

**NATIONAL CONFERENCE ON
SUSTAINABLE WATER AND ENVIRONMENTAL
MANAGEMENT
(SWEM - 2017)**

21 – 23 December 2017

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Organized by

Centre for Water Resources

Institute of Science and Technology

Jawaharlal Nehru Technological University Hyderabad

Kukatpally, Hyderabad - 500 085

Preface

Preface

It is indeed a matter of great concern that our natural resources are getting depleted raising many environmental issues. It is imperative therefore to conserve and protect the environment. Conservation is a sustainable use and management of natural resource including wild life, water, air and earth deposits. Natural resources may be renewable and non renewable. The conservation of renewable resources warrants a balance between consumption and their replacement. The conservation of non-renewable resources, like fossil fuels, involves ensuring that the sufficient quantities are maintained for future generation to utilize. Conservationist accept that development is necessary for the better future, but not at the cost of environmental degradation.

Preservation, in contrast to conservation, attempts to maintain the existing environmental conditions. This is due to the concern that mankind is encroaching on to the environment on such a rate that many untamed landscapes are being taken for farming, industry, housing, tourism and other developments in turn damaging ecosystem.

As the priority and availability of water changes, we must also remember that everyone should have the right to a safe source of drinking water. We have to create a more sustainable approach to water management and identify the key influencing factors. It can be concluded that water sustainability, climate change, ecological health, population changes, land management, urbanisation and economic prosperity are all intrinsically linked. It is therefore important to recognise that the challenges we face on a global scale can only be resolved by scientists, engineers and policy makers working together to create aligned objectives and strategies.

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 National Conference on Sustainable Water and Environmental Management (SWEM-2017) 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 SWEM will focus its attention on various themes such as

1. Mathematical Modeling in Water & Environmental Management
2. Impact of climate change, mitigation and adaption
3. Floods and droughts and its effects
4. Applications of GIS and remote sensing for water and environmental management.
5. Sustainable Irrigation management
6. Reservoir operation and soil erosion
7. Sustainable rainwater harvesting and recharge methodologies
8. Sustainable storm water management, Reuse, Stakeholder participation
9. Water Resources Planning, modeling and Monitoring
10. Groundwater exploration, development and Modeling
11. Urban water and environmental management
12. Water conservation practices
13. Surface water quality and pollutant control
14. Water, food, energy and health
15. Wetland development and management

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 SWEM- 2017.



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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

Prof. A. Venugopal Reddy
Vice-Chancellor



MESSAGE

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 “*Sustainable Water and Environmental Management – SWEM 2017*” during 21st – 23rd December 2017.

Adaptation to climate change is closely linked to water and environmental sustainable development. To recognize this reality and to respond accordingly presents development opportunities. Various necessary adaptation measures that deal with climate variability and build upon existing land and water management practices have the potential to create resilience to climate change and to enhance water security and thus directly contribute to development. As a priority and availability of the water changes, it is to be remembered that everyone should have the right to safe source of drinking water. Innovative technological practices and implementation of strategies are also needed at the appropriate levels for adaptation as well as for mitigation.

Water is an essential resource for all life on the planet. Water, once an abundant natural resource, is becoming a more valuable commodity due to droughts and overuse. To ensure adequate supply of water to our future generations every individual should feel responsible to conserve, manage and distribute. In situations where we trust we can contribute straight forwardly, I hope that this National Conference on SWEM will be of immense use for delivering measures of water 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 and committee members of this conference for taking up this topic and wish them all success.

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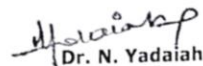


MESSAGE

I am glad to know that " Centre for Water Resources, Institute of Science and Technology, Jawaharlal Nehru Technological University Hyderabad is organizing a three day National Conference on " ***Sustainable Water and Environmental Management – SWEM 2017*** " during 21st – 23rd December 2017.

Environment sustainability focuses on the natural environment, the way it suffers at the very hands of man and how to endure it and remain diverse and productive. Since the natural resource is derived from environment, it is the main concern of man to design innovative activities that preserve the environment and meet the needs of man. As the continuous increase in the growth of population in excess, the demand for more water has risen. At the same time the impact of climate change is making it more difficult to ensure that supply of safe water is needed the most. On this note I would like to mention that, one can contribute, in 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 focus on innovative ideas and learning approaches for the management of water resources and environment for every individual to effectively tackle the challenges. On this occasion I wish the program 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 National Conference on “ *Sustainable Water and Environmental Management – SWEM 2017* ” during 21st – 23rd December 2017 with a mission to contribute for the improvement of social developmental issues that can ensure sustainable management of water and environment.

Protecting our natural environments and water through better management is crucial in adapting to changing demography, resource use and climatic regimes. Promoting innovative renewable applications and reinforcing them will contribute to preservation of the ecosystem by reducing emissions at local and global levels. This will contribute to amelioration of environment conditions by replacing the conventional methods with new innovative technologies that will help in the sustainability of natural resources.

I feel that this conference will provide a platform to exchange the experiences and interactions on these pertinent environmental issues. Simultaneously the outcomes of this conference will definitely lead to viable solutions paving path for sustainable development. On this occasion I would like to extend my heartfelt wishes to the participants and entire organizers for this academic endeavor aiming to ensure quality of water and environment. I congratulate the convener and 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 National Conference on “*Sustainable Water and Environmental Management – SWEM 2017*” during 21st – 23rd December 2017.

The world is facing an uphill task in the field of environmental management and its conservation for the future generation. The rapid pace of urbanization and industrialization has resulted in widespread ecological imbalance and detrimental health concerns in global scenario. Various environmental issues must be carefully investigated and a remedial measure adopted on priority to mitigate the disastrous impact on environment. The problems of environment and water are intertwined and continue to grow.

Water is an essential natural resource for ecological sustenance, agricultural productivity, environmental purity, industrial growth and enrichment and renewal of land and air. If teeming millions have to be properly fed and water resources have to be wisely managed and protected, then new innovative ideas are to be employed to the fullest extent.

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

On this momentous occasion, I extend my best wishes to the organizing committee and the participants.

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Professor of Chemistry

DIRECTOR I/c



MESSAGE

I am very pleased to note that “ Centre for Water Resources, Institute of Science and Technology, Jawaharlal Nehru Technological University Hyderabad is organizing National Conference on “ Sustainable Water and Environmental Management – SWEM 2017 ”during 21st -23rd December 2017.

Advances in technology and zeal for economic progress are responsible for all round environmental degradation. However evaluation of the extent of environmental destabilization has been extremely difficult till recently since the environmental problems are more complex and dynamic in nature. To solve such problems and to update the national know-how in the technologies pertaining to environmental and water problem solving, resolve environment and water management strategies and disseminate nationally this national conference has been organized.

Maintenance of environmental stability is ensured by management of water resources. The development and management of our water resources should be based on a participatory approach involving users, planners and policy-makers at all levels; women play a central role in the provision, management and safeguarding of water resources, and that water has an economic value and should therefore be seen as an economic good.

I hope that the participants will avail this opportunity to enhance their technical knowledge greatly and contribute to the wider utilization of management and impact of Environmental changes on water resources. I convey my congratulations to staff, Scholars and students of centre for water resources who are involved in this national event. I wish this conference a grand success.

Dr. A. JAYA SHREE



**CENTRE FOR WATER RESOURCES
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**Dr. C. SARALA
Professor & Head**



MESSAGE

I am indeed privileged and delighted to host day National Conference on “ *Sustainable Water and Environmental Management – SWEM 2017* ” during 21st – 23rd December 2017.

Environment improves by watershed management, a rapid means of reviving green foliage on wastelands. In the present endeavor, the concept on watershed management is dealt after introducing the reasons for degradation of lands and the need for watershed management. The simple, integrated scientific techniques are given on land, water, greenery and energy management. Socio economical conditions, basic people’s involvement in promoting sustainable society are also dealt. Stress is laid for presenting appropriate technologies, check dams water harvesting ponds and greening systems.

In conclusion impact achieved by watershed management and barefoot pathways are given. Our current understanding of sustainable water management is based primarily upon the principles that freshwater is a finite and a valuable resource that is essential to sustain life, the environment and development.

We centre for water resources extend our warm welcome to environment and water academicians, practitioners & interested colleagues regardless of discipline and states. I hope this national conference will be a great success.


HEAD/CWR

Acknowledgments

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 National Conference on Sustainable Water and Environmental Management SWEM -2017 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.

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. A. Jaya Shree**, 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 very great appreciation to **Prof C. Sarala**, Head, Centre for Water Resources for her valuable and constructive suggestions during planning, development and implementation of this task.

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

My sincere thanks to the officials of Technical Education Quality Improvement Program (TEQIP), Phase-III, IST, Science and Engineering Research Board (SERB) for sponsoring this event. Without their help organization of this conference would not have been possible.

Further “The financial assistance received from research and development fund of National Bank for Agriculture and Rural Development (NABARD) towards

publication of journal/printing of proceeding of the conference is gratefully acknowledged. 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.

I thank the research scholars who have assisted in every event of 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.

My sincere thanks to my students Smt. P. Sowmya, Research Scholar and Ms. Shyama Mohan 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. Giridhar
Convenor

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APPLICATION OF LIFE CYCLE ASSESMENT IN LAND FILLING

Shilpa Mishra

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Abstract

In ISO 14040, Life Cycle Assessment (LCA) is defined as “compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle.” Thus, LCA is a tool for the analysis of the environmental burden of products at all stages in their life cycle- from the extraction of resources, through the production of materials, product parts and product itself, and the use of the product after it is discarded. The total system of unit processes involved in the life cycle of a product is called as “product system” Life Cycle Assessment is performed to analyze the potential environmental burden of landfill process. The LCA results are useful in determining where the improvements could be made in the process to obtain a sustainable municipal solid waste management system. For decision makers LCA could serve as an invaluable tool for such an analysis. The results obtained from LCA can be used for policy decisions as well as strategic decisions on waste management systems. According to the ISO standards, a Life Cycle Assessment is carried out in four distinct phases: goal and scope, life cycle inventory, life cycle impact assessment and interpretation.

Keywords: Life Cycle Assessment, Product System, Land-filling.

HYDROGEOCHEMICAL STUDIES OF GROUNDWATERS OF JUKKAL AND BICHUKUNDA AREAS NIZAMABAD DISTRICT TELANGANA STATE

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Abstract

Studies on the hydro geochemical characters of the ground waters of Jukkal and Bichukunda mandal areas, Nizamabad District, have been carried out. The study area falls in the Survey of India Topo sheet No. 56F/11. Two litho units namely basalts and graniticgneisses are identified within the area. Fifty water samples including Surface water, Dug well, Hand pump and Bore well during the pre-monsoon (May-June) and post-monsoon season (November) are collected and analyzed for major constituents. The water samples belong to Ca+Mg+Na+K cation facies and HCO₃-CL+SO₄ and Cl+SO₄ - HCO₃ anion facies. Barring a few samples all the ground waters are suitable for drinking, domestic and agricultural utility.

Key words: Ground waters, litho units, major constituents.

OPTIMAL CROPPING PATTERN FOR SUSTAINABLE WATER MANAGEMENT: A CASE STUDY

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Abstract

Due to rapid growth of population and fast urbanization more water needs to be diverted for domestic and industrial use thus decreasing the allocation of water for irrigation in the near future. Hence there is an urgent need for optimal and sustainable use of the available surface and ground water resources in the irrigated agriculture. For efficient and sustainable use of land and water resources in a river basin, proper policies for optimal use of land and water resources are needed. In a given agro-climate region, having scarcity in the availability of surface and ground water, an optimal cropping pattern can be developed such that the return from the available land resources is maximized with minimum consumption of water. The present study aims at getting the maximum net return from a command area by satisfying minimum food production requirements and maximizing net return from the land resources of the basin population by the year 2051AD while consuming lowest amount of water. As a case study the Ramiala cultivable command area of Brahmani Basin in Odisha State has been considered. For the purpose of optimization Linear Programming model has been used. Software package Language for Interactive Discrete Optimizer (LINDO) has been used for solving the LP model. For estimating crop water requirement the guide lines of Food and Agricultural Organization have been considered. The optimal cropping pattern so developed utilizes 4978.8 ham water and generates a net profit of Rs 7748.95 lakhs against the existing cropping pattern which uses 5455.57 ham of water and generates a net profit of Rs 3513.37 lakhs.

Keywords: Cropping Pattern, Crop Water Requirement, Optimization Techniques, Ramial Irrigation Project

**SUSTAINABLE CONSERVATION PRACTICES FOR DRYLAND
FARMING IN VIDARBHA REGION OF MAHARASHTRA**

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Abstract

Low till conservation farming strategy is aimed to reduce the tillage input for better resource conservation including energy. If low till planting is practiced for long period of 4-5 years and the crop residues are recycled, the soil ecology will be build up to such an extent to minimize the adverse effect of low till. The field experiment was conducted at the field of AICRP for Dryland Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. The experimental layout had been arranged in split plot design with five replications. Main plots and sub plots include different tillage and nutrient management treatments. The long term impact of low tillage treatments is being observed in terms of productivity, energy management and resource conservation. Here in this paper results for the year 2015-16 regarding resource conservation are presented. The conventional tillage treatment (T_1) has recorded 32.81% more runoff compared to low tillage with hand weeding (T_2). The runoff in the low tillage treatments was less as compared to conventional tillage treatment (T_1). Also the low tillage treatments, T_3 and T_2 has less soil loss (0.64 and 0.92tons ha^{-1}) as compared to conventional tillage (1.44tons ha^{-1}) treatment (T_1). Rainwater use efficiency was observed to be highest in the in low tillage with hand weeding treatment, T_2 (6.08) followed by low tillage with herbicides, T_3 (5.53) and conventional tillage, T_1 (4.73). It is concluded that treatment combination of low tillage with hand weeding along with 50% recommended dose of fertilizer through organic and inorganic each was superior over other treatment combination.

Keywords: Conservation, low tillage, runoff

SOIL MOISTURE MONITORING: A USEFUL INDICATOR FOR IMPACT ANALYSIS OF CONSERVATION MEASURES ADOPTED CATCHMENT

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Abstract

In drought prone area, there are two critical factors responsible for survival and growth of plants i.e., water and soil. So in such areas main objective must be to conserve these factors by adopting suitable conservation techniques. Once soil and water are conserved, vegetative growth sustains easily (Sadgir, 2006). Field experiment has been carried out at All India Co-ordinated Research Project for Dryland Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during 2014-15. Area of experimental plot was divided into two parts (50x100 m²) each. The catchments A and C are treated with continuous contour trenches (CCTs) and B and D are non-treated. The catchment A and B are having custard apple (*Annona squamosa*) plantation and catchment C and D are having atemoya (*Annona cherimola*) plantation. In this paper we examine the variation in distribution of soil moisture in different depth of soil profiling. The soil moisture content of custard apple and atemoya plantation in the CCT treated micro-catchment (T₁) was observed to be more by 25.22% and 35.78% respectively over untreated (T₂) micro-catchment at all depths in every recorded month. However, the soil moisture was observed highest at the depth of 70-80 cm and lowest at the depth of 0-10 cm in all recorded months in the micro- catchments. The enhanced soil moisture in CCT treated (T₁) micro-catchments was observed to be useful for better growth of the plantations.

Keywords: Conservation, depth, moisture, plantation

RAINWATER MANAGEMENT THROUGH *IN-SITU* SOIL AND WATER CONSERVATION TECHNIQUES AND UTILIZATION OF HARVESTED WATER THROUGH FARM POND

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Abstract

The demand of water is increasing due to several factors such as increase in population growth, which has led to a situation in which water has become a scarce resource. Hence it is very essential to harvest rainwater during rainy season. Rainwater harvesting is the intentional collection of rainwater from a surface and its subsequent storage in order to supply water during the time of demand. Rainwater harvesting is essential in view of the fact that rainfall, which is a source of fresh water, occurs in very short spells and runs off as a waste unless arrangements are made for its storing. In this paper the importance of location specific farm pond with proper design considerations and results of enhancement of productivity of *Kharif* and vegetables crop by using stored rainwater are presented. The experiment was conducted at the field of AICRP for Dryland Agriculture, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. From the results of the experimentation it was observed that, during the *Kharif* season treatment T₂ (Two protective irrigations) have shown better yields as compared to treatments T₁ (One protective irrigation) and T₃ (No irrigation). The water use efficiency and B:C ratio was also higher in T₂ over treatments T₁ and T₃. During *rabi* season, for chickpea, highest yield and B:C ratio was recorded in the treatment two protective irrigations of 50mm depth each with sprinkler set from stored pond water (T₂). For vegetable crops the water use efficiency was found in the range of 2.50 – 5.60kg/m³. The total income from small vegetables plots during rabi season was Rs. 9375. Computed total income from these vegetables is around Rs.101241ha⁻¹. Thus from these results it can be concluded that if rainwater is harvested in farm pond and if utilized judiciously then the sustainability in production can be achieved.

Keywords: Conservation, Harvested Water, AICRP

**DELINEATION AND DEVELOPMENT OF GROUNDWATER
RESOURCES IN GRANITIC TERRAINS USING ELECTRICAL
RESISTIVITY TOMOGRAPHY**

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Abstract

A major part of the peninsular India falling under Telangana, Andhra Pradesh, Karnataka and Tamil Nadu, is occupied by crystalline granites granitic gneisses. Acute shortage of groundwater in hard rock terrains is well known. These hard rocks are rendered porous and permeable to store ground water and allow its movement because of inherent secondary porosity due to presence of fractures, joints, faults and fissures. In granitic terrains ground water occurs under phreatic condition in the top soil/weathered zone and under semi-confined to confined conditions in the fractured zones at relatively deeper level. The top weathered zones are being annually replenished by precipitation and water stored in the ponds and lakes. Some part of percolated water from lakes and ponds are stored in the faults, joints and fractured zones at deeper level. Because of limited groundwater storage capacity of hard rock aquifers, reduced recharge from the dwindling lakes/ponds and day by day increasing demand of water supply to meet the requirements of ever growing population and industries, the ground water level is declining year by year in these terrains. As a result the upper weathered zones, the main sources of water supply to the dug wells, have been almost dried up and the possibility of availability of ground water is mostly confined to joints and fractured zones at deeper level. Such aquifers are distributed sporadically and are of finite areal extent. Their sustainability depends upon intensity of fractures, orientation and their connectivity to the sources of recharging. In the absence of any surface manifestation of these geological features, delineation of their exact locations and spatial extent was a challenging task. This becomes possible with the newly developed geophysical technique known as Electrical Resistivity Tomography (ERT). The present work is aimed to describe the efficacy of ERT in delineation of groundwater potential zones and in the identification of suitable sites for managing recharge with the help of case studies from some places located in Hyderabad and Rangareddy districts of Telangana state, India.

Keywords: Electrical Resistivity Tomography, Granitic Terrains, Groundwater Resources.

STORM WATER MANAGEMENT USING SWMM: A CASE STUDY ON INDRAPRASTHA AREA, BELAGAVI

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Abstract

To avoid the regularly flooding during the rainy season, coming up with an efficient storm-water system has become the necessity of the present world engineers and urban planners. Scientific System to catch the storm-water may be a future ambition of the society, especially in cities. Urbanization Strongly modifies natural catchments by rapidly increasing impervious cover due to the anthropogenic developmental activities needs proper storm-water drainage for to collect runoff and discharging runoff safely in to environment. In this study an attempt has been made to simulate the rainfall-runoff process by using Storm-water Management Model (SWMM) in Indraprastha area, Karnataka, India. The current study aims to simulate runoff from 20 sub-catchments using with help of different tools such Arc GIS. The model was validated with observed values from rational method. The validated results obtained in peak runoff from model 6.67 m³/s very near to observed value 6.18 m³/s, R² value is 0.9791 and Nash-Sutcliffe co-efficient values is 0.97. LID (Low Impact development) structures are employed in open areas of the sub-catchments which results in reducing the peak flows and Manning's equation is used to frame the dimensions of storm drainage system. From the simulated runoff results, the future flow estimated and drains capacity with respect to different return periods (P = 5, 10, 20, 30, respectively). The simulated results obtained from the study can effectively be used to design storm drains and detention facilities and other works related to urban storm-water management.

Keywords: SWMM, Flood Frequency Analysis, Return periods, LID Control Structures, Rational Method, Validation.

PRE-HISTORIC CULTURAL REMAINS IN WATER SHED

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Abstract

Pre-Historic Culture period to till date water is important aspect of every one life. Animal, Plant, Human etc are depending upon the water. Rain water is main source of the water. Natural water storage is important form of natural reservoir i.e. lakes, ponds etc. Pre-Historic man was used these natural recourses for their survival. Today so many small and big reservoirs, water sheds, dams and bund are constricted for artificial store and ground water recharge. In the case study of the natural ponds and lakes of middle reaches of Bhima basin and its tributary Sina, Man, Bori and Bor river Basin of Western Maharashtra. Matkuli, Bramhangaon villages of Ashti tehsil in Bead District and Dahiwadi and Talsangi village of Mandhahiwadi and Mangalwedha tehsil of Satara and Solapur Distric. Kapurwadi village of Ahmednagar tehsil and District etc site are recovered important evidence of Prehistoric Cultural material of Mesolithic period Microlithic stone tools. Agate, Chart and Chalcedony etc locally available raw material are used for the Microlithic tool making. Blade, Flakes, Core and debitage are recovered from above mention natural lakes or ponds but now it is construct for water conservation reservoir. These tools are very important evidence of natural water storage activity and settlement of hunting gathering society settlement. So, now many places are used for modern water shed constriction.

Keywords: Pre-Historic-Water Shed, Western Maharashtra, Rain Water.

ESTIMATION OF GROUND WATER STORAGE CHANGES USING SATELLITE DATA

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Abstract

Detection of groundwater storage (GWS) changes is vital to the utilization and control of water resources in the Hyderabad region. Detail observations and reliable hydrological models including GWS are not available for Hyderabad region. we have used GRACE data and MAIRS data to quantitative GWS changes in Hyderabad region from 2009 to 2014, for generation of GIS maps we have used IRS1C satellite data (LISS-III data of scale 1:50000 is used). The main theme of the work is to use GRACE data set to see ground water storage levels and its changes in Hyderabad region and to do water balance analysis using GIS and RS techniques which is obtained by

1) Time series comparisons of satellite data over field based data in same spatial scale at various temporal cycles.

2) Generation of GIS maps with ground water levels between 2009 to 2014.

There is strong seasonality in ground water with lowest levels prior to rainy season and highest levels at the end of rainy season that is identified clearly in GRACE data. GRACE measure changes in earth's gravity field, which is directly related to changes in surface mass. The surface mass changes with Total Water Storage. In the study area Hyderabad region is subjected to drastic depletion of ground water levels in last decade due to over usage of ground water. The assessment of ground water availability in Hyderabad region has been delineated using remote sensing and GIS techniques. The thematic layers prepared from satellite data were integrated using Arc GIS and final ground water prospects were prepared. This information will be useful for effective identification of suitable locations for extraction of groundwater and construction of recharge tanks.

Keywords: GRACE, Ground water storage (GWS), Total water storage (TWS), GIS

RADON MEASUREMENTS IN KOZHIKODE COAST, SW INDIA AND ITS IMPLICATIONS

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Abstract

To distinguish as well as detect the presence of fresh and re-circulated Submarine Groundwater Discharge the best tracers that can be used are radon and salinity. Due to its conservative nature, short half-life, high abundance in groundwater compared to surface water, radon (^{222}Rn) acts as a good indicator of groundwater characteristics. Salinity (>35 PSU) differentiates sea water and groundwater with values <2 PSU reflects the presence of freshwater. Kozhikode coast of SW India is very dynamic due to its tidal influence. There are regions, where saline water intrudes much towards inland (upto 500m) and there are locations, where groundwater discharges to sea and often this mechanism varies seasonally. We have investigated such variations and fluctuations using spatial and temporal measurements of radon in air and water. Tidal fluctuations affect aquifer recharging and thus the discharge of water to sea. Presence of higher value of radon near coast and low salinity values shows the presence of groundwater closest to the ocean, supporting freshwater discharge to sea through aquifer medium. Similarly low radon value and high salinity value marks the re-circulated saline SGD. Characteristics of 35 km coastal zone in Kozhikkode, Kerala state with respect to the radon reflections have been brought out. Stagnant water seen in wetland zones of the area as well as in selected coastal wells of the site, with no signature of radon release could be due to complete escape of radon at the time of measurement.

Keywords: Radon, RAD7, Submarine Groundwater Discharge, coastal aquifer, Kozhikode coast, Kerala

GIS & RS APPLICATION FOR HYDROLOGICAL & ENVIRONMENTAL PLANNING - A CASE STUDY

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Abstract

Water is one of our most important natural resources. Without it, there would be no life on earth. The supply of water available for our use is limited by nature. Although there is plenty of water on earth, it is not always in the right place, at the right time and of the right quality. Adding to the problem is the increasing evidence that chemical wastes improperly discarded yesterday are showing up in our water supplies today. Hydrology has evolved as a science in response to the need to understand the complex water systems of the Earth and help solve water problems. Polluted ground water is less visible, but more insidious and difficult to clean up, than pollution in rivers and lakes. Ground water pollution most often results from improper disposal of wastes on land. Major sources include industrial and household chemicals and garbage landfills, industrial waste lagoons, tailings and process wastewater from mines, oil field brine pits, leaking underground oil storage tanks and pipelines, sewage sludge and septic systems. Human settlement with their propensity to create hard, impermeable surfaces for building houses and roads, and the need of water intake and overflow in a variety of forms, are not in harmony in a natural hydrological cycle. The adverse effect of creating impervious surface cover in urbanized watershed, reducing the groundwater recharge and consequent reduction in the base flow of stream and river flow the area. Sewage and water supply system having dense settlement can further interfere with ground water and surface hydrology. Urbanization in India and other developing countries is taking place at a faster rate than in the rest of the world. Urban water supply, storm water and watershed management is at a critical juncture all over the world. Methods must evolve in response to urban development, population growth and diminishing natural resources.

Key words: Watershed, Hydrology, groundwater, natural resources, pollution.

GREEN TREATMENT OF ACID MINE DRAINAGE (AMD) EFFLUENT FOR THE REMOVAL OF CU(II) USING CHILLI STALKS

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Abstract

Acid mine drainage (AMD) is found to be a key environmental issue in the mining industry in the current scenario. Among a variety of metals found in AMD discharges, copper is observed to be in high concentrations i.e. greater than 3 mg/l (MoEF stds.) which are quite alarming to the mining industry, as the danger it causes to the human health, animals and ecological systems. Apart from various conventional methods, adsorption has taken its place in heavy metal removal because of its advantages over other methods. The intention of this work is to assess the ability of *chilli stalks* in the removal of Cu (II) from AMD effluent. Kinetics and equilibrium models have been developed to describe adsorption isotherm relationships, the two main isotherm models used in this work are the Langmuir and Freundlich models.

Keywords: AMD, Adsorption, Chilli stalks, Kinetics, Langmuir and Freundlich.

TREND ANALYSIS OF REFERENCE EVAPOTRANSPIRATION IN A HOT AND HUMID COASTAL LOCATION IN TAMILNADU STATE

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Abstract

Evapotranspiration is a key component of the hydrologic cycle. In the context of global warming and climate change, it becomes imperative to study the nature of variations on a short-term and long-term basis on evapotranspiration on regional and local levels. The general belief is that due to global warming, there will be an increase in evaporation or evapotranspiration. However, some studies reported in the literature reveal that despite the increase in ambient air temperature due to global warming, evaporation and/or evapotranspiration tended to decrease in certain parts of the world. In the present study, the trend in reference evapotranspiration (ET_0) computed using the FAO-56 Penman-Monteith method was investigated for a hot and humid coastal location in Tamilnadu State namely, Annamalaiagar, Chidambaram. Non-parametric methods have been employed for detecting trends in reference evapotranspiration at the study location.

Keywords: short-term and long-term, global warming, ET_0 , Tamilnadu.

WATER SUSTAINABILITY AND ENVIRONMENTAL MANAGEMENT

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Abstract

Sustainability development is a hot issue facing corporations. Studies showed that financial accounting could not fully support sustainability development since the highly regulated financial accounting had specific accounting rules that resulted in incomplete capturing and presentation of environmental costs. In the relatively less regulated accounting application, the management accounting, studies found that environmental costs were usually absorbed in overheads. The communication between accountants and environmental experts were usually limited and this lead to misallocation or incorrect calculation of environment costs. As a result, managers did not have the correct environmental information for managing environmental costs for sustainability development. To address the limitations of management accounting, environmental management accounting (EMA) was developed. EMA could address both monetary and physical aspects of environmental accounting. Physical EMA included the flow of water, energy, while monetary EMA measured the costs of the firm's consumption of natural resources and the costs for controlling or preventing environmental damages. Studies found that EMA could help firms to identify cost savings opportunities and to develop more efficient production processes. The application of EMA is still having problems at firm level. Studies found that lack of promotion on the use of EMA, lack of collaboration between accountants and environmental management departments were major barriers of EMA adoption. Accountants did not have sufficient training on EMA and they believed that implementing EMA was costly. Firms have their own definitions of environmental costs, which make collection, analysis and comparison of environmental costs difficult. Finally, managers did not want to be held responsible for the significant environmental costs also prohibit the EMA adoption. To check rapidly deteriorating environmental conditions, many management tools are being used by different industries. In order to address environmental issues the corporate sector has seen a drastic increase in the use of environmental management systems. There is strong need to check how these environmental management systems are rendering environmental management services. Research shows that environmental management systems are mistakenly expected to prescribe technical and environmental objectives. Without describing what goals an organization must achieve, they lay out a system for management of numerous environmental obligations. Hence environmental management systems are not strategic; they tend to reactively fix issues contingent upon their occurrence and may miss opportunities to avoid problems before they occur. Further, environmental management itself is seen in isolation of a socio-ecological context, which makes environmental management lose ground and operate in a virtual vacuum. Mostly environmental management is identified as an 'agenda' which runs counter to the overall development of an organization. Provided, environmental management systems can be integrated with basic principles of sustainable development these management systems can be utilized as a launching pad to move organizations towards sustainability. Built to render the administrative services only through a mechanism of self-regulation and continuous improvement,

these management systems can be used to deliver sustainable product planning. The present study illustrates the possibilities for integration of sustainability objectives into environmental management systems. In our effort to integrate sustainability in environment management systems extensive literature reviews, interviews and a case study (Hammarplast AB) have been used. For the analysis of the current reality, a framework for strategic sustainable development and methods incorporating —back casting from principles of sustainability— i.e. templates for sustainable product development and strategic life cycle management – has been used. The use of tools not only illustrates contemporary sustainability gaps but also gives a concrete set of guidance to integrate sustainability in environmental management systems.

Keywords: Water Sustainability, environmental management accounting, Hammarplast

TREND ANALYSIS OF SEASONAL MAXIMUM AVERAGE RAINFALL INTENSITIES IN RAYALASEEMA REGION OF ANDHRA PRADESH

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Abstract

Regional seasonal rainfall analysis is essential for effective planning, designing and management of water resources such as urban water supply, drainage and irrigation system. The present study was conducted to determine the trends in 1h, 2h, 3h, 4h, 5h and 6h maximum average rainfall intensities at Ananthapur, Arogyavaram, Kadapa and Kurnool rain gauge stations in Rayalaseema, a semi-arid region of Andhra Pradesh. Hourly rainfall data during pre-monsoon, monsoon, post-monsoon and winter seasons at Ananthapur (1969-2010), Arogyavaram (1969-2005), Kadapa (1972-2005) and Kurnool (1969-2010) were collected from India Meteorological Department, Pune and used in the analysis. The procedure used in the present analysis is based on the nonparametric Mann-Kendall test for the trend and the nonparametric Sen's slope estimator method for the magnitude of the trend. The analysis using these methods, has revealed no significant trend at 1h, 2h, 3h, 4h, 5h and 6h maximum average rainfall intensities during the four seasons at Arogyavaram and kadapa rain gauge stations. At Ananthapur rain gauge station, significant downward trend has been noticed at 5h (-0.085 (mm/h)/year) and 6h (-0.055 (mm/h)/year) maximum average rainfall intensities during post-monsoon. At Kurnool rain-gauge station, significant upward trend has been identified at 1h (0.412 (mm/h)/year), 2h (0.305 (mm/h)/year) and 3h (0.147(mm/h)/year) maximum average rainfall intensities during pre-monsoon and 2h maximum average rainfall intensity (0.281(mm/h)/year) during post-monsoon.

Keywords: Maximum average rainfall intensities, Trend analysis, Mann-Kendall test, Sen's trend line method, Sen's slope estimator, Season-wise rainfall, Rayalaseema.

CLIMATE CHANGE EFFECTS ON SUSTAINABLE SCENARIO IN INDIA

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Abstract

Climate change is one of the major challenges of our time and adds considerable stress to our societies and to the environment. The impacts of climate change are global in scope and unprecedented scale. It is a consequence of Global warming with increased temperatures and seasonal variations. Many issues like that Climate Change, Environmental degradation and Displacement have been the major challenges to the entire human populations. A range of human activities which mainly include the burning of fossil fuels, industrial wastes, deforestation, population rise are substantially increasing the concentrations of greenhouse gases in the atmosphere resulting in adverse change of climate. Climate change is a serious threat to human security and national economy. Scientists predict that climate change would increasingly impact the humans by severe heat waves, floods, storms and forest fires causing as many as 5,00,000 deaths a year by 2030 and thus it has become the greatest humanitarian issue engaging the attention of all people in the third world (Liu Jie and IPCC Report 2007). Forced displacements leading to loss of livelihoods, drought, famine, protracted conflicts and unresolved disputes over land and property led them to marginality. The lukewarm response of the Government's and the private entrepreneurs towards the displaced people is often extemporized and largely insufficient and they frequently find themselves in extremely vulnerable situations. The recent instances of displacement across the country met with vehement resistance bears testimony to the people's struggle and keenness to protect environment and their livelihoods. These protest movements illustrate the people's concerns and priorities for their well-being and sustainable livelihoods rather than for sheer economic considerations.

Keywords: Environmental degradation, fossil fuels, human population and national economy.

GRAPHENE FOR SUSTAINABLE WATER

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Abstract

However, the use of graphenic materials for large-scale and down to earth application like water purification is limited. This is mainly because of the difficulty in large-scale synthesis. The ability to make GO through chemical methods and its subsequent reeducation to reduced grapheme oxide (RGO) opened up the possibility for the mass production of grapheme in solution phase. The properties of GO or RGO can be easily enhanced through chemical modifications. Several attempts have been made to produce GO and RGO-composites. Recent literature suggests that RGO, GO and their composites are getting into environmental remediation. RGO- magnetite and GO-ferric hydroxide composites were used for the removal of arsenic from water. Iron based oxides and hydroxides are known to remove arsenic from drinking water. The reports show that RGO and GO supported materials have higher binding capacity compared to free nano-particles. A study by Hu et al. also showed that RGO is antibacterial and this property may help in preventing the development of bio film on the filter surface due to bacterial growth, which can cause unwanted tastes and odors or prematurely clogging of filters. Important aspects to be considered for the large-scale production of RGO-composites are ease of synthesis and post synthesis purification. In most of the existing methods of composite preparation, constituents were separately prepared and mixed or external aids were employed for the production of composites, which has many limitations in large-scale synthesis. Another aspect for using such composites for application such as water purification is the ease of solid-liquid separation and post treatment-handling. Laborious processes like high speed centrifugation, membrane filtration, or magnetic separation are not practical for many end-users. A practical adsorbent material has been under study here which shows that RGO-based materials are also field adaptable. In this report, we propose a simple strategy to synthesize monodispersed and uncapped nanoparticles of silver, gold, platinum, palladium and manganese oxide on the surfaces of RGO. An in situ homogenous reduction strategy utilizing the inherent reducing properties of RGO to produce composite materials was explored, at room temperature without any external aids. The simple methodology adopted here permits to make large-scale composites with good control over the particle size. The process uses the inherent reduction ability of RGO, simplifying the post-synthesis treatment and thereby increasing the liability in commercial applications. Among the materials prepared, one metal (Ag) and one metal oxide (MnO₂) based composites were selected, considering their possible utility in mitigating range of

contaminants from water. The applicability of RGO-Ag and RGO-MnO₂ were demonstrated for removing heavy metals from water. Hg (II), one of the most toxic metals found in the environment, was used as the model pollutant. The effects of mercury on humans and the environment have been documented. Considering the practical difficulty in using RGO and its composites as such in water purification, a simple methodology was developed to immobilize the composites on a cheap and inert support like river sand (RS). Chitosan (Ch), an abundantly available and environment-friendly biomaterial was used as a binder for this process. The supported RGO-composites were also demonstrated for Hg (II) uptake and their applicability in the field of water purification. Various microscopic and spectroscopic techniques were used to probe the composite formation and attachment of Hg (II) onto the composites. Scientists have reported that membranes made from graphene oxide appear to be highly permeable to water while being impermeable to all other liquids and gases. The membranes consist of millions of small flakes of graphene oxide with nanometer-sized empty channels (or capillaries between the flakes that favour the passage of monolayer of water and resist other substances. Graphene oxide is similar to ordinary graphene but is covered with molecules, such as hydroxyl groups (OH). Copper oxides and its salts are now widely used as pesticides to control fungal and bacterial diseases of field crops. Copper toxicity is often a major contributor of human health problems caused through accumulation of excess copper ions in various organs via drinking water, fruits and vegetables. So, detection and estimation of cupric ions in biological organs, drinking water, fruits and vegetables are extremely important. Recently, a fluorescence based sensor using coumarin dye (high quantum yield) has been proposed to detect micro-molar Cu²⁺ ion in biological organs. But major problem with coumarin dye is that it is insoluble in water and undergoes dye-dye aggregation in organic solvents. We proposed here a synthetic scheme of preparation of graphene oxide conjugated coumarin dye derivative which would be water dispersible and expected to be an ideal candidate for Cu²⁺ ion estimation in biological organs and drinking water. In this paper, we would propose to design synthetic scheme of coumarin conjugated Graphene Oxide (GO) nano-materials. This design will take advantage of the high selectivity of the coumarin derivative towards Cu²⁺ ions as reported in the literature and minimize the self-quenching problem. This is a feasible strategy as the coumarone dye will be covalently attached to GO surface and this attachment will hinder the formation of J-aggregation of coumarin dye molecules. The use of GO to prevent such J-aggregation has been reported in the during the recent time Graphene, GO and nonmaterial research has gained a tremendous momentum because of their potential applications in material science. Graphene has a two-dimensional (one atom thick) crystal of SP² bonded carbon atoms densely packed in a honey comb crystalline lattice. The C-C bond length of graphene is nm and Graphene sheets are stuck to form graphite with inter planar spacing of nm. It possesses some unique properties such as high surface area high

electronic conductivity (electron mobility 20,000 cm/second under unit potential gradient) low resistivity (specific resistance) high mechanical and chemical stability. Calculation based on ab initio shows that Graphene is thermodynamically unstable if it contains less than 6000 atoms (by Shenderova et al.) Graphene is a hydrophobic material and it has no binding sites available for ions. Graphene is chemically converted to GO (via oxidation)/GO derivatives for increasing its hydrophilicity by introducing suitable functional groups. GO can be dispersed in aqueous solution and they carry hydroxyls, acids and epoxy groups on the surface. Functional groups on the GO surface can be further modified to attach suitable ligands. In general, GO is considered as a biocompatible materials. However, there are reports showing cytotoxic effect of GO to human fibroblast cells above 50ug/mL concentration.

Keywords: Sustainable Water, nano-materials, Chitosan, composites, Scientists.

SUSTAINABLE URBANIZATION USING REMOTE SENSING AND GIS – AN OVERVIEW

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Abstract

Globally, the migration to urban areas is rapidly increasing leading to an unprecedented shift and significant changes relating to population distribution and spatial patterns. The change in the dominant habitat of world population makes the process of urbanization a significant global trend of the twenty-first century. Urban areas not only shape the present land cover patterns but also prominently influence social and economic issues. Poorly managed urban growth and development can exaggerate inequalities, increase in vulnerability among marginalized population. It is essential that urban cities need to focus more on orderly expansion of the existing land resources by implementing sustainable practices without depriving the needs and aspirations of future generations. Issues related to unsustainable development in urban areas needs to be addressed with the help of recent technologies such as Remote Sensing and GIS. Mapping of urbanization specifies locations where growth/expansion is taking place, help in identifying areas having serious environmental issues like depletion of natural resources and pollution. The integration of these new technologies with proper planning not only helps judicious utilization of the existing natural resources but also emphasize on environmental protection such that basic needs of future generations are secured.

Keywords: Remote Sensing, GIS, Urban areas

TO PURIFYING OF GROUND WATER AT SUB GROUND LEVEL BY NATURAL METHODS

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Abstract

Groundwater typically becomes polluted when rainfall soaks into the ground, comes in contact with buried waste or other sources of contamination, picks up chemicals, and carries them into groundwater. Sometimes the volume of a spill or leak is large enough that the chemical itself can reach groundwater without the help of infiltrating water. Heavy metals occur in the earth geological structures, and therefore entire water resources through natural process. For example, heavy rains or flowing water can leach heavy metals out of geological formations. Arsenic occurs in many minerals usually in combination with sulphur and metals, and zinc is chemically similar to magnesium, zinc deficiency such as retardation of growth in children, mail reproduction, according to this two chemicals lead, cadmium plays a major role in groundwater due this pollution. Humans affected with several health disorders like reduce in blood cell production, break up red blood cells in circulation and brain damage. in this circumstances by using natural methods we can clean the ground water and sub ground level by using natural methods with natural products, like corn, coal powder and gravel by this method we can purify ground water and control the entering of chemicals into the food chain then we can control the food born diseases.

Keywords: Groundwater, contamination, Arsenic, zinc, corn, coal powder and gravel

OPERATION STUDY FOR RELIABLE WATER SUPPLY OF HYDERABAD SYSTEM

(A CASE STUDY ON SINGUR RESERVOIR SYSTEM)

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Abstract

The study on Reservoir Operation Models is a challenging task and researchers have adopted various optimization and simulation techniques to evolve the best release policies. Singur reservoir is one of the key storage reservoirs for Hyderabad Drinking water supply system. This paper presents the simulation model study on Singur reservoir operation based on simulation basis using fuzzy rules as basis and the results were compared with that of crisp model releases and the developed fuzzy rule based model is found to be superior over the crisp simulation mode. The deficits from the developed model were found to minimized the deficits from the reservoir.

Keywords: Reservoir Operation, Simulation Models, Design performance, Fuzzy logic

A REVIEW OF APPLICATION OF REMOTE SENSING AND GIS IN HYDROLOGICAL MODELING

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Abstract

In order to model the hydrological processes in a multi-vegetated watershed it is necessary to update the information regarding the response of these processes to various watershed parameters and acquire an in depth knowledge about the suitability of different hydrologic models for the simulation of these hydrologic processes. As most hydrologic models requires the application of Remote Sensing and GIS, it is also necessary to update information regarding the information of remotely sensed watershed information and GIS techniques by different models. Keeping this in view the present chapter deals with the review of significant contributions made by researchers in the field of hydrologic models, use of remote sensing and GIS for runoff estimation.

Keywords: Remote Sensing, Gis, Hydrological Modeling

RAINWATER HARVESTING AND ARTIFICIAL RECHARGE –A CASE STUDY

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Abstract

In a progressive society it is natural that demand for water is continuously on the rise. The issues are varied and complex in our country because of remarkable variation in the availability of water on account of the variation in the regional rainfall and geography. Rapid and accelerated development of ground water has led to stress on ground water resources. Further, the increasing population and urbanization are having telling effect on the availability and quality of water. The groundwater level in Bangalore urban area is progressively declining in some pockets due to over-exploitation and groundwater quality is deteriorating. As a part of activity, Central Ground Water Board (CGWB) has carried out rainwater harvesting and artificial recharge studies covering the NBSS & LUP Regional Centre campus to recommend suitable measures to maintain sustainability of the ground water resources in the area. About 2357 cubic meter rainwater is available for harvesting from open areas of the campus. Out of this only 11% (204 cu.m) is currently being used for ground water recharge. Further, 3558 cu.m roof top rainwater is available for either direct use or artificial recharge to groundwater by different structures. Hence, about 5711 cu.m of rainwater is available for Harvesting through Point Recharge Structures and Recharge pits in the campus. Maintenance of artificial recharge structures is very important for effective functioning of the structures. Timely removal of the silt load from the top sand layer in the case of point recharge structures, restoration of infiltration trenches on silting, periodical cleaning of roof top area and the filters in the of roof top rainwater harvesting etc. are very much essential from maintenance point of view. Hence, provisions are to be made in the implementing stage to maintain the recharge structures after construction. The case study outlines the significance of rainwater harvesting and artificial recharge practices in addressing the ever-increasing demand of urban areas.

Keywords: Ground water, rainwater harvesting, artificial recharge, augmentation.

**DETAILED HYDROGEOCHEMICAL STUDY OF SURYAGANGA
WATERSHED OF WARDHA RIVER BASIN DISTRICT AMRAVATI,
MAHARASHTRA**

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Abstract

Suryaganga river is a tributary of Wardha river. It originated from north-west part of Amravati city. This river meets Wardha River near Varkhed in Tiosa taluka. The study area comes in the toposheet number 55 G/16, 55 H/13, 55 K/4, and 55 L/1 of survey of India maps. The main villages of the study area are as fallows Pimpalvihir, Digargaon, Digargaon, Fatehpur, Siwangaon, Shendola Khurd, Sirasgaon, Gurudevsnagar, Mojhri, In this paper we have done Systematic qualitative analysis of water sample of pre monsoon and post monsoon season, and also interpret the ground water condition of the above village. The physical and chemical analysis of water has been done of the water sample collected from 49 well of different villages. Physic-chemical analysis following parameter is studied and determined. Physical parameter of water like pH, TDS, temperature, Electrical Conductivity, and chemical parameter like acidity, alkalinity, CO₂, Chloride, Hardness, Calcium, Magnesium, Sodium. The quality required of the ground water supply depends on its purpose, thus needs for drinking water, industrial purpose, and irrigation water vary widely. Ground water comes into contact with various mineral. Most of the virtual resources for all kinds of life on this planet are the resources affected both qualitatively and quantitatively by all kinds of human activities on land in air and water. Availability of clean water is going to become the greatest constraint for tomorrow development. Man has tried to cope up with this scenario and has rapidly advanced it's effect to counteract this a large number of parameter signifying the quality of water in various cases have been proposed. A regular monitoring of them not only prevents diseases and hazardous also checks the water resources from further going polluted. The purposes of this assessment are (1) to provide an overview of present groundwater quality, (2) to determine spatial distribution of groundwater quality parameters such as Hardness, pH, EC, TDS, Na, and Cl, etc. The spatial distribution analysis of groundwater quality in the study area indicated that some of the samples collected are not satisfying the drinking water quality standards. The temperature of ground water of the field area for pre monsoon is maximum 26.4°C and minimum temperature is 21.5°C and temperature for post monsoon is maximum 23.5°C and minimum temperature is 20.2°C. The pH of water of the Study area for pre monsoon is maximum 8.32 and minimum pH is 6.27 and pH for post monsoon is maximum 8.23 and minimum is 6.44. The Electrical Conductivity of water of the Study area for pre monsoon is maximum 2.668mho and minimum 0.298mho is and Electrical Conductivity for post monsoon is maximum 2.030mho and minimum is 0.353mho. The Total Dissolved Solid

of water of the Study area for pre monsoon is maximum 1047mg/L and minimum is 346mg/L and for post monsoon maximum TDS is 1126mg/L and minimum TDS is 305mg/L. The Alkalinity of water of the Study area for pre monsoon is maximum 1560 and minimum is 240 and for post monsoon maximum Alkalinity is 1360 and minimum is 240. The Acidity of water of the Study area for pre monsoon is maximum 120 and minimum is 20 and for post monsoon maximum Acidity is 130 and minimum is 305. The Carbon Dioxide of water of the Study area for pre monsoon is maximum 3528.8 and minimum is 1636.8 and for post monsoon maximum is 2314.6 and minimum Carbon Dioxide is 1311.2. The Chloride of water of the Study area for pre monsoon is maximum 420.32 and minimum is 71 and for post monsoon maximum is 79.52 and minimum Chloride is 221.52. The Hardness of water of the Study area for pre monsoon is maximum 1044 and minimum is 332 and for post monsoon maximum is 448 and minimum Hardness is 216. The Calcium of water of the Study area for pre monsoon is maximum 149.09 mg/L and minimum is 19.23 mg/L and for post monsoon maximum Calcium is 113.82 mg/L and minimum is 46.49 mg/L. The Magnesium of water of the Study area for pre monsoon is maximum 205.63 mg/L and minimum is 25.33 mg/L and for post monsoon maximum is 70.16 mg/L and minimum Magnesium is 4.87 mg/L. The Sodium of water of the Study area for pre monsoon is maximum 58 mg/L and minimum is 32 mg/L and for post monsoon maximum is 46 mg/L and minimum Sodium is 22mg/L. The present study will certainly help not only to improve the groundwater resource assessment management but also useful to achieve social, economic and environmental benefits to support governance and policy. Groundwater is the major source of water is now facing threats due to rapid growth of population, urbanization and industrial activities. The groundwater quality is equally important as that of quantity. The present study was undertaken to map the groundwater quality in Suryaganga watershed in the Amravati district of Maharashtra, India. This study aims to visualize the spatial variation of certain physicochemical parameters and morphological parameters. Since, in future the groundwater will have the major share of water supply schemes, plans for the protection of groundwater quality is needed. Present status of groundwater necessitates for the continuous monitoring and necessary groundwater quality improvement methodologies implementation. The rain water is only available source for the recharging as well as improves the quality of ground water particularly in saline area. At some places of the Suryaganga basin having steep slopes is marked which increases the percentage of runoff therefore deep trenching and longitudinal ridges are required to check the runoff. The occurrence of groundwater in this region is thus restricted in the recent alluviums, top weathered zones on the hard crystalline rocks of lower relief and in the secondary porosities present as fractures and fissures in the hard crystalline rocks. For sustainable development through proper groundwater exploitation should be restricted to recent alluvium, top weathered zones of hard rocks and areas with higher secondary porosities.

Keywords: Suryaganga River, Wardha River, Hardness, TDS, Na, and Cl, Electrical

**GEOMORPHOLOGICAL AND HYDROGEOCHEMICAL STUDY OF
CHIKHALDARA AND ADJOINING AREA DISTRICT
AMRAVATI, MAHARASHTRA**

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Abstract

Since ancient times, human civilizations have always settled near the water source, which were basically rivers, big talaws, Assured which are perennial water supply was the main reason. Hence most of the towns and cities had been developed on the banks of the rivers all over throughout the world. Water being one of the basic necessities for strength of life, It is essential to people. Water is the only substance that exists naturally on earth in all three physical states of matter gas, liquid and solid. Clean, safe and freshwater is suitable for the human society. The importance of the role of ground water and surface water for domestic, rural, urban, industrial and agricultural purpose. Chikhaldara is famous as a hill resort in Maharashtra region from British region. As a hill station chikhaldara was first discovered by captain Robinson of Hyderabad regiment in 1823. Also chikhaldara has an added advantage unlike any other hill station, chikhaldara is locate in the midst of forest and surrounded by melghat tiger project area. The combination of hill station and melghat forest tour and waterfall can attract the tourist. For any hill station to become successful, access and accommodation water are the prime needs. In future tourist point of view chikhaldara will developing speedily and covering large area and hence taking into consideration we are doing detail hydro geochemical study of groundwater of the Chikhaldara and adjoining area for the study including geomorphological study of local Datri river In this paper we are giving emphasis on qualitative and quantitative study of ground water keeping in the mind of local people and tourist facility. The study area is part of Amravati district of chikhaldara taluka in which Datpari river sub tributary of Chandrabhaga river which is a part of Toposheet No 55G/7 (Survey of India).we have collected 20 water samples of lakes wells and river and other water bodies from the Chikhaldara town and its adjoining villages like Aladoh, Shahapur, Lawada, Baglinge, Malkapur, and Ramtek for hydrogeochemical analysis. We are doing physical and chemical quality parameter including temperature, pH, electrical conductivity, TDS ,Acidity ,Alkalinity, Carbon di oxide ,hardness of the ground water ,Chlorides ,Calcium,Magnesium for their permissibility for the domestic and irrigation use The water availability of any area are depend on it's environmental condition and monsoon rain. Monsoon rain is only one of the important sources to available water from the earth surface. The distribution of rain water in Maharashtra are not same. Even during monsoon surface water in the given area does not uniformly collect in subsurface Ground water being the primary water source in arid region and of surface water in humid region. In the absence of availability of surface source of water a

large percentage population depends upon ground water therefore it is necessary to development and management planning for ground water resource. In the geomorphological study we are giving more emphasis on morphometric analysis. . The three main parameters of a drainage basin used for morphometric analysis ie linear parameter, Areal parameter, Relief parameter. In the linear aspect of the channel system we calculated Stream order of the Datri river which is fourth order, total stream number are 112, total stream length is 113 and Bifurcation ratio. Areal aspect of the drainage basin like Area of a basin (A) is 48.68 and perimeter (66) are the important parameter in quantitative morphology. Basin area is hydrologically important because it directly affects the size of the storm hydrograph and the magnitudes of peak and mean runoff. Horton's in 1932 introduced the Drainage density which is 2.711. Stream frequency is 2.67. Drainage intensity (Di) is 7.284, The circularity value of 0.69 of a basin indicates that the basin is elongated in shape, low discharge runoff and high permeable subsoil condition. It is influenced by stream, geological structure land use/land cover, climate relief and slope of water shade expressed. Texture ratio is 1.272, Form factor ratio is 0.0711, Constant channel maintenance having 0.368. The area of investigation is characterized by the presence of erosional landforms with minor occurrence of depositional landforms. The topography is characterized by the presence of various landforms like lava plateaus, lava hills, mesa, butte and escarpment etc. The highest point exposed in the study area is Vairat peak (1177m) whereas; the lowest point is Parsapur village (374m). The study area is dominated by monotonous, flat topped terrace hills, which might have resulted from the lateral erosion of lava flows.

Keywords: Hydrogeochemistry, morphometric analysis, environmental issue Chikhaldara hill station, Vairat peak.

SURFACE WATER QUALITY AND POLLUTANT CONTROL

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Abstract

Surface water quality depends on Criteria and Objectives. The criteria are mainly seven. Objectives are Eco system Approach and guiding principles for water pollution control. Agriculture and urban activities are major sources of Phosphorus and nitrogen to the aquatic eco-systems. These nutrients cause diverse problems such as toxic algal blooms, loss of oxygen, loss of biodiversity, loss of aquatic plant beds coral reefs which ultimately degrades aquatic ecosystems and impairs the use of water for drinking, industry, agriculture, recreation and other purposes. This paper is divided into three parts [1] Water quality criteria and objectives [2] Principles for water pollution control. [3] Eco-system approach which contains[a] Eutrophication [b] non-point pollution [c] inputs of P and N.[d]Nutrient flow to aquatic eco-systems.

Keywords: Agriculture, Eutrophication, Aquatic ecosystem, Non -point pollution, Phosphorus, Nitrogen.

ASSESSMENT OF GROUNDWATER QUALITY OF DOULATHABAD AND KODANGAL MANDALS ,VIKARABAD DISTRICT ,TELANGANA STATE,INDIA

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Abstract

Groundwater samples are collected from parts of Doulthabad and Kodangal mandals, Vikarabad district during the Post monsoon season. Assessment of groundwater quality for suitability for drinking and domestic purposes has been carried. Groundwater quality has been assessed by examining various physico-chemical parameters. Parameters like pH,EC,TDS, F⁻, Cl⁻, NO₃⁻, SO₄²⁻, Na⁺, Ca²⁺ and Mg²⁺ have been determined .Results are compared with WHO-2011 water standards. Overall view of samples reveals that out of 45 water samples concentration of Fluoride in 4, Nitrate in 26, Chloride in 09, Calcium in 08 and Magnesium in 07 Samples are exceeding the permissible limits for drinking purpose in the area.

Keywords: Groundwater, WHO, Physico-chemical

ASSESSING THE CONTRIBUTION OF CLIMATE CHANGE IN AN INTENSE WEATHER EVENT: A CRITICAL RISK MANAGEMENT

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Abstract

Pertaining to the occurrence of extreme weather events in certain locations, it has become immensely significant to perceive the influence of the burgeoning climatic changes on such events to establish a scientific frontier on the deliberate human-engendered activities. While the observational records provide inaccurate and deficient amount of data concerning climate change, there exists a snowballing curiosity from the scientific commonality to facilitate the grappling of the perception that the anthropogenic actions have infinitely aggravated and modified the natural climate resulting in detrimental calamities. It is therefore substantial to apprehend and ascertain the extent of this climate change on the magnitude of the extreme events. An instinctive primary phase in event attribution, perhaps, is to investigate the observations for the purpose of establishing the uncommonness of the event in the past, otherwise to probe into the distribution and relevant characteristics of the condition of the climate which had pre dominated at the time of the event. In view of the fact that there are strong verifications present portraying the human influence mounting the probability of several extremely warm seasonal temperatures as well as diminishing the probability of extremely cold seasonal temperatures in various regions across the world. However, the data for human influence on the probability of extreme rainfall events, droughts, and storms seems to be varied. Despite the fact the the study of event attribution has expounded swiftly in the present day, geographical analysis of events continues to be in consistent as it was grounded on the interests and competences of the distinct research groups. In order to assess the event attribution in a precise manner, the outstanding scientific ambiguities must be strongly weighed and the outcomes could be inter connected. Reviewing the sequences of past data, trend analysis, and models from previous studies, we will endeavor to clarify the impact of the human activities on the climate that instigated in the extreme event in this paper.

Keywords: Extreme rainfall events, Trend analysis, Event attribution, Climate Change, Risk management

INTEGRATION OF GREENERY INTO RESIDENTIAL BUILDINGS

Koka Vineel

Abstract

Residential buildings should be constructed for the sustainable environment. Buildings should not cause any harm to environment. For sustainable environment we are introducing greenery into residential buildings. Plants can be integrate at outside and at inside. For outside, it can be done on roofs, outer vertical walls and for inside, it can be a living wall or bio filter, or potted plants placed in atriums, indoor rooms to act as a pocket of green patch into these vertical cities. Buildings have been shown to produce more than 40% of global carbon dioxide emissions, an important greenhouse gas (GHG) that contributes to global climate change. Green buildings can reduce carbon dioxide emissions by 35%, compared to traditional buildings. Furthermore, green buildings can reduce energy use by 30-50%, reduce waste output by 70%, and reduce water usage by 40%. (World Green Building Council)

Green Roofs: Most urban areas show swathes of asphalt, black tar and gravel-ballasted rooftops. Heat radiates off of the dark roofs and water rushers over the hard, impermeable surfaces. The heat absorption and monotony of these common roofs can be break though green roof tops. The concept of rooftop gardens are introduced with the aim of reducing heat gain into a building and modifying the ambient conditions through photosynthesis and evapotranspiration of plants. Results from several studies suggest that rooftop gardens can effectively cool down the immediate ambient environment by 1.5 degrees C. (Wong, N.H. and et al ., 2002). Generally, the surface temperature reading collected from the rooftop garden was found to be lower than that recorded on a barren concrete rooftop. This shows that the thermal insulation of a building is improved in the presence of plants. High relative humidity at the rooftop garden was also observed due to the presence of plants. To prevent discomfort due to high humidity, adequate natural ventilation should be ensured.

Green walls: The green façade is the outer wall which can be free-standing or part of a building, partially or completely covered with vegetation and in some cases, soil or an inorganic growing medium. They are also referred to as living walls, bio walls, or vertical gardens. The vegetation for a green façade is always attached on outside walls, but some cases it can also be used in interiors. The green walls being advocated today are designed and engineered with a support structure. Based on current applications and data from the experience of green roofs, green walls can offer considerable cost savings to both the public and private sectors. For example, the reintroduction of vegetation into cities has been correlated with the reduction of the urban heat island effect, and therefore will

reduce energy consumption (Sharp R., 2007). Cities are cooler and quieter through shading, evaporative transpiration, and the absorption of sound by green walls.

Green Filters:

Green filters also referred as 'Active living walls', which is used in indoors incorporating with building's HVAC system based upon the sciences of bio filtration and phytomediation. According to study done at university of Waterloo, "Living walls with bio filters increase the capacity of air filtration". These bio filters replace high-tech, energy consumptive air filtration systems with living walls that harness the natural phytoremediation capabilities by drawing air through the roof system of the wall of tropical houseplants to effectively remove common airborne pollutants. Beneficial microbes actively degrade the pollutants in the air before returning the new, fresh air back to the building's interior. In the breathing wall filtration takes place right in the active living wall.

Keywords: Improve indoor environment quality, HVAC, Green buildings

MAPPING OF PERMANENT SNOW COVER AREA USING SATELLITE DATA IN SUTLEJ BASIN

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Abstract

The mountains cover a large portion of the Earth surface. In these high mountains, it is estimated that the total surface area is covered from 30 to 40% of seasonal snow cover and Himalayas possess one of the largest resources of snow and ice outside the Polar Regions. Snow form a natural reservoir. Snow cover measurements are difficult and not easy because of the hostile climatic conditions and the remoteness of the areas .So remote sensing is attractive tools as a means of estimation of snow-cover properties. Keeping in view the importance of snow cover area, in this study remote sensing methods have been applied for mapping of permanent snow cover area. The study area comprises of Sutlej river basin in Western Himalayas which is snow fed and contributes to snowmelt runoff during summer month. The permanent snow cover in Sutlej basin has been mapped using NOAA/AVHRR data of 1998-1999 and IRS-P6/AWiFS data of 2007-2009 years. The permanent snow cover area (PSCA) is observed to be 1672.58 sq.km and 1703.38 sq.km. This is about 3.25% and 3.31% of the basin area. The permanent snow line is above 4500m elevation. The PSCA values derived from NOAA/AVHRR data and AWiFS data are very much comparable and majority of the PSCA is above 5500m elevation.

Keywords: Snow Cover Area, Satellite Data, PSCA, NOAA/AVHRR

ATITATIVE AND MORPHOMETRIC ANALYSAS OF SELECTED WATERSHEDS USING GIS

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Abstract

Development of morphometric techniques was a major advance in the quantitative description of the geometry of the drainage basins and its network which helps in characterizing the drainage network, comparing the characteristics of several drainage networks and examining the effect of variables such as lithology, rock structure, rainfall etc. Development of a geomorphic response model requires some of the important geomorphological characteristics which are to be evaluated for the watersheds. The geomorphologic parameters of a river basin play an important role in modelling various hydrological processes for the determination of soil loss and runoff. Morphometric analysis and their relative parameters have been quantitatively carried out for the twelve selected watersheds of Tapi basin, Maharashtra, India. The quantitative analysis of the morphometric characteristics of the basin include average slope of the watershed (Sa), elongation ratio (Re), circulatory ratio (Rc), basin shape factor (Sb), relief ratio(Rf), relative relief (Rr), ruggedness number (RN), main stream channel slope (Sc), drainage factor (Df), stream length ratio (Rl), bifurcation ratio (Rb), and length width ratio (Lbw). These parameters then can be used according to their importance in the basin for development of geomorphological models to study various hydrological processes. The study would help the local functionaries to utilize the resources for sustainable of the basin area.

Keywords: Geomorphological parameters, Geomorphological Information system, Modelling.

**HYDROCHEMICAL EVOLUTION AND AQUIFER STUDIES OF
GROUNDWATER IN PARTS OF PEDDAVURA MANDAL, NALGONDA
DISTRICT, TELANGANA, INDIA**

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Abstract

Groundwater resources and their quality are the most important aspects in their utilization for different purposes. Hydro-chemical evolution reveals the rock-water interaction including the quality of water that is suitable for drinking, agriculture and industrial purposes. Other than rock-water interaction, water quality is also depends on anthropogenic influence like industrialization. The major and trace elements of groundwater play a significant role in classifying and assessing water quality. Residual sodium carbonate (RSC) can be used as a criterion for finding the suitability of irrigation waters. It was observed that the criteria used in the classification of waters for a particular purpose considering the individual concentration may not find its suitability for other purposes and better results can be obtained only by considering the combined chemistry of all the ions rather than individual or paired ionic characters. Chemical classification also throws light on the concentration of various predominant cations, anions and their interrelationships. A number of techniques and methods have been developed to interpret the chemical data. The study area is covered in Survey of India toposheet number 56 P/2 is part of Peddavura schist belt (PSB) which is a NW-SE trending narrow linear belt extending for over 60 km from Juvvigudem in the NW in Nalgonda district to Tummurukota in the SE in Guntur district southern part of the traverse. From the information of the geology of the study area, collected from various sources is discussed. The Nalgonda district is located in the north eastern part of the Proterozoic Cuddapah basin is located between latitudes 16° 15'N to 17° 45'N and longitudes 78° 45' E to 80° E. The district covers an area of 17,170 Sq.Km and is bounded on the north by Medak and Warangal districts, on the east by Khammam and Krishna districts, on the south by Guntur and Mahabubnagar districts. Final output of this research will be much useful to the society particularly to the people living this area for their use of drinking water, irrigation and industrial purposes. This study will also be helpful in the construction of check dams, water harvesting structures in turn improves the groundwater occurrences.

Keywords: Field investigations, hydro-chemical, Laboratory investigations, Study Area

**PREDICTION OF TAIL WATER LEVEL – A CASE STUDY OF
THOTAPALLI RESERVOIR SPILLWAY IN VIZIANAGARAM
DISTRICT OF ANDHRA PRADESH STATE, INDIA**

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Abstract

The hydraulic jump is one of the most important rapidly varied flow phenomena and is used in many hydraulic structures as energy dissipation. The Hydraulic Modeling is generally carried out by various means such as physical hydraulic modeling or mathematical modeling. Physical hydraulic modeling is widely used to investigate hydraulic design and operational issues of hydraulic structures such as dams, barrages, bridges, spillways, etc. The tail water rating analysis study has to be carried out from the model studies. Physical model to a selected geometric scale is constructed for a given prototype before the construction of the actual structure. However the model similitude incurs expenditure. Therefore in the present study the numerical modeling using HEC-RAS5.0.1 software has been carried out for the prediction of tail water levels for the Thotapalli Reservoir new spillway. The Thotapalli barrage has been constructed across Nagavali River near Garugubilli Mandal, Vizianagaram district of A.P, during the year 2003 - 2015 at 415m upstream of existing old regulator which was constructed in 1908. The longitudinal section data for the geometric hydraulic model creation of the Thotapalli barrage new spillway is developed using the cross section drawing of the ogee spillway. The cross section bed elevation data of the tail water channel reach was provided by the Thotapalli barrage irrigation department. The steady flow analysis has been simulated for the created geometric model for all gates openings condition, Extreme left vent operative and Extreme right vent inoperative conditions at 100% to 25% design flood discharges i.e. 3234.3, 2425.7, 1617.15 and 808.57m³/sec. According to the Thotapalli barrage 3D model studies Without old barrage at a scale of 1:55 the tail water level was observed at +96.087m. In the present study using HEC-RAS5.0.1, water surface elevations were computed and the tail water level obtained through this process is +97.20m. During the present study, a flood of 3681m³/sec occurred in Nagavali river basin from 15th -19th July, 2017. A discharge of 2832m³/sec (100,000 cusecs) was released from Thotapalli reservoir. The tail water level was observed to be +96.56 to +97.00M and is validated.

Keywords: HEC-RAS5.0.1, Cross section bed elevation data, spillway cross section drawing, hydraulic data.

PREDICTION MODELING OF COMBINED THERMOPHILIC COMPOSTING(IN-VESSEL) AND VERMICOMPOSTING IN THE BIOCONVERSION OF VEGETABLE MARKET WASTE

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Abstract

Pre-composting (thermophilic) was carried out to sanitize the vegetable market waste for 14 days in a rotary In-vessel and later introduced to earthworms for 16 days for vermin composting. The integrated approach was carried out to combine the pertinent approaches of both these composting techniques of pre-composting in an In-vessel followed by vermin composting, to enhance the overall process and product qualities. The substrate taken was vegetable market waste which was composted along with the along with cow dung, bulking agents, sawdust, and dry leaves. The outcome of the results of combined In-vessel composting along with vermin composting were taken for modelling using Artificial neural network (ANN) approach to quantify the volatile solids with respect to time. The observed physical and chemical parameters were given as input for the model prediction and the volatile solids contents were derived as output. The results indicate that the system will be of much help in predicting the outcome in the case of large scale composting operations where the input is often heterogeneous and the recipe has to be modified to derive the right outcome. One model was developed with 50% of total data for training and remaining 50% for validation and another model was developed with 75% of total data for training and remaining 25% for validation. Thereby the predicted values of modeling assures to provide a model efficiency of 84.22% for the first and 90.16 for second model, ensuring the combined integrated approach of composting helps in shortening stabilization time of compost and improving its quality.

Keywords: Aerobic composting, Bioconversion, Bulking agents, In- vessel composting, Thermophilic composting, Vermi-composting. Artificial neural network

REMOVAL OF REACTIVE DYES FROM TEXTILE EFFLUENTS BY USING ACTIVATED CARBON FROM SUGARCANE BAGASSE

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Abstract

Wastewaters originated from dye production and application industries present a very serious environmental problem because of the aesthetic nature due to the fact that the coloration is visible even in a low dye concentration. Although the presence of color in water might not appear to have a negative effect other than aesthetic, this is not actually the case. The color can absorb and reflect sunlight entering the water. Consequently, bacteria cannot grow sufficiently in the water and that can have a disastrous effect on the food chain. But even more important, many substances in such wastewaters were considered toxic and even carcinogenic and mutagenic. In this present research work an agricultural waste Sugarcane Bagasse used as a precursor for the preparation of activated carbons. The prepared activated carbons were characterized by SEM, FTIR, TPD and XPS. Then the efficiency of the prepared activated carbons was tested by the adsorption of Reactive Orange 5(RO5). Finally, reactive dyes are removed from textile effluents collected from textile industry in Dharmavaram by using these activated carbons.

Keywords: Sugarcane Bagasse, activated carbon, adsorption, SEM, FTIR, XPS

PERFORMANCE OF HARGREAVES RADIATION FORMULA IN ESTIMATION OF REFERENCE EVAPOTRANSPIRATION IN A HOT AND HUMID COASTAL LOCATION IN TAMILNADU

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Abstract

Reference crop Evapotranspiration (ET_o) is a major component in hydrological studies to evaluate crop water requirement in arriving the irrigation demand. Precise ET_o estimates are essential in almost all water resources planning projects. There are several methods available for the estimation of ET_o, the choice depends on a number of factors. FAO-56 Penman-Monteith (P-M) method is the standard method for the computation of ET_o adopted worldwide, but is data intensive. Many researchers have studied the consistency of the P-M method for estimating ET_o. Determination of ET_o involves several interacting daily meteorological factors such as air temperature, relative humidity, wind speed, bright sunshine hours as well as on the type and growth stage of the crop demanding meticulous effort and considerable time. This paper attempts to examine the efficiency of Hargreaves Radiation formula in FAO P-M method for estimating ET_o for a data short environment in a coastal region with a hot humid climate. The study area is Annamalai Nagar of Chidambaram in Tamilnadu which has observations of daily weather data with bright sunshine hours missing for certain periods.

Keywords: Hargreaves Radiation, Humid Coastal, ET_o

ASSESSMENT OF GROUNDWATER CONTAMINATION DUE TO LANDFILL LEACHATE

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Abstract

The objective of the study is to assess the effect of leachate generated from municipal solid waste dumping yard on ground water quality by using ground water quality index in Hyderabad, Telangana. Groundwater Quality Index is one of the tools used to know the quality of groundwater. Ground water samples are collected from wells, 2 kms around the municipal solid waste dumping site and the physio- chemical analysis of water was carried out. The study revealed that municipal solid waste leachate plays a major role in contamination of the ground water.

Keywords: Ground water, Leachate, Water Quality Index.

ACHIEVING DOUBLE DIGIT GROWTH RATE FOR A CENTURY BY INTER BASIN TRANSFER OF RIVER WATER IN INDIA

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Abstract

Long term sustained high growth rate can be achieved by proper utilization of run-off Monsoon water to the oceans. This water can be stored and transferred from surplus to deficient river basins to mitigate frequent flood and drought conditions. Cascading dams will insure perennial flow to rejuvenate river systems. Increase in agricultural land and conversion of single to double and even triple crop regions, will also advance fulfillment of national commitment to provide water to every field. Availability of surface water will reduce pressure on ground water, increase natural and artificial recharge potential. The study proposes to develop national water grid, to insure fairness to every state, on the pattern of electrical power. States will be able to charge for water provided to other provinces. Since the water supplied will be surplus rain water, it is expected to find favor from every quarter. Electricity generate from innumerable reservoirs will fulfill the present as well as future requirements at reasonable cost. This in turn will reduce nation's dependence on import of crude oil and our coal resources to mitigate effects on climate change by shifting to renewable energy. We studied the geomorphology and geology of different geo-climatic zones of India to suggest suitable corridors for the inter-basin transfer of water. This study has brought out great potential for storage of enormous amount of rain water. Maximum utilization of existing river channels and natural gradients has been made, to avoid construction of long canals, tunnels and lifting of water. Satellite and radar imagery is interpreted for geomorphic land use details, particularly the relief features and elevation data is acquired from topographical sheets. New geological data is generated, to identify narrow gorges and competent rock section, for construction of dams, alignment of canals, tunnels, roads and availability of construction material on GIS platform. The study identifies sites for storage of water, on the western side of Sahyadri ranges, for supply of water to Mumbai and ensures regular flow to Konkan region. Transfer of water, from the western side to the eastern side of Sahyadri mountain ranges in rain shadow regions of Maharashtra, Karnataka and Telangana. Surplus water from Narmada basin to Tapi, Godavari and later to Krishna basin is very significant findings of the study. Transfer of Godavari water to the easterly flowing tributaries such as Mula, Ghod, Bhama, Mula-Mutha and Nira, will ensure augmentation of water to deficient upper Godavari basin in Maharashtra. Furthermore, surplus available water in lower Krishna basin can be transferred to highly productive Kaveri delta region.

Keywords: River Water, run-off Monsoon, Sahyadri ranges, Konkan region

GEOSPATIAL APPROACH FOR ANALYSIS OF GEO-MORPHOMETRIC PARAMETERS IN THE PURNA WATERSHED IN AKOLA DISTRICT OF MAHARASHTRA

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Abstract

The study of Geo-Morphometric analysis can be used to take information for hydrology related project such as watershed planning, agriculture development and artificial recharge conservation structures in the saline zone area. In this study various landforms like younger and older alluvial, mesa and butte has been identified. During morphometric analysis parameters were conceded out from digital elevation model using geospatial technology. The drainage characteristics have been classified based on linear, aerial and relief aspects using survey of India toposheet and satellite data. The watershed boundary and drainage network lines have been delineated from SRTM with 30 m resolution through Arc hydro tools in the extension of Arc GIS 10 software. The drainages pattern has been observed such as dendritic and sub-dendritic drainage types in the Purna watershed area. The stream order map was prepared from drainage network with reference of LISS-III satellite images. The drainage data were checked by ground data using GPS instruments. This study based on geospatial approach is useful for analysis of different morphometric characterization for development of groundwater and thereby the agricultural development. In this watershed stream orders ranges has been observed such as first to fourth orders using Arc GIS 10.3 software. These results should be applicable for planning of artificial recharge structures, groundwater recharge structures and thereby sustainable agriculture development in the Purna watershed area.

Keywords: Geo-morphometric, GIS, Recharge, Watershed.

A STUDY ON INCREASED CHLOROPHYLL CONCENTRATIONS AFTER THE DUST STORM

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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 8 October 2004 over the Arabian Sea. Results from observation of satellite images revealed that due to dust storm of 8 October 2004 there was increase in chlorophyll concentrations of Phytoplankton's. This increase in chlorophyll concentrations was more prominent on 13 October 2004.

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

ESTIMATION OF REFERENCE EVAPOTRANSPIRATION USING CROPWAT

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Abstract

Evapotranspiration is the sum of evaporation and plant transpiration. The evapotranspiration rate from a reference surface, not short of water, called the reference crop evapotranspiration denoted as "ET₀". The Study area selected is Kaddam watershed present in the G-5 sub basin of Godavari River Basin. In this study, the normal monthly minimum, maximum temperatures are analyzed and reference evapotranspiration of the study area calculated using CROPWAT for years 2000-2014. The reference evapotranspiration ET₀ can be estimated by using many methods, methods range from the complex energy balance equations to simpler equations that require limited meteorological data. For the study, the Food and Agriculture Organization (FAO) Penman-Monteith methodology was used to determine the reference evapotranspiration (ET₀). During the years 2000-2014 minimum ET₀ was observed in 2013 having value 1.42 mm/day and maximum ET₀ of 13.52 mm/day was observed in the year 2010.

Keywords: Reference Evapotranspiration ET₀, FAO Penman-Monteith method,

**OCCURRENCE AND DISTRIBUTION OF GROUNDWATER IN
WARDHA RIVER SUB-BASIN, CHANDRAPUR
DISTRICT, MAHARASHTRA STATE, INDIA: A GIS APPROACH**

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Abstract

During this study WR-16 watershed of Wardha river basin flowing through Chandrapur district, Maharashtra state, India has been studied with respect to pre-monsoon and post-monsoon groundwater levels, seasonal groundwater fluctuation, type of aquifer, lithological control over the occurrence and distribution of groundwater in the area. Well inventory of 34 wells has been carried out with collection of hydro-geological information regarding depth, diameter of the wells, pre-monsoon and post-monsoon water levels, lithology, type of aquifer, water level fluctuation, pumping capacity, canal command area if any, area irrigated by the well etc. Result of groundwater assessment of the watershed shows that this watershed falls in safe category with 18.66% stage of development, indicating further scope for groundwater development. It is attributed to the assured rainfall of this area (GSDA, 2014). After analysing hydrogeological data for complete watershed, it is observed that seasonal water level fluctuation ranges between 1.8 to 10 meter, pre-monsoon water levels ranges between 2.5 to 17.4 meter and post-monsoon water levels ranges between 0.5 to 9.4 meter below ground level (bgl). Accordingly pre-monsoon and post-monsoon water level maps have been prepared to study variation in ground water levels within the watershed. It is observed that the occurrence and distribution of groundwater in this area is dominantly controlled by lithological variations and not by the topography, slope and relief.

Keywords: Watershed, Hydrogeology, Groundwater Assessment, Aquifer

**EFFECT OF DIFFERENT ENVIRONMENTAL CONDITIONS ON
PERFORMANCE OF SAPOTA SOFTWOOD GRAFTS WORKED ON
INVIGORATED KHIRNI ROOTSTOCK**

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Abstract

An experiment entitled “Effect of different environmental conditions on performance of sapota softwood grafts worked on invigorated khirni rootstock” was carried out at Commercial Fruit Nursery, Nagarjun Garden, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, during the year 2016-2017 with the objectives to study the effect of different environmental conditions on performance of sapota softwood grafting on invigorated Khirni rootstocks and to find out the suitable environmental condition for higher success and better growth of sapota grafts on invigorated Khirni rootstocks. Experiment was laid out in Factorial Randomized Block Design with eight treatment combinations. The treatment combination of poly tunnel and decaping height at 15 cm from ground level took minimum days for bud sprouting (15.80) days , initial graft success (83.00 %) , length of scion shoot (20.20 cm) , sprout length (19.76 cm), leaves per graft (24.40) , leaf area (51.40 cm²), Average growth rate (0.40) , fresh and dry weight of grafts (9.46 and 6.20 g, respectively) , final survival of grafts (81.00%) and per cent saleable grafts (79.00 %) obtained in poly tunnel and decaping height at 15 cm from ground level, whereas minimum percent of all parameters obtained by open condition and decaping height at 10 cm from ground level. For utilization of the invigorated khirni rootstock seedlings which were failed during last year, can be reused by grafting in poly tunnel with decaping height at 15 cm from ground level, for getting maximum grafts success.

Keywords: Sapota Softwood Grafts, Khirni, Vidyapeeth

IMPACT OF MUNICIPAL SOLID WASTE DUMPSITE ON GROUND WATER QUALITY

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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. As water percolates through the landfill, contaminants are leached from the solid waste. Leachate is produced when moisture enters the refuse in a landfill, extracts contaminants into the liquid phase. Leachate is generated in a landfill as a consequence of the contact of water with solid waste. Leachate contains dissolved or suspended material associated with wastes disposed off in the land fill, as well as many by-products of chemical and biological reactions. Leachate tend to migrate in surrounding soil may result in contamination of underlying ground water and soil. The rate at which it percolates depends on the soil, texture and depth of the aquifer. It is established that the ground water was contaminated by the leachate in many cities not only in India and but in many other countries. 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 Land-filling 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. Four stations have selected as sampling stations namely Paradesipalem, Kamala Nagar colony, Kothapalem Village, and main dumpsite i.e., Kapullapada Dumpsite during the study period. The physico-chemical analysis was done for four years at all the six stations selected for the present study. Six samples were collected in alternate months in a year. A total of 144 samples were collected during the study period from these six stations. The parameters studied were: pH, total dissolved solids, total hardness, chlorides, nitrates, sulphates, phosphates, phenols, cyanide, iron, zinc, nickel, copper, chromium and cadmium. The results of the present study revealed that the total dissolved solids, total hardness and chlorides were in very high concentrations. These parameters, though not directly affect the human health, indicate the increase of ions in the ground water through leachate contamination worsen the quality of water, to prevent future contamination of heavy metals and organic and inorganic materials, the following recommendations are suggested.

Keywords: Leachate, Heavy metals, Landfills.

EFFECT OF *IN-SITU* RAINWATER CONSERVATION PRACTICES ON MOISTURE USE AND YIELD OF PIGEON PEA

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Abstract

The field investigation was conducted at All India Co-ordinated Research Project (AICRP), for Dry Land Agricultural Farm, Vasantrao Naik Marathwada Agricultural University Parbhani, for Pigeon Pea crop during kharif season of 2013. Performance of opening of furrow across the slope after two rows in pigeon pea imparted significant effect on moisture conservation in the root zone of the pigeon pea growth, plant height, number of branches, and no. of pods are found significantly superior. Among the *in-situ* rainwater conservation practices, significantly higher mean consumptive use (724.45mm) and rain water use efficiency (4.95 kg/ha-mm) was recorded in opening of furrow after two rows (T₃). Also the Highest yield was recorded i.e., T₃ (3583.3kg/ha) over rest of treatments with higher net return (138930Rs./ha) and B: C ratio (7.4:1).

Keywords: Opening of furrow after different rows, Water use efficiency, Consumptive use, Yield, Cost benefit.

AQUIFER PERFORMANCE TEST IN RCI RESIDENTIAL AREA SAROORNAGAR MANDAL, RR District, TELANGANA STATE.

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Abstract

Aquifer is the water bearing geological formation, is very important in ground water yielding .pump out test is the one of method for determination of aquifer performance. In the present work pump out test are conducted in Research Center Imrath (RCI), Hyderabad. In the study area, pumping test was conducted in seven tube wells with depths ranging from 17 to 40 meters. Each well is tapping 3 to 9 meters of aquifer thickness. The aquifers of the study area, based on their litho- logy can be grouped under one category– non- leaky confined aquifer

Keywords: Aquifer, Transmissivity (T) Geomorphology.

WATER SUSTAINABILITY AND ENVIRONMENTAL MANAGEMENT

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Abstract

Sustainability development is a hot issue facing corporations. Studies showed that financial accounting could not fully support sustainability development since the highly regulated financial accounting had specific accounting rules that resulted in incomplete capturing and presentation of environmental costs. In the relatively less regulated accounting application, the management accounting, studies found that environmental costs were usually absorbed in overheads. The communication between accountants and environmental experts were usually limited and this lead to misallocation or incorrect calculation of environment costs. As a result, managers did not have the correct environmental information for managing environmental costs for sustainability development. To address the limitations of management accounting, environmental management accounting (EMA) was developed. EMA could address both monetary and physical aspects of environmental accounting. Physical EMA included the flow of water, energy, while monetary EMA measured the costs of the firm's consumption of natural resources and the costs for controlling or preventing environmental damages.

Keywords: Environmental Management Accounting,

GEO-SPATIAL TECHNIQUES FOR AN AUTOMATIC SHIP DETECTION ON SPACEBORNE SAR IMAGES

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Abstract

The human interpretation of SAR images is often complicated, and time taking, but the Satellite-based Synthetic Aperture Radar (SAR) provides a powerful surveillance capability allowing the observation of broad expanses, independently from weather effects and from the day and night cycle. Since the SAR imaging technology many models for ship detection have been developed such as the K-distribution Constant False Alarm Rate (CFAR) method and two-parameter CFAR method etc. Using the advantages of both the methods a new improved two-parameter CFAR method has been proposed. Thus, the method not only has high detection rate but can improve processing speed.

Key Words: SAR, ship target detection, CFAR, K- distribution, Two-parameter distribution.

COMPUTATION OF RUNOFF BY SCS-CN METHOD USING REMOTE SENSING AND GIS

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Abstract

Watershed management plays vital role in water resources engineering. It is necessary to plan and conserve the available resources. Remote Sensing (RS) and Geographic Information System (GIS) techniques can be used effectively to manage spatial and non-spatial data base that represent the hydrologic characteristics of the watershed. A study was conducted to estimate the runoff by SCS-CN method using RS & GIS technique. The study area considered is Dhulapally watershed in Malkajgiri district of Telangana State with an area of 80.86 sq.km. The spatial and non-spatial data were collected from various departments and thematic layers of land use, hydrologic soil group were prepared and overlaid with one another, the overlaid output results were assigned curve numbers with respect to soil and land use categories. The most prominent land use classes were cultivated/open land, forestland, built up area and hydrologic soil group for the project area is identified as C. Finally, runoff is calculated by based on the past 31 years' rainfall data i.e., from 1978 to 2008. The result obtained by SCS-CN method show that the average annual runoff depth of watershed is 294.8 mm & total runoff volume is 23.87 Mm³. Regression equations for Exponential, Linear, Logarithmic, Polynomial and power assuming the rainfall as an independent variable and runoff as the dependent variable is plotted, reliability and performance of the relation obtained by graph was checked by computing the correlation coefficient and found that Polynomial rainfall runoff empirical relation gives the highest coefficient of correlation in all the time periods.

Keywords: Rainfall, Runoff, SCS-CN Method, RS, GIS.

BREWERY EFFLUENT IMPACT ON CHICKPEA GROWTH, YIELD AND SOIL PROPERTIES

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Abstract

Use of wastewater increased largely because of water scarcity issues and also due to continuous demand on scarce fresh water sources. Several studies have been conducted on safe reuse of wastewater and its implications on soil properties and plant growth. This study is also conducted to know the effect of brewery wastewater on chickpea growth and also on soil properties. A pot scale experiment using black soil was conducted in green house of ICRISAT, Telangana. From effluent treatment plant (ETP) of SAB Miller beer factory, three types of water samples were collected i.e., 1) effluent of up-flow anaerobic sludge blanket reactor (UASBR), effluent of tertiary clarifier (TC) of ETP and reject effluent of reverse osmosis (RO) plant. Study contained five types of treatments—tap water as control, UASBR-50% (50% UASBR effluent + 50% distilled water), ETP-50% (50% TC effluent + 50% distilled water), ETP-100% (TC effluent without dilution) and RO-10% (10% RO reject + 90% distilled water) with three replications in completely randomized design. Initial soil and soil samples of respective treatment at the end of 90 days were collected and analyzed for parameters like pH, EC, NPK and Na. At the end of experiment (90 days), plants were harvested and respective treatment plant height, dry weight and yield were recorded. Results of study revealed that root height (32.3 cm) and shoot height (46.3 cm) were highest with RO-10%, root (6.1 gm) and shoot (18.8 gm) dry weight were highest with UASBR-50%, Highest yield was achieved with ETP-100% (39.7 gm). pH, EC, N, P and Na concentrations increased and K concentration decreased considerably from Initial to end of experiment (90 days). From initial to end of experiment, 367% and 99% increase in EC and P concentrations respectively was recorded with UASBR-50% treatment. Whereas, ETP-100% showed 687% increase in Na concentration and 60% increase of N concentration achieved with ETP-50% treatment. Hence from the present study, it can be concluded that application of brewery wastewater showed positive effect on plant growth of chickpea and also enhanced the soil fertility.

Keywords: Wastewater reuse, Brewery wastewater, Chickpea, Soil properties.

ESTIMATION OF LIFE OF RESERVOIR UNDER THE CONDITIONS OF NON AVAILABILITY OF SEDIMENT SURVEYS

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Abstract

Pulichintala reservoir is a new reservoir constructed in between Nagarjunasagar reservoir and Prakasam barrage in Krishna basin. This reservoir will stabilize the age old ayacut of Krishna delta which is 250 years old. It is necessary and required to know for how long this reservoir will be serving Krishna delta and will become de-functional to meet its purpose of meeting the demands of Krishna delta with improved performance. Therefore it is proposed to estimate the life of this reservoir. The sediment observations at wadenepalli just upstream of Pulichintala on Krishna basin by CWC are utilized and the silt loads reaching the reservoir is estimated. Trap efficiency is estimated by Brunes trap efficiency curves. The distribution of sediment across the reservoir is done using area reduction method as specified in the code. The life of the reservoir is considered as that period when 50 % of live storage is lost due to sedimentation. The life of reservoir worked out to 138 years.

Keywords: Sedimentation, Pulichintala reservoir, Brunes trap efficiency curves, Krishna delta, Area reduction method

COMPUTATION OF RUNOFF BY SCS CN METHOD USING SPATIAL MODELING IN ERDAS IMAGINE

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Abstract

Runoff estimation is requirement in a watershed for design of hydraulic structures, reservoir maneuver and for control measures of soil erosion. Runoff is an important parameter for water resource planning and management which is significant during draught conditions, regions of arid and semi-arid. The occurrence of runoff is affected by several factors like geo-morphological structures and type of watershed with different land use changes that effect the volume of runoff and rate of runoff significantly. Hence, a hydrological model depends on land use and type of soil to estimate runoff volume. For the computation of runoff the soil conservation service curve number (SCS-CN) method is used for a given rainfall for different Land Use /Land Cover in the study. In this study remote sensing (RS) and geographic information systems (GIS) are applied in combination with the SCS-CN method for precise and timely estimation of runoff. The remote sensing imagery used are Landsat ETM+ images and soil maps are pre-processed and maps are generated using ERDAS IMAGINE and Arc GIS softwares. The different land use land cover was generated from Landsat satellite images for the years of 2004 and 2011. The most predominant land use land cover was found to be agricultural land and water bodies. The soil groups were categorized into soil hydrological group depending on the infiltration capacity of the soil. Three types of soil hydrologic groups were mainly found namely A, B and C categories. The CN maps were prepared using the Arc GIS software with the input as land use land cover and soil map. At the final stage runoff was computed for 15 years from 2000 to 2014. The study area showed significant land use land cover changes from the year 2004 to 2011. The statistics were computed shows different runoff grid value varying across the years from 0 being the lowest when no rainfall occurred and 92.3 being the highest runoff during highest rainfall record for the year 2006.

Keywords: Runoff, SCS-CN method, ERDAS IMAGINE, Spatial modeler ArcGIS

**ASSESSMENT OF SPECTRAL SIGNATURES FOR DIFFERENT
VARIETIES OF COLACASIA SPECIES USING CONTINUUM
REMOVAL METHOD**

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Abstract

Every natural and artificial object reflects and emits electromagnetic adiation over a range of wavelengths in its own characteristic manner, according to its chemical composition and physical state. A basic assumption made in remote sensing is that specific targets have an individual and characteristic manner of interacting with incident radiation that is described by the spectral response of that target. Vegetation has a unique spectral signature which enables it to be distinguished readily from other types of land cover in an optical/near-infrared image. In this present research work developed spectral libraries using SVC Spectroradiometer for the different stages of growth and different varieties of colacasia (Taro) which is a tuber crop in the Sri Konda Laxman Telangana State Horticultural University Rajendranagar, Hyderabad by measuring and analyzing their reflectance curves using SVC and ENVI software. By developing the spectral libraries for the different varieties of colacasia at different stages of growth, and the continuum removal is performed for the developed spectral signatures. The analysis is done on the continuum removed spectral libraries to distinguish the different species and growth stages using the spectral libraries.

Key words: Spectral signatures, Spectral Library, Colacasia, Spectroradiometer.

A SYSTEMATIC REVIEW ON HYPERSPECTRAL DATA PROCESSING AND CLASSIFICATION METHODS

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1.

Abstract

Classification is a process of assigning a label to all the pixels in a digital image in order to produce an accurate thematic map. Factors like - spectral pattern present within the data for each pixel, spatial associations, purity and size of the training samples are used as a numerical basis for the classification. Hyper spectral data contain huge number of spectral bands with spatial resolution varying between few meters to hundreds of meters (fine to coarse). The spatial resolution of the hyper spectral data plays a very important role in imparting mixed pixels in the data and thus bringing challenges like data redundancy and ambiguity in processing and classifying the datasets. There are various advanced classification methods that have come up that help in handling these challenges and accurately classifying the voluminous hyper spectral data. Kernel based Support Vector Machines, Angle Mappers, Random Forests, Artificial neural networks, sub pixel un mixing classifiers; Markov Random Fields etc. are discussed in detail along with few other techniques. The current paper gives a systematic review of initial hyper spectral data processing and various classification methods that can be used for classifying the hyper spectral datasets. Also, certain results that were obtained from classifying hyper spectral datasets using various classifiers and their comparisons are also addressed.

Keywords: Hyper spectral data, classifications, Support Vector Machines, Artificial Neural Networks, Random Forest, Un-mixing.

NUMERICAL SIMULATION OF FRANCIS TURBINE USING COMPUTATIONAL FLUID DYNAMICS – CFX

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Abstract

Turbine is the most critical component in hydropower plants because it affects the cost and as well as overall performance of the plant. Hence, for the cost effective design of any hydropower project, it is very important to predict the hydraulic behaviour and efficiency of hydro turbines before they are put in actual use. Experimental approach of predicting the performance of hydro turbine is costly and time consuming compared to CFD approach and hence the numerical simulation using CFD approach plays a vital role. The main aim of the project is to predict the performance and efficiency of Francis turbine using CFD approach and to validate the same with analytical calculations. The efficiency of draft tube is also predicted though CFD approach. The numerical simulation is carried out in CFX solver using ANSYS 17.2. The overall efficiency of the turbine is determined based on the fundamental equation. The overall efficiency when compared with the analytical values for the present case study is in proper agreement using k-epsilon model in CFX solver. This makes us understand to a large extent that, the CFD approach has once again proven to be a helpful tool in analyzing various features and performance of hydro turbines.

Keywords: Turbine, efficiency, draft tube, CFD, CFX

URBAN WATER MANAGEMENT IN INDIA.

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Abstract

Environmental Management in urban settings encompass many aspects including urban water management. Urban water management includes drinking and industrial needs of cities, the drainage system, treatment, rain water harvesting, runoff water routing to nearby tanks, flood water disposal etc. However the sewerage system is not exclusively considered in urban water management and it is assumed to be safe in terms of leakages, collection system, treatment and final disposal. But in urban areas the sewerage system is in peril due to haphazard concrete structures, illegal occupation of drainage streams, improperly designed roads and storm water management system and disposal of solid wastes in surface drainage. Indian cities are poorly equipped with disaster mitigation; especially in the event of urban flash floods the cities pose sever environmental threat to the habitants. In regulation of concrete structures, the role of Government limits to provision of rules related to rain water harvesting, front, rear and side setbacks and limiting the total height of the building etc. There are also rules stipulated by pollution control board in safeguarding the water by getting contaminated by industrial and domestic wastes. But in reality, very less has been achieved in management of urban water systems and it will not be possible with the coordination of all stakeholders. The present paper deals with such steps essential from various aspects in the urban water management. Satellite data and GIS are to be better utilized for urban water management which include watershed modeling to control the drainage, run off and flood water disposal. Reliable Cross drainage arrangements at suitable points on streets, roads and at junctions are suggested for better management of water. In this theoretical paper, we propose certain solutions as part of urban water management to achieve resilient and habitable urban environment.

Keywords: GIS, runoff water, Reliable Cross drainage, habitable urban environment.

**A GEOSPATIAL BASED STUDY ON ARTIFICIAL RECHARGE OF
GROUNDWATER RESOURCES MANAGEMENT IN GREATER
VISAKHAPATNAM MUNICIPAL CORPORATION,
VISAKHAPATNAM DISTRICT, ANDHRA PRADESH**

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Abstract

Water being one of the most important natural resources need to be conserved and managed properly. Owing to industrialization and urbanization Indian metropolitan cities, were constructed unscientifically leading to irrational urban planning. Unless the need for scientific planning is realized, it is sure to clear up the environment. The Greater Visakhapatnam Municipal Corporation (GVMC) city forms the area of the study in the present investigation. The population in the city is increasing at a rapid pace due to migration from surrounding areas, with corresponding increase in sub-urban areas also. The extensive growth of residential apartments along the coastal stretch resulted in excess withdrawal of groundwater initiating seawater intrusion in these tracts. All these factors combined, leading to an acute environmental crisis in the area. Forecasting urban water demand can be of use in the management of water utilities (Salvatore Campisi-Pinto, 2012). Thus there is need to recharge groundwater. The artificial recharge techniques enhance the sustainable yield in area and utilize the rainfall runoff which otherwise goes to sewer. Hence, it is necessary to manage the available water resources in an efficient manner. This is done by using advanced technologies like Remote Sensing and Geographical Information System

Keywords: Aquifer, Groundwater, Artificial recharge, remote sensing & GIS.

INFLUENCE OF VELOCITY ON MAJOR LIFT IRRIGATION PROJECTS

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Abstract

Lift Irrigation Projects are drawing more attention in changed scenario owing to the non-feasibility of Dams and Barrages; Lift Irrigation Projects gained momentum. In the days to come ;Lift irrigation projects are going to play vital role in irrigation sector to fill the gap ayacut created due to non provision of conventional irrigation structure. There are many regions located far away from water source high elevation requiring water immediately and providing lift irrigation projects has become inevitable. With thrust and lift irrigation projects, many projects are being taken up with lifting huge quantity of water from rivers and high heads with lengthy pipes; which was not dealt before with those magnitudes. Discharge and pumping head are the parameters; which govern the planning of the project. To achieve economy, better control over them is required. Major Lift irrigation Project needs optimization in planning while fixing the pumping head and pump capacity along with length and diameter of pressure mains. For optimization, discharge if pumps can be fixed with effective usage of tanks enroute the alignment and deriving advantage of lesser demand crop during non-peak period. Pumping head can be reduced considerable by selecting the duty point of pumps with respect to water levels in the source where maximum operation period is expected. Function and efficiency of the Lift Irrigation Projects mainly depend on the performance of pumps and pressure mains of pumps act as heart of Lift Irrigation Project and pressure mains act as nerves of Lift Irrigation Project. In this study an attempt has been made to analyze influence of velocity on project cost referring a case study of Alisagar Lift Irrigation Project apart from Pumps, Pumping head, Pump Capacity, advantages of minimum number of rows, precautions taken in laying and design of pressure mains, selection of pipe materials, number of pumps for better production at lower costs and explore means to optimize the efficiency of planning ,design, construction, operation and maintenance of Major Lift Irrigation Project.

Keywords: Lift Irrigation Project, Planning and Design, Velocity, Pumping Head and Discharge, Pump Capacity and Project Cost.

EFFECTIVE RAINWATER HARVESTING BY GIS ANALYSIS IN GRIET CAMPUS, BACHUPALLY

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Abstract

Rain water is the natural surface water resource and best useful for various purposes. It requires to store and reuse for the various human needs. The quality of rain water is especially depends on the zone and area of rain fall. The quantity of rain fall depends on the arid and semiarid region. Rain water is the best quality water which can be used for the drinking, irrigation, industrial and gardening and for the cleaning and other purposes. The rain water is very precious and good water resource freely available in seasonally and occasionally. Different countries are adopting various procedures to Harvest the rain water for the needs. In this paper discussed about the type of harvesting methodology and selected one of the two best method to proposed to implement in the GRIET Campus.

Keywords: Rainwater Harvesting, Gis Analysis, GRIET

OPTIMAL CONTROL OF WATER DISTRIBUTION AT DAMS & RESERVOIRS USING SCADA & TELEMETRY

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Abstract

In order to meet the end customers requirement there is a need to demand for the Supply of water that is transmitted via interconnected pipes from the source dams & reservoirs through valves and pumps by controlled pressure regulations. These supply elements are categorized as active and passive. Those elements that can be operated by controlling the flow of water and pressure viz., valves, pumps etc. are defined as active whereas the reservoirs are treated as passive. This discussion is focused primarily on overview of SCADA, Architecture of SCADA, and its Operation. The study area considered is Osmansagar & Himayatsagar Reservoirs to understand the water losses happening here using SCADA & Telemetry Units. The preliminary data of both the reservoirs were collected via the internet.

Keynotes : SCADA, Osmansaga, Himayatsagar, valves, pumps.

AN ASSESSMENT OF RAINFALL EROSION POTENTIAL IN AKOLA FROM DAILY RAINFALL RECORDS

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Abstract

This study observed rainfall graph, which are measured rainfall by automatic recording rain gauge collected from the Central Research Station, Dr. PDKV, Akola and analyzed the a rainfall data for period of eight year from 2004 to 2011. A more simple quick and time saving method for estimating Erosion Index is needed for soil conservation planner to predicts this information factor of USLE. The kinetic energy from these-storm for 8 years of daily rainfall data for duration 5,10,15,30 and 60 minutes. The daily precipitation index for daily, monthly and annual index values for 5,10,15,30 and 60 minutes. Relation between the erosion index and precipitation index is obtained for 5,10,15,30 and 60 minutes for Akola Station. Daily PI and EI values of 5,10,15,30 and 60 minutes selected time intervals were computed for the period of 8 years from 2004 to 2011 by using Raghunath's method for 144 erosive storms. It is found that, 144 erosive storm correlation co-efficient for 5 minutes is 0.73, for 10 minutes 0.42, for 15 minutes 0.50, for 30 minutes 0.77 and for 60 minutes 0.48 are resulted for the observations.

Keywords- Erosion index, precipitation index, USLE etc.

ANALYSIS OF GROUND WATER QUALITY PARAMETERS RANGA REDDY DISTRICT, TELANHANA

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Abstract

Due to human and industrial activities the ground water is contaminated. This is the serious problem now a day. Thus the analysis of the water quality is very important to preserve and prefect the natural eco system. The assessment of the ground water quality was carried out in the different wards of Ranga Reddy District. The present work is aimed at assessing the water quality index (WQI) for the ground water of Ranga Reddy District and its industrial area .The ground water samples of all the selected stations from the wards were collected for a physiochemical analysis. For calculating present water quality status by statistical evaluation and water quality index, following 12 parameters have been considered Viz. pH, total dissolved solids, dissolved oxygen, electrical conductivity, chlorides, sodium, potassium, total alkalinity, acidity, total hardness ,temperature, turbidity . The obtained results are compared with Indian Standard Drinking Water specification IS: 10500-2012. The study of physico-chemical and biological characteristics of this ground water sample suggests that the evaluation of water quality parameters as well as water quality management practices should be carried out periodically to protect the water resources.

Keywords: Ground water, water quality standards, physico-chemical, Water Quality Index

ANALYSIS OF WATER QUALITY IN SEWAGE TREATMENT PLANT- BUDDHA PURNIMA PROJECT

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Abstract

Sewage may be defined as the used water or liquid waste of a community, which includes human and household wastes together with street washings, industrial wastes and such ground and storm water as may be mixed with it. Sewage must ultimately be disposed into receiving waters or on the land. Treatment of the sewage is required to remove all the contaminants from it before the same is disposed off to a natural water body or on to the land, which otherwise can cause adverse affects on health and environment. The main objective of this work is to analyze the outlet samples of each chamber such as receiving chamber, filtration unit, grit chamber, aeration tank, settling tank and outlet chamber in the process of treatment of domestic waste water at Buddha purnima project site Hyderabad. The parameters analyzed are PH, EC, COD, TS, TSS, TDS, Ammonical nitrogen, Phenols and Metals like cadmium, lead, zinc, nickel, manganese, copper and chromium. The instruments such as pH meter, EC meter, desecator, hot air oven and atomic absorption spectrometry method are used in the analysis. The values obtained in this analysis are compared with CPCB standard values. From the analysis it is found that pH, TDS, Ammonical nitrogen, phenols and heavy metals such as cadmium, lead zinc, nickel, manganese, copper and chromium are within the limits of CPCB. However two parameters namely COD and TS are exceeding the limits recommended by CPCB. It is also found EC and TSS is very close to the CPCB limits. Therefore treatment for these parameters COD, TS, EC and TSS are to be improved.

Key words: Sewage Treatment, Buddha Purnima project, Water Quality.

TWO DIMENSIONAL INDUCED POLARIZATION IMAGING TO DELINEATE THE KAOLINIZED ZONES IN THE KHONDALITIC TERRAIN

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Abstract

An attempt is made with Two Dimensional (2D) Induced Polarization (IP) techniques for the investigation of high yielding water wells in the khondalitic terrain of northern parts of Eastern Ghats of India. This khondalitic terrain is mostly faced with the problem of identification of the extent of the depth of kaolinisation of the aquifer. The traditional One Dimensional (1D) Vertical Electrical Sounding survey could not identify the kaolinisation of the aquifer. The 2D IP Imaging surveys are attempted for the identification of kaolinised layer and the depth of kaolinisation. Number of 2D IP Imaging profiles was conducted using an ABEM SAS 1000 Terrameter near Chipurupally in Vizianagaram district along successful and failed wells located within short distances. The 2D IP Chargeability images have provided a reasonable clarity about the occurrence of the highly weathered zone (kaolinised zone) at both successful and failed wells. The layers having the high thickness obtained at greater depths with higher chargeability values below the success wells are identified as aquifer layers in the khondalitic suit of rocks. It can also be observed that below the success well, the formations having the low chargeability values with lesser thickness are obtained at the shallow depths. The layers having the high thickness obtained at greater depths with lower chargeability values below the failed well are indicating the kaolinised formations which are responsible for failure of wells.

Keywords: Khondalites, Kaolinisation, Eastern Ghats, Vertical Electrical Soundings, 2D Induced Polarization Technique.

STUDY OF GROUNDWATER FOR MULTI-PURPOSE USE FROM MINI WATERSHED, SOLAPUR, MAHARASHTRA

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Abstract

There are 1531 watersheds in the state of Maharashtra. The Shelgi nala watershed covering an area of 183sq.km falling in drought effected district of the state. The area is bound by north latitudes 17°41' and 17°47' and east longitudes 75°15' and 75°57' forming part of the survey of India topographic sheets 47 O/ 14, 47 O/ 13, 56 C/1 and 56 C/2. Sampling of groundwater was carried out at 48 locations. The physico-chemical parameters analyzed were Na, K, Ca, Mg, Cl, HCO₃, CO₃, SO₄ and NO₃ and various indices calculated are Na%, SAR, RSC, CAI-I and CAI-II. The concentrations of various parameters for potability were compared with those of WHO (2004) standards. The scenario for the parameters is conflicting but for many parameters the values are within the permissible range. The dominant hydro chemical facies is Ca²⁺-Mg²⁺-Cl⁻-SO₄⁻; Na⁺-K⁺-Cl⁻-SO₄⁻ and Ca²⁺-Cl⁻-SO₄⁻ types. The plot on the Gibbs diagram indicates the samples falling in the rock domain reflecting the role of aquifer chemistry and climatic conditions. The groundwater chemistry further, reflects its suitability for irrigation purpose through the USSS classification falling in the range of C₂S₁ and C₄S₁ categories. The paper brings about various quality aspects in determining the usage of groundwater for various purposes.

Keywords: Groundwater Quality, Hydro geochemical study, Watershed