters ranges from pH (7.52 to 7.62) EC (2795 to 6250Mhos/cm), TDS (1730 to 3826 mg/L), COD (98 to 204mg/l), Nitrate (up to 15 mg/L), Chloride (625 to 1592 mg/L), Sulphates (197 to 417 mg/L), and Sodium (up to 5.12 mg/L). In the present paper, Water Quality Index is calculated to assess the level of ground water pollution. The Water Quality Index (WQI) of the ground water ranged between 85.2 to 379.7 that indicates the water quality is very poor and is unfit for drinking purpose.

Keywords: Physico-chemical parameters; Water pollution; Textile industry, Water Quality Index.

About the Convener and Editor

Dr. M.V.S. Giridhar was born on 04th June, 1971 in Praindham District, Andhra Pradesh. He Graduated in Civil engineering from Nagajana University (1993) and did his M.Tech (Water Resources Development and Management) from Indian Institute of Technology(IIT), Kharagpur(1995). He obtained his Ph.D in Civil Engineering from Jawaharlal Nehru Technological University Hyderabad in 2007. He is an academician having 19 years of teaching, research and administrative experience. He joined in JNTU University, Hyderabad, in 2006 as Assistant Professor at Centre for Water Resources of science and technology, JNTUH Hyderabad and presently working as Associate Professor in centre for water resources, Institute of science and Technology, JNTUH, Hyderabad. He was coordinator for the World Bank funded project TEQIP- II (Technical Education Quality Improvement Programme Phase II-IST, JNTUH) and presently he is a coordinator for the TEQIP- III (Technical Education Quality Improvement Programme Phase III-IST, JNTUH) as well as coordinator for the Centre for Earth Atmospheric Weather Modification Technology CEAWMT, IST, JNTUH.

Dr. Giridhar had worked as Coordinator for the World Bank funded project TEQIP (Technical Education Quality Improvement Programme) Phase-II and Phase-III. He also worked as Additional Controller of Examinations of the university from 2010 to 2014. His research interests are Remote Sensing and GIS applications to Water Resources, Integrated Water Resources Management, Watershed Management, Rainwater Harvesting and Urban Water issues.

Dr. Giridhar has published 151 research papers in various National/International Journals/conferences. He guided one Ph.D student and also guided 32 M.Tech dissertations. He has organized several national and international conferences and workshops. He published three international proceedings and six national proceeding as an editor, nine training programs in the area of Geospatial applications for water resources and environmental engineering. He is a Member of Institution of Engineers and a member of various reputed professional bodies.

Dr. Giridhar visited several countries for dissemination of his research outputs and for exchange of ideas at places like Los Angeles, USA (2008), Honolulu, USA (2009), Bangkok, Thailand (2009) and Hanoi, Vietnam (2010), USA (2015), Thailand (2016) and Sri Lanka (2016). He has participated in more than 50 Conferences at national and international level on themes related to his subject expertise to share his views in the field of water resources.

Dr. Giridhar successfully completed Seven R&D projects and is currently handling four research projects. With the funds received from the Coastal Ground Water Board, MoWR, AICTE, he constructed 24 recharge bore wells in the University campus and every year more than 10.0 crore litres of rainwater is being harvested and recharged into the aquifer after proper filtration.

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Centre picture – RWH structures constructed at Gottiparthi village in Nalgonda