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2019 ESCC

EPISIRUS SCIENTIFICA™

Proceedings of

2019

Environmental Science

& Climate Change Conference

2019

EDITION



Proceedings of

2019 ESCC



*2019 Environmental Science
and
Climate Change Conference*

SEPTEMBER 10-11, 2019

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2019ESCC

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SCIENTIFIC PROGRAM

Day 1: September 10th, 2019

Hall: Balestier 2

09:30 - 09:50

Registration

09:50 - 10:00

Opening Ceremony

10:00 - 10:30

KEYNOTE FORUM



Title: The Human Sphere and Its Impact

Robert D. F. Thomas, Director, Environmental Compliance, Sysco, USA

10:30-10:35

Group Photo Session

10:35-11:05

Networking and Refreshments Break

Speaker Sessions: Corporate Sustainability | Sustainable Development and Green Technology | Renewable Energy | Waste Recycle & Reuse Methods | Climate Change & Impacts



Session Chair: *Robert DF Thomas, Director, Environmental Compliance, Sysco, USA*

Session Co-Chair: *Rajeev Pratap Singh, Department of Environment and Sustainable Development, Institute of Environment and Sustainable Development, Banaras Hindu University, India*



11:05 - 11:35

Title: Lidar-based flood hazard modelling and simulation towards climate resiliency

Floresca Januel, College of Engineering, Isabela State University, Echague, Isabela, Philippines

11:35 - 12:05

Title: Microbiological and Cytogenetic Assessment of Irradiated Philippine Aglibut Sweet Tamarind (AST) Fruit (*Tamarindus indica*)

Gabino E. Santos, College of Arts And Sciences, Environmental Science Department, Our Lady of Fatima University, Philippines

12:05 - 12:35

Title: An Invasion of Weeds at Uttarkashi District of Uttarakhand due to Climate Change

Mahendra Pal Singh Parmar, Department of Botany Govt. P.G College Uttarkashi

Panel Discussions

12:35 -13:35**LUNCH BREAK****13:35 - 14:05****Title: Energy recovery potential from municipal solid waste: A promising sustainable solution for waste management***Rajeev Pratap Singh, Department of Environment and Sustainable Development, Institute of Environment and Sustainable Development, Banaras Hindu University, India***14:05 - 14:35****Title: Key of Sustainability and Environmental Innovation for Integrated Nickel Mining and Processing: an Initiative of PT Vale Indonesia Tbk, Sorowako, Indonesia.***Sudirman Payangan, PT Vale Indonesia Tbk***14:35 - 15:05****Title: Impacts of cropping sequences on aggregate stability and associated nutrients under differentially tilled rice paddy soils***M.M.R. Jahangir, Dept. of Soil Science, Bangladesh Agricultural University***15:05 - 15:35****Title: Using A.I. to save building energy***Mr. Tin Cheung Wong, Yau Lee Holdings Limited, Hong Kong***15:35 - 16:45****Poster Session****P1****Title: Copper Recovery from Acidic Wastewaters generated in Electronic Manufacturing Processes***Min-Chan Kim, Institute of Technology, SehwaVL, Korea***P2****Title: Hydraulic Performance Evaluation of Rainwater Harvesting Techniques to face climate changes in dry environments***Paolo Tamagnone, Department of Environment, Land and Infrastructure Engineering, Italy***P3****Title: Using the Delphi Technique to Explore Core Tasks in Government Organizational Reform***Ping-yang Wu, Dept. of Comprehensive Planning, Environment Protection Administration, Executive Yuan, Taiwan***16:45 - 17:00****Networking and Refreshments Break****17:00 - 17:30****Video Presentation****V1****Title: Historical Tree Height Growth associated with Climate Change at The Species Geographic Range in Western North America***Yassine Messaoud, Faculty of Natural Resources Management, Lakehead University, Canada***V2****Title: The Evaluation on Environmental Processes, Hazards, Resources, Land uses and Socio Economic Conditions of Saint Martin Island, Cox's Bazar, Bangladesh***Md. Galib Ishraq Emran, Department of Environmental Sciences, Jahangirnagar University, Bangladesh***17:30 - 17:35****E-Poster Presentation**

EP

Title: Ecological Activities of Heterorhabditis Isolates and their Tolerance to Environmental Extremes and Reproduction Potential

Faiza El Assal, Department of Zoology, Faculty of Science, Cairo University, Egypt

END OF DAY 1

Day 2: September 11th, 2019

10:00-12:00

Networking and Refreshments Break

12:00-13:00

LUNCH BREAK

END OF DAY 2

JOURNAL PARTNER



About Health Education Bureau:

Objective: "To bring innovative & affordable education and health products, so as to make education and health in reach of every Indian"

Genesis: Health-Education, Bureau (INDIA) is a indian philanthropic organisation, the bureau was launched, with the blessings of former President **Dr.APJ Abdul Kalam**. It's prime aim is to bring innovative & affordable education and health products, so as to make education and health in reach of every Indian.

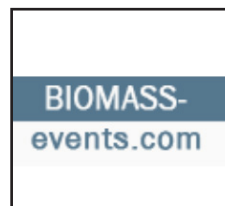
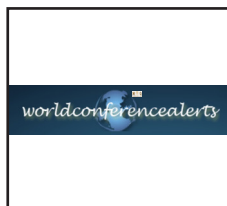
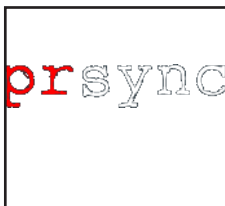
Presently the bureau is promoting journals like "Journal of hospital pharmacy", "SCR (supreme court report)", "CASS Studies" & software like "Ex-Pharm Series", "Ex-Physio Series", "Software - EWL (software for - English word's worth learning)", Ayu hosp", "Homeohosp", "Digi Frog" & "Plag Check Software".

About CASS Studies:

ISSN NO: 2581-6403

CASS Studies (Comprehensive Advanced Specific Summarised Studies) is a multidisciplinary, bi-annual Journal and its language is English (Addendum are published on monthly basis). "CASS Studies" publishes original research articles, review articles and case reports in the diverse areas.

COLLABORATORS & MEDIA PARTNERS



Day 1

KEYNOTE FORUM





Robert D. F. Thomas

Environmental Compliance, Sysco, USA

The Human Sphere and Its Impact

Robert D. F. Thomas, Director, Environmental Compliance, Sysco, USA

In his 1994 book “Earth in Mind”, David Orr wrote that “if today is a typical day on planet Earth, we will lose 116 square miles of rainforest, another 72 square miles to encroaching deserts as a result of human mismanagement and overpopulation, 40 to 100 species will be lost, an additional 15 million tons of carbon will be added to the atmosphere and the human population will increase by 250,000” (Abel & McConnell, 2008, pg. 19). Thus, one can easily suggest that the human sphere through the lens of sustainable development is vast and multidimensional; as humans are the dominating force that has shaped the past, current, and the future of the world. For example, issues such as poverty, climate change, universal health, overpopulation, resource depletion, food and water scarcity, political instability, and the degradation of our environment are all interconnected. Yet, the primary driver impeding sustainable development is economic growth; thus, creating inequality from the top of the pyramid to the bottom. Additionally, an ecological, social, political and global crisis has been building since the Industrial Revolution. What comes to mind when I think of the human sphere is our carrying capacity. A scientific term, carrying capacity is defined as “the number of individuals an environment can support without degrading a population’s ecosystem” (Robertson, 2014, pg. 41). That said; our “planetary system is currently operating at 140 percent of its capacity” (Gilding in Robertson, 2014, pg. 41). In other words, the planet’s carrying capacity is currently being strained by human consumption patterns. For example, if every country lived at the standards of the “United States and Canada, we would need 4.5 more planet Earths” (Robertson, 2014, pg. 41) to support humanity. In 1971, biologist Paul Ehrlich and physicist John Holdren developed a formula called “IPAT”, written $I=P \times A \times T$ to summarize the drivers of environmental degradation (Robertson, 2014, pg.41). The “I” stands for Impact, the “P” stands for Populations, the “A” stands for Affluence, and the “T” stands for Technology (Robertson, 2014, pg. 41). Or we can simply say that “IPAT” stands for environmental Impacts on the planet due to the Population growth of humans and our Affluence on the world, as well as, the Technology used to harm the planet.

The question that comes to mind is...What impact do individuals, institutions, organizations and governance systems have on creating real change through the lens of sustainability? Accordingly, the word sustainability derived from the Latin *sustinere*, which means to hold up. Yet, one could easily argue that society is not holding up but rather on the break of the Great Unraveling. The Great Unraveling encompasses the following: Economic Decline, Resources Depletion, Climate Change, Social Division and War, as well as, Mass Extinction of Species (Macy and Johnstone, 2012, pg. 17). Specifically, the Great Unraveling is due to the rise of multinational corporations and the global economy that has created rival sources of authority and power. Thus, causing governmental structures, organizations and decision-makers to diverge widely country by country. Intrinsicly, the common challenge is how to imbue them with a greater degree of foresight, accountability, transparency and responsiveness. Therefore, this paper/presentation will seek to examine, explore and bridge the gap between society, the environment, institutions and organizations, as well as, governance systems through the lens of sustainable development.

Keywords: Corporate Sustainability, Economic Prosperity, Environment, Social Well-being, Sustainability Compass, Sustainable Development, Eco-Efficiency, Environmental Social and Governance (ESG), Four R’s, Human Sphere, Natural Capital, Human Capital, Manufactured Capital, Earth Democracy, Social Change, System Thinking, 3-Ps, 3-Es, Planetary Boundaries, Carrying Capacity, IPAT

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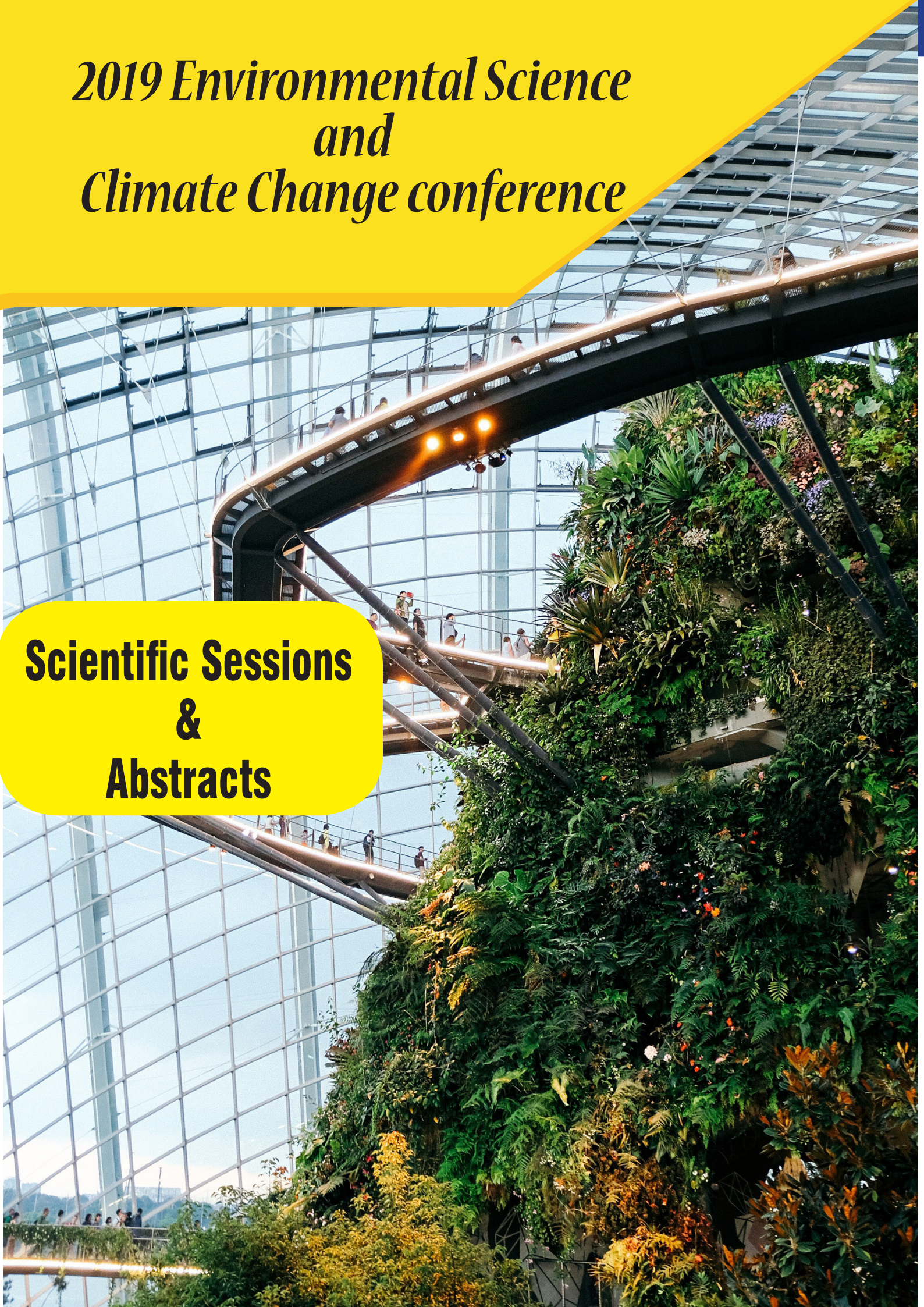
Abel, D.C. and McConnell, R.L. (2008). *Environmental Issues: Introduction to Sustainability*. Upper Saddle River, NJ|Pearson Prentice Hall

Macy, J. and Johnstone, C. (2012). *Active Hope: How to Face the Mess We’re in Without Going Crazy*. Novato, CA |New World Library

Robertson, M. (2014). *Sustainability Principles and Practice*. New York, NY | Routledge

2019 Environmental Science and Climate Change conference

**Scientific Sessions
&
Abstracts**



SESSIONS

Day 1, September 10-11, 2019

Session Chair:

Robert DF Thomas

Director, Environmental Compliance, Sysco, USA

Session Co-Chair:

Rajeev Pratap Singh

Department of Environment and Sustainable Development,
Institute of Environment and Sustainable Development,
Banaras Hindu University, India

Speaker Sessions: Corporate Sustainability | Sustainable Development and Green Technology | Renewable Energy | Waste Recycle & Reuse Methods | Climate Change & Impacts

Title: Copper Recovery from Acidic Wastewaters generated in Electronic Manufacturing Processes

Min-Chan Kim, Institute of Technology, SehwaVL, Korea

Title: Lidar-based flood hazard modelling and simulation towards climate resiliency

Floresca Januel, College of Engineering, Isabela State University, Echague, Isabela, Philippines

Title: Environmental Significance of the Study of the Sediments and Benthic Foraminifera from the Polluted Waters of the Visakhapatnam and Kakinada Harbour Channels, East Coast of India

Bangaku Naidu K, Centre for Environment, Jawaharlal Nehru Technology University Hyderabad, Telangana, India

Title: An Invasion of Weeds at Uttarkashi District of Uttarakhand due to Climate Change

Mahendra Pal Singh Parmar, Department of Botany Govt. P.G College Uttarkashi

Title: Energy recovery potential from municipal solid waste: A promising sustainable solution for waste management

Rajeev Pratap Singh, Department of Environment and Sustainable Development, Institute of Environment and Sustainable Development, Banaras Hindu University, India

Title: Key of Sustainability and Environmental Innovation for Integrated Nickel Mining and Processing: an Initiative of PT Vale Indonesia Tbk, Sorowako, Indonesia.

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M.M.R. Jahangir, Dept. of Soil Science, Bangladesh Agricultural University

Title: Microbiological and Cytogenetic Assessment of Irradiated Philippine Aglibut Sweet Tamarind (AST) Fruit (Tamarindus indica)

Gabino E. Santos, College of Arts And Sciences, Environmental Science Department, Our Lady of Fatima University, Philippines

Copper Recovery from Acidic Wastewaters generated in Electronic Manufacturing processes

Min-Chan Kim¹, Young Goo Park¹, Hee Jun Lim¹, Ji Yoon Park¹, You Lip Jeon¹, Ji Min Yu², Min Soo Kim², and Han S. Kim^{2}*

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²*Department of Civil and Environmental Engineering, Konkuk University, Seoul, 05029, Korea*

In Korea, the amount of copper used as a primary source for raw materials and core parts in electronic industries has increased substantially due to the rapid development in electronics industry, which results in increase in wastewaters generated in manufacturing processes [1]. These copper-containing wastewaters are generated by the use of strong inorganic acids such as hydrochloric, nitric, and sulphuric acids. These acidic wastewaters contain 1~10% copper (w/w) but it is very difficult to develop a recycling process making it into a commercialization technology due to the complexity of recycling process and high operation cost [2]. In this study, an optimized process for the recovery of copper and inorganic coagulant from acidic wastewaters was developed on a field-scale. It was also compared with conventional copper recovery processes with regard to performance efficiency and cost effectiveness. 3 types of acidic wastewaters were used in this process for the recovery of copper and inorganic coagulant. In the case of hydrochloric acid wastewater, copper was recovered as a solid form by iron substitution reaction, and iron (II)-chloride coagulant was produced as a by-product. However, in the case of nitric acid wastewater, neutralization reaction using sodium carbonate was required, and copper carbonate sludge was produced. Then, copper was substituted using iron chloride and it was recovered as in the case of hydrochloric acid wastewater. In the case of sulphuric acid wastewater, copper was recovered by the substitution reaction with aluminium, and aluminum sulfate was generated as a by product. The recovery rate and purity of copper were 99.5% and 99.5%, respectively, and the coagulation efficiency of inorganic coagulant recovered in this study was as good as 98% of commercial refined coagulants used for wastewater treatment processes. The results of this study are useful for the recovery of high purity copper and inorganic coagulant from wastewaters various industries.

Acknowledgement

This research was supported by the Research and Business Development Program funded by the Korea Institute for Advancement of Technology and the Ministry of Trade, Industry and Energy (P0003792), the Research and Business Development Program funded by the Korea Institute for Advancement of Technology and the Ministry of Trade, Industry and Energy (P0003792), the National Research Foundation of Korea Grant funded by the Korea Ministry of Science and ICT (2016R1A2B4010126/2019R1A2C1008706).

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- [2] Ministry of Environment in Korea, Research on establishment statistical-based of waste- metal resources, (2018), 135-179

Biography:

Min-Chan Kim gained his master's degree from Konkuk University, Korea. For the last 9 years, he has worked as a soil & groundwater remediation engineer. He has designed and supervised over 30 site (over 3 billion US\$ in total cost). He is currently working at the R&D Center in Sehwa VL for waste recycling for the development of the future technologies .

Lidar-based flood hazard modelling and simulation towards climate resiliency

Floresca Januel P.

College of Engineering, Isabela State University, Echague, Isabela, Philippines

The aim of this paper is to show the accuracy of a new flooding simulation system, based on light detection and ranging (LiDAR)-derived elevation data [1] such as digital terrain and surface models (DTM and DSM), capable of predicting the impacts to agriculture, aquatic, forestry and natural resources (AAFNR) and properties at specified rainfall scenarios [2] to achieve climate resiliency through accurate and high resolution maps to be used for flood advisory (early warning) system before the flood actually happens. Covering 6,087.48 sq. km processed LiDAR data in 10 selected river basins (RBs) in Northeastern Luzon, accuracy of calibrated and validated DTM and features extracted from DSM had passed the allowable 2.0 root mean square error (RMSE) [3]. The calibrated and validated Hydrologic Engineering Center-Hydrologic Modelling System (HEC-HMS) models obtained satisfactory efficiency test values such as Pearson correlation coefficient (r^2) of 0.89-0.97 and Nash-Sutcliffe Error (NSE) of 0.77-0.96 which were close to 1.00, more negative percent bias (PBIAS) and low standard deviation ratio (RSR) of 0.19-0.48 indicating an almost perfect match between simulated and observed outflows. Accuracy of validated flood heights were satisfactory with 0.46-2.01 m RMSE. Hydrologic Engineering Center-River Analysis System (HEC-RAS) simulation results at 100-year rainfall return periods showed that flood areas mostly affected residential buildings [4]. Among the 10 RBs, it was worth-noting that Aunugay RB having only 14.39 sq. km. flood area affected 1,912 residential buildings within short time period of 1.0 hr. Its flood areas also affected 7.00 sq. km cultivated areas and 4.03 sq. km. clay loam soil. Flood simulations can be ran during every rainfall events with rainfall data (mm/hr) and water levels (m/hr) over at least 24 hour period and produce realistic flood maps that fit into calibrated and validated DTM thereby able to accurately locate flood hazards affecting a wide scope of AAFNR and properties [5].

References

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Biography:

Januel has completed his PhD in Environmental Science at the University of the Philippines Los Baños, Laguna in 2007 at the age of 37. He is now a full-fledged professor of the Isabela State University (ISU) and the Center Director of the Climate Change Center and the Geomatics for Sustainable Development Center of ISU. He had completed research projects funded by various institutions and presented award-winning papers in various national and international scientific conferences.

Environmental Significance of the Study of the Sediments and Benthic Foraminifera from the Polluted Waters of the Visakhapatnam and Kakinada Harbour Channels, East Coast of India

Bangaku Naidu K, Anji Reddy M

Centre for Environment, Jawaharlal Nehru Technology University Hyderabad-500085, Telangana, India

Numerous studies on pollution ecology of Foraminifera have been made all over the world ([1],[2],[3],[4],[5],[6],[7],[8],[9],[10],[11],[12],[13],[14] and [15]). Although a few such studies have been undertaken on the West Coast of India ([16],[17] and [18]) and East Coast of India ([19],[20] and [21]). Hence, these studies are proposed to make a detailed and systematic study of the Foraminifera ecology of the Visakhapatnam and Kakinada Harbour Channels.

Foraminifera have been reported from marine environments extending from tidal pools in marshy areas to the abyssal plains in the seas or oceans. The ecological parameters such as salinity, temperature, dissolved oxygen, pH, etc., and substrate and its organic matter content play a major role on the living conditions and the morphology of the Foraminifera. When the ecological parameters and the sediments are affected by pollution, they in turn affect the metabolism and the morphology of the fauna mentioned above. Some species of Foraminifera and s occur abundantly withstanding the highly polluted environments and can be considered as pollution indicators. According to James Hutton (1726-1797) and Sir Archibald Geike (1835-1924) “the present is the key to the past”. The pollution effects on recent fauna and the sediments and various ecological parameters can help us to reconstruct the palaeogeography of any area affected by pollution. The Visakhapatnam and Kakinada Harbour channels consist of highly polluted environments. The Visakhapatnam Harbour channels (one outer channel and two inner channels) are polluted by domestic and industrial sewage, appreciable amounts of manganese and iron ore dust and other minerals which settle in the waters during loading and unloading operations, fuel lets off the exhausts of ships and other crafts rendering the water less transparent. The waters of the Kakinada Harbour channel are also polluted by domestic and industrial sewage and oillet off the exhausts of ships and other crafts. Hence, these two areas are considered for the study of the sediments and the living conditions and morphological modifications of the Foraminifera and s occurring there in which will be considered as useful tools in palaeoecology and palaeogeography and thereby palaeoenvironments. The Foraminifera certain of their environmental factors that control their distribution and abundance, and seasonal variations in distribution and abundance in the two areas. The faunal charts representing the number of various species both living and dead at each station will be prepared for interpretation which will be useful in the delineation of paleoenvironment. The society is facing many problems from environmental pollution and to take necessary measures to protect the society/country from environmental pollution.

Key words: Foraminifera, substrate, ecological parameters, pollution, sewage, paleoenvironment, palaeogeography, palaeoecology, Harbour channels.

Biography:

Kilaparathi Bangaku Naidu is a UGC- Dr. D. S. Kothari Post Doctoral Fellow of Environmental Science and Technology, Centre for Environment, Jawaharlal Nehru Technological University Hyderabad (JNTUH) India, Dr. Naidu received Ph.D in Geology from Andhra University, Visakhapatnam in 2016, M.Sc in Geology and Bachelor of Sciences (B.Sc) from Andhra University in 2008 and 2006 respectively and research interest in Geochemistry, Micropalaeontology, Marine Geology, Sedimentology. Dr. Naidu has published fifteen research publications that have been cited over eight times, and his published reputed Journals. He also delivered number of lectures on these areas of research in national.

An Invasion of Weeds at Uttarkashi District of Uttarakhand due to Climate Change

Mahendra Pal Singh Parmar , Department of Botany Govt. P.G College Uttarkashi

Weed commonly called khar-kabad in Uttarakhand or kharpatawar in India and worldwide. Any unwanted plant which reduces the productivity of our commercial crop, farmers are often concerned that weeds may reduce crop yields. Weeds use the same nutrients that crop plants use, often in very similar proportions. They also use resources such as water, sunshine and space that might have gone to crops. The more similar the weed and crop requirements, the more they will compete for those resources. Weeds that compete aggressively with crops reduce their yield. Weeds damage the crop yield and they are highly unwanted.

Four factors are especially important: density, timing, size and chemistry. For instance, at very high densities, green foxtail plants tend to compete strongly with each other and thus remain very small. These small plants probably have little competitive effect on the crop even when there are many of them. At medium densities, green foxtail plants grow larger and can severely reduce crop yields. In this example, a reduction in weed numbers may actually increase the weed problem.

Timing of weed-crop competition is important. Ecologists have defined a critical period of weed competition. This is the time when the weed reduces crop yield. Weeds that are removed before the critical period, or that emerge after the critical period do not cause any appreciable yield loss. The exact timing of this period is not an “inherent property of the crop” and varies for different crops, for different weed species, and under different conditions such as year or location. In general, weeds should be removed at early crop growth stages. Early weed removal was found necessary to protect field yield.

Relative timing of crop and weed emergence is very important in determining the magnitude of yield loss from weed competition (Singh et.al.) When it comes to plant competition, generally the first one out of the ground wins. Competition from wild oat resulted in a 17% yield loss in barley when it emerged five days before the crop compared to a 3% yield loss when wild oat emerged five days after crop emergence.

Weed size is partly a matter of timing. Weeds that emerge before the crop are generally larger and better established than those that emerge after the crop. This gives them greater access to soil and spatial resources, and thus they do more damage to crop yield. Size also varies among species. For instance, Canada thistle plants are naturally much larger, and likely to cause more yield loss, than thyme-leaved spurge plants. Size also depends on plant nutrition, disease, and pests.

Some weeds may limit crop development through chemical means, or allelopathy, either while they are alive, or as they decompose. Some weeds, for example (Naidu, 2012) or quack grass, release chemicals that inhibit their neighbors . This affects their competitive relationships.

Key Words: Weeds, nomadic grazing, introduction of new weeds, fertilizers, fungicides.

Energy recovery potential from municipal solid waste: A promising sustainable solution for waste management

Barkha Vaish¹, Pooja Singh², Rajeev Pratap Singh¹

¹Department of Environment and Sustainable Development, Institute of Environment and Sustainable Development, Banaras Hindu University, Varanasi-221005

²Department of Science, Institute of Computer Science and Technology, SHEPA, Varanasi, India

Diverse stream of waste is generated by human population living in urban and industrialized background. Improper disposal of municipal solid waste has potential to harm the environment and pose potential risk to human health. At the same time, ever-increasing energy demand is putting immense pressure on the non-renewable energy sources and there is a huge gap between demand and supply particularly in the developing economies. This has led the scientific communities to adopt innovative methods for tapping energy from waste. Waste-to-Energy is recognized as a means to dispose municipal solid waste, produce energy, recover materials, and free up scarce land that would otherwise have been used for landfill. Nowadays, there is a growing interest in waste to energy conversion technologies that could play a pivotal role in substantial energy recovery and bridging the gap between demand and supply of the energy requirement. Also, organic fraction of MSW provides an excellent opportunity for production of different value-added by-products that can be used as platform for energy generation through the biorefinery concept further fueling the circular bioeconomy.

Therefore, it is essential to critically assess and explore the untapped energy potential of solid waste that would be helpful in meeting two folds' problems at a time viz. waste management and energy security. In spite of its potential to serve developing nations, high costs and lack of expertise in installation and maintenance of waste-to-energy technologies restricts its widespread adoption in geographically isolated communities. Concerted efforts from both governmental and non-governmental sectors are absolutely essential in facilitating modernization and dissemination of waste-to-energy technologies to harness the inherent potential that is currently underutilized and unexploited.

Keywords: Municipal Solid Waste; Waste-to energy; Bioeconomy; Biorefinery; Sustainable.

Key of Sustainability and Environmental Innovation for Integrated Nickel Mining and Processing: an Initiative of PT Vale Indonesia Tbk, Sorowako, Indonesia.

Dewi Permatasari², Sudirman Payangan¹, Aris Prio Ambodo¹, Budiman Paelongan¹, Radios Hendrartijanto¹, La Ode M Ichman¹, and Deddy Aulia¹

¹PT Vale Indonesia Tbk.

²Environmental Professional – Renewable and Non-Renewable Energy

PT Vale Indonesia Tbk. (PTVI), located in Sorowako, South Sulawesi - Indonesia, is a subsidiary of Vale Global, one of the largest mineral mining and processing company in the world. Towards their mission to be an environmentally friendly and sustainable multi-mining company, this paper presents initiatives on environmental innovation that has been successfully implemented in recent decades. Since 2019, PTVI has begun to prepare a life cycle inventory for future Environmental Product Declaration as one of visualization on sustainability campaign.

This paper discusses about the best practice implementation in mining management and the reclamation- rehabilitation both plans and implementation by involving local communities. PTVI also pioneered in some improvement of operational consumption and installation of best available technology which also positively impacted on the surrounding environment, such as emission reduction, energy saving, waste water pollution reduction, utilization of both hazardous and non-hazardous waste is also taking into account. In terms of social responsibility, some environmental-based community development programs have been periodically monitored.

Other key successes of the programs implementation are seen in stakeholder involvement, emphasizing on local community and the government support. Participation and contribution to the government activities, from the district and provincial to national levels, are also the results of whole process initiated by the company and the surrounding stakeholders. All these sustainability initiative are intended for long term purpose, whereas after the post-mining activity phase has been reached, the environment is still viable for the next generation.

Keywords: Sustainability, Life Cycle Inventory, Environmental Innovation and Best Practice, Nickel Mining and Processing Industry, PT Vale Indonesia Tbk, Community and Stakeholder Involvement.

Impacts of cropping sequences on aggregate stability and associated nutrients under differentially tilled rice paddy soils

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²Soil Resource Development Institute, Regional Laboratory, Cumilla;

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Soil aggregation and associated nutrients regulate nutrient storage, flows and availability to plants. The objective of our study was to evaluate the impact of tillage and cropping pattern on soil aggregate formation and stability and associated nutrients under a subtropical rice-based ecosystem. A split-plot experiment in a RCB design with tillage systems (minimum, MT vs. conventional, CT) as a main plot and cropping patterns [mustard (*Brassica napus*)- rice (*Oryza sativa*)- rice (M-R-R), Wheat (*Triticum aestivum*)- rice - rice (W-R-R), and Lentil (*Lens esculenta*)- rice- rice (L-R-R)] as a sub-plot was conducted for a 4-year period (2014 to 2018). Composite soils were sampled after harvesting of transplanted Aman rice and analyzed for aggregate properties and within aggregate nutrient contents along with the bulk soil. Soil tillage had significant impacts on soil aggregation. In both MT and CT, the dominant aggregate size was <0.053 mm. Aggregate size for >2.0 and 2.0-0.85 mm was higher in MT while the 0.85 mm to up to <0.053 mm was higher in CT. This suggests that mechanical disturbance in the CT disrupted macroaggregates (>0.30mm) into smaller macro and microaggregates (<0.30mm). Macroaggregate stability (MaAS) was significantly higher in MT than in CT which can be attributed to the annual plowing which led to soil structural disruption and changes. Likewise, cropping patterns had a significant effect on soil aggregation showing higher aggregates of >2.0mm size in L-R-R than in M-R-R and W-R-R. Contrasting to L-R-R and W-R-R, the M-R-R had a higher percent distribution of microaggregates. Mean weight diameter (MWD), geometric mean diameter (GMD), stability index (SI), and persistence index (PI) were all higher in MT than in CT and significantly lower in M-R-R than in W-R-R and L-R-R, respectively. The MT increased MWD by 14% in W-R-R to 29% in L-R-R. Nutrients within aggregates were higher than the bulk soils. The SOC, TN and P was higher in MT than in CT both in bulk soils and within aggregates while it was similar for available K and S. Regarding cropping patterns, the M-R-R had a higher macro and microaggregate SOC content than L-R-R and W-R-R while the W-R-R had a lower TN content than other cropping patterns. Unlike, SOC and TN, available P and S increased in microaggregates while K was similar across aggregates, implying that the accumulation of SOC, N, P, and S differed among aggregates in response to tillage and cropping sequences. Wheat-based cropping pattern had a higher production potential than the lentil and mustard-based cropping systems in terms of sustenance of soil fertility.

Keywords: Minimum tillage, mean weight diameter, carbon and nutrient sequestration, alluvial soil, system productivity

Microbiological and Cytogenetic Assessment of Irradiated Philippine Aglibut Sweet Tamarind (AST) Fruit (*Tamarindus indica*)

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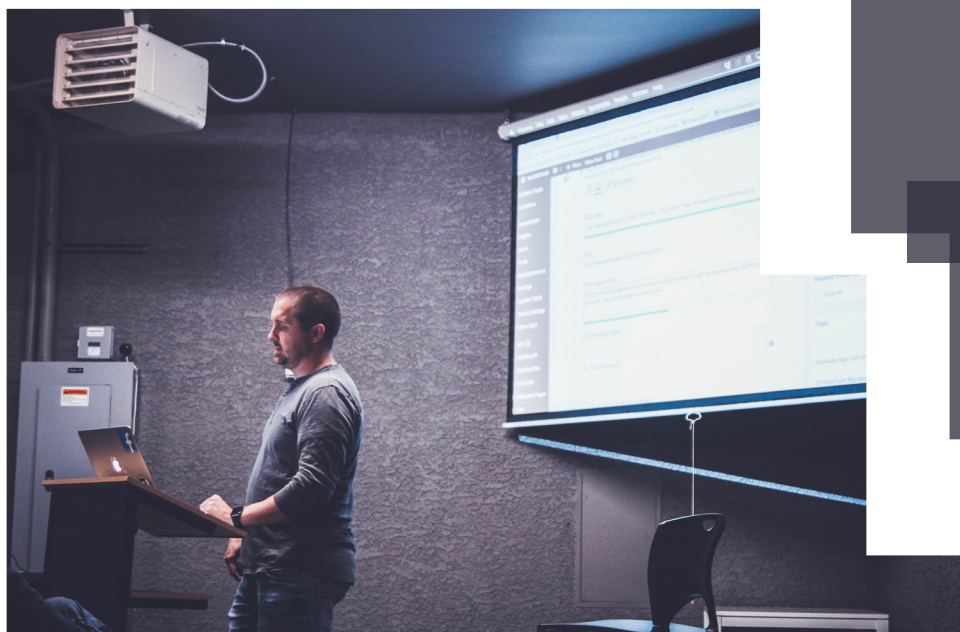
The study investigated the pre-and post-harvest practices as related to microbiological and cytogenetic quality of irradiated AST fruits (*Tamarindus indica*). The study made use of survey to determine the factors that are relative to the initial microbiome of Philippine AST Fruit. Both irradiated and non- irradiated fruits were subjected to microbiological and cytogenetic analysis using TBC and YM test for microbial profile and C-metaphase analysis for cytological profile. Results of the survey found out that some of the practices relative to possible fruit contamination are hand picking, unsanitized container and

contact to the soil during harvesting. The initial microbial count is possibly associated with unacceptable farmer's practices during pre-harvest and harvesting process. Microbial analyses established that T3 (irradiated AST fruit at 5kGy) is the best irradiation dose to extend the shelf life of fresh tamarind fruit up to 20 days followed by T2 (irradiated AST fruit at 3kGy) that has also the capability to extend a the shelf life up to 15 days. On the other hand, T1 and control are comparable with each other but cannot prolong the shelf-life of tamarind fruit as compared to T3 (irradiated AST fruit at 5kGy and T2 (irradiated AST fruit at 3kGy. The C-metaphase analyses of chromosomes in mice fed with the irradiated Sweet Tamarind Fruit

established that all treatments including control did not impose chromosomal aberrations, hence, are not clastogenic. Lastly the irradiated Sweet Tamarind Fruit at 5kGy is established to be microbiologically and cytogenetically safe.

Keywords: chromosomal aberration, Cytological profile, clastogenic, Irradiation, Microbial profile,

POSTER SESSION



Title: Hydraulic Performance Evaluation of Rainwater Harvesting Techniques to face climate changes in dry environments

Paolo Tamagnone, Department of Environment, Land and Infrastructure Engineering, Italy

Title: Using the Delphi Technique to Explore Core Tasks in Government Organizational Reform

Ping-yang Wu, Dept. of Comprehensive Planning, Environment Protection Administration, Executive Yuan, Taiwan

Hydraulic Performance Evaluation of Rainwater Harvesting Techniques to face climate changes in dry environments

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¹Department of Environment, Land and Infrastructure Engineering, Politecnico di Torino, C.so Duca degli Abruzzi 24, 10129 Torino, Italy

In sub-Saharan Africa, climate and land use/land cover changes are strongly affecting the hydrological behaviour of land surface enhancing runoff and decreasing water hold capacity [1]. The present study examines the possibility to use rainwater harvesting techniques (RWHT) as flood mitigation approach and evaluates their performance in runoff reduction. Focusing on Niger, the most commonly applied micro-catchment WHT are pits (tassa), half-moon (demi-lunes) and contour stone bunds (cordons pierreux) [2]. In addition to agricultural benefits, they have the dual function of slowing down and collecting overland flow increasing the concentration-time of the whole basin. With this twofold aim, RWHT can be adopted in the framework of the climate-smart agriculture to deal with the increase of extreme events that characterize west Africa [3]. To evaluate the runoff reduction efficiency different hydraulic analyses have been conducted. Firstly, rainfall-runoff simulations were carried out on synthetic catchments (rectangular shape and 1% constant slope), in case of plain surface and with shaped RWHT. At this stage, the best design was evaluated and alternated half-moon configuration was chosen for an application on a real topography. 2D hydrodynamic simulations were implemented using the software HEC-RAS. Consequently, the hydraulic simulation of an intense rainfall event (measured in the wet season 2012) on a real small watershed (26 ha), located next to the village of Toure (Niger), was performed. The outcomes show a significant reduction of outlet hydrograph (10% of the flood peak) having manipulated an agricultural area that is less than 4% of the watershed surface. Thus, implementation of RWHT on a wider scale can blend flood hazard prevention and agronomic principles improving the adaptation to climate change.

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Biography:

Paolo is a PhD student from the Politecnico di Torino, Italy. He won a fellowship in hydraulic engineering in 2017. He is involved in the international cooperation project ANADIA 2.0 between Italy and Niger.

Using the Delphi Technique to Explore Core Tasks in Government Organizational Reform

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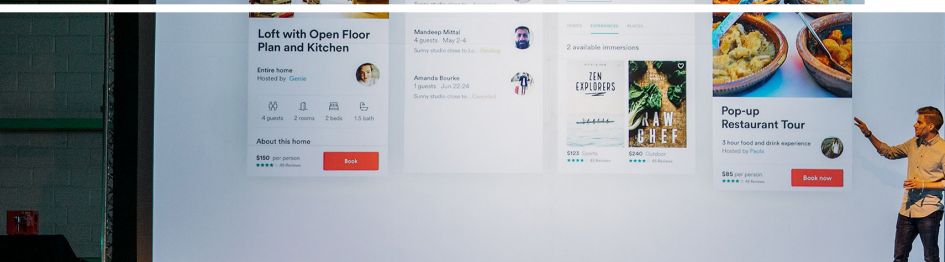
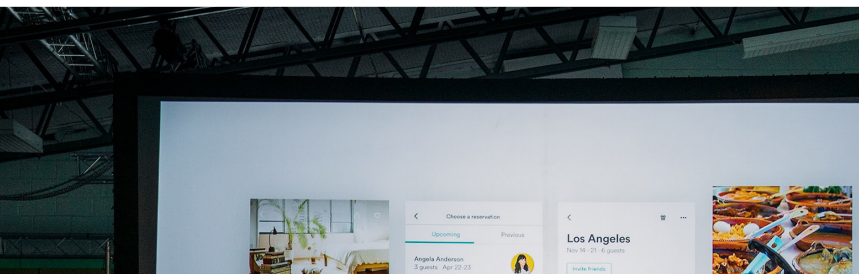
In response to new challenges brought by global warming and climate change, the Taiwan Government is promoting organizational reform, planning the establishment of the Ministry of Environment and Natural Resources (MENR), moving from the original concept of environmental protection to environmental resources management. The MENR will merge six government agencies which oversee different management issues. In order to understand the views of various government agencies on the core tasks of the new MENR, the Delphi technique was used to conduct an investigation.

In this survey, we designed an open-ended questionnaire for the personnel of government agencies that will be incorporated into the MENR. The respondents provided 62 items that should be the core tasks of the MENR. After adjusting similar and possible duplicate projects, there were 28 items. The results of the survey showed “the use of environmental resources and sustainable management” and “ecological conservation” had a high value and high degree of consistency. In addition, the results also show the respondents’ expectations regarding the establishment of the basic data of environmental resources and the utilization of resources after the establishment of the MENR. The results of the survey can be used as important reference for the MENR.

Keywords: Core task, Delphi technique, environmental resource management, organization reform

VIDEO

SESSION



Title: Historical Tree Height Growth associated with Climate Change at The Species Geographic Range in Western North America

Yassine Messaoud, Faculty of Natural Resources Management, Lakehead University, Canada

Title: The Evaluation on Environmental Processes, Hazards, Resources, Land uses and Socio Economic Conditions of Saint Martin Island, Cox's Bazar, Bangladesh

Md. Galib Ishraq Emran, Department of Environmental Sciences, Jahangirnagar University, Bangladesh

Historical Tree Height Growth associated with Climate Change at The Species Geographic Range in Western North America

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The effect of climate change on tree growth in boreal and temperate forests has received increased interest in the context of global warming. However, most studies were conducted in small areas and with a limited number of tree species. Here, we examined the height growth responses of 14 tree species to climate change over the whole species range of western North America. 27425 stands from forest inventory databases in Canada and USA with varying establishment dates (1089-1967) were selected. Dominant and co-dominant trees from each stand were sampled to determine total tree height at 50 years from stand establishment measured at breast height and related to the average mean annual (AN_T) and summer temperatures (June- August; JJA_T), Palmer Drought Severity Index (PDSI), establishment date (ED), slope, aspect, soil fertility as determined by the rate of carbon organic matter decomposition (carbon on nitrogen), geographic locations (latitude, longitude, and elevation), species range (coastal, interior, and both ranges), growth habits (shade tolerance) and leaf form (needle leaves, deciduous needle leaves, and broadleaves). Climate change had mostly a positive effect on tree height growth. The model explained 55.5% of the height growth variance. Since 1880, warming was more beneficial for coastal species, although interior species showed the greatest sensitivity to JJA_T. Height growth increased more on moderate and steep slopes, on medium soil fertility, and for the medium and high-shade tolerant species. Greater height growth increase was globally observed at the leading range and upward. However, a few species showed the opposite trend and declined, probably related to the peculiarity and particularity of western North America topography and climate conditions. The novelty of this study highlights the role of the species ecological amplitude and traits, and geographic locations as the main factors determining the growth response and its magnitude to the recent global climate change.

Biography:

Yassine Messaoud has completed his PhD at the age of 36 years from University of Quebec in Abitibi-Temiscamingue, QC, Canada and postdoctoral studies from Lakehead University. He has published 7 papers in reputed journals and has been serving as reviewer of reputed journals. He also participated in many conferences, workshops, and did posters in Canada.

The Evaluation on Environmental Processes, Hazards, Resources, Land uses and Socio Economic Conditions of Saint Martin Island, Cox's Bazar, Bangladesh

Md. Galib Ishraq Emran, Department of Environmental Sciences, Jahangirnagar University, Bangladesh

Saint Martin's Island is a small island having an area of only 8 km², situated in the north-eastern part of the Bay of Bengal, about 9 km south of the tip of the Cox's Bazar-Teknaf peninsula, and forming the southernmost part of Bangladesh. There is a small adjoining island which is separated at high tide known as Chera Dwip. It is about 8 kilometres (5 miles) west of the northwest coast of Myanmar, at the mouth of the Naf River.

The only way to reach St. Martin's Island is by water transportation: boats and ships (mostly for tourists) from Teknaf. The only internal transport for island is non-motorized van (pulled by man.) The roads are made of concrete, and their condition are decent. All the hotels run generators until 11 PM which are not allowed afterwards, so they then rely on solar power, which is popular throughout the island. There is no electricity supply from the national grid since a hurricane in 1991. The island is all about sun, sea and palm trees. During the day, it comes alive with water and beach sports, with beach parties and bonfires lighting up the evening skies. This research attempts to evaluate the natural and artificial processes, to list the natural and artificial resources of the study area: Forest resources, River based resources, Soil resources, Water resources, and Mineral and hydrocarbon resources: Solar energy and wind energy resources; and artificial resources. Identify the possible hazard (natural and anthropogenic) of the study area and evaluate its existing management system. To evaluate the socioeconomic conditions of the study area and find out the factors which are controlling it. For this reason information was taken from 20 local peoples. Tourism aspects were also noticed. The study area supports a diverse set of ecosystems including sandy beaches to mangroves, flood plains, terraces and hills. On the basis of information for drinking and household purposes they use tube well water and have no established household garbage management system. No industry was established except some shrimp farming and salt cultivation. Natural resources of study area was evergreen and semi evergreen forest, beach sand, marine fisheries, tourism and various coastal resources in beach area but during the last few decades they have been degraded heavily due to various managerial and other problems. Due to over exploitation of natural resources by forest department and local people, unplanned expansion of forest and marine drive, this ecologically important area is losing its diversity. The involvement of local communities in preventing over-exploitation and poaching is essential to long-term conservation. The study concludes that, ecological condition of different ecosystem is degrading and a separate statutory body or institution is fundamental to ensure conservation; sustainable use and equitable sharing of benefits arisen from biodiversity products in study area.

E Poster SESSION



Title: Ecological Activities of Heterorhabditis Isolates and their Tolerance to Environmental Extremes and Reproduction Potential

Faiza El Assal, Department of Zoology, Faculty of Science, Cairo University, Egypt

Ecological Activities of Heterorhabditis Isolates and their Tolerance to Environmental Extremes and Reproduction Potential

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²Plant Protection Research Institute, Doki, Giza, Egypt.

Entomopathogenic nematodes, the heterorhabditids, in particular, have received much attention in recent years because of their biological control potential against pestiferous insects in agriculture, nurseries and home gardens. Nematodes of genus *Heterorhabditis* are found in soils in most parts of the world including Egypt (1). These nematodes have become commercially available in many countries (2). In the present investigation, the tolerance to environmental extremes and reproduction potential of isolates of four *Heterorhabditis* species (*H. indicus*, *H. zealandica* and 2 *H. bacteriophora* isolates), were studied. The tolerance of these isolates to environmental extremes was studied using the heat essay (3.5 hours exposure to 37° C) and the desiccation essay (3 hours exposure to low relative humidity of 60 - 65 % at 25°C). All the four isolates were very much sensitive to environmental extremes, especially desiccation. The reproduction potential of the tested isolates was studied at two infection levels (10 & 40 IJs/larva). Two factors were studied for their effect on the reproductive potential, the nematode dose and the larval diet. The tested isolates showed variable reproduction potential in the greater wax moth *Galleria mellonella* and the rice moth *Corcyra cephalonica* larvae. These potentials were affected by the host species, nematode type and the type of larval food.

Key words: Entomopathogenic nematodes, *Heterorhabditis*, ecological activities, tolerance, reproduction.

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Biography:

Faiza El Assal is Professor of Invertebrate Zoology and Parasitology at the department of Zoology, Faculty of Science, Cairo University since 1993. She was graduated from the same faculty in 1967. She published over 150 papers on freshwater ecosystems, schistosomiasis and parasites of fish, published in indexed international journals and Egyptian journals. She supervised and planned over 70 M.Sc. and Ph.D theses in invertebrate Zoology and parasitology. She was chairman and keynote speaker in international conferences, the last was the 5th International conference on Parasitology & Microbiology held during July 12- 13, 2018 Paris, France, at which she presented a keynote on "Fish infected with trematode encysted metacercariae and its role in transmitting parasitic diseases to human and domestic animals."

ACCEPTED ABSTRACT



Synoptic Conditions associated with Duststorm in central Sudan

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The present study focuses on examining the synoptic and dynamic meteorological conditions associated with duststorm in central Sudan. Synoptic system in this area is more complicated due to the migration of the ITCZ from south to north following the movement of the sun during the Northern Hemisphere summer. And the most common phenomenon coincides with, is duststorm, as a natural hazard in arid and semi-arid regions, and it is known in science as “haboob” which describes a weather phenomenon characterized by immense walls of blowing sand and dust [1].

The Sahara and drylands in North Africa are the main terrestrial sources of airborne dust, with some contributions from Arabian Peninsula, into the Arabian Sea and adjacent areas [2].

The purpose of this paper is to determine the general trend of dust storm, to explore dust storm formation factors and to detect dust storm effects in the study area as common natural hazards, and can create significant difficulties with transportation, visibility; and the blowing dust can also create severe health hazards. The aim of the present study is to determine synoptic patterns that are associated with or even favor dust outbreaks over the study area.

Synoptic data have been collected from Khartoum Meteorological station; including 13 stations, covering the area from 10°-22° N latitudes and 22°-37° E longitudes, for the period 2004- 2014. These data consist of monthly averages of rainfall, dust storm speed (mile/hour), and wind direction and speed, in order to obtain the dust frequencies occurrence days. Additionally, the NCEP/NCAR reanalysis data are used for classifying dust storm types over this area [3].

Based on the duststorm data and weather parameters in 13 meteorological in Sudan stations, we analyzed the annual number of dust storms days for 11 years as well as their correlation with above mentioned parameters and the results showed that the relation between annual duststorm days with precipitation were inverse, while the relation between duststorm days and temperature was converse.

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- [3] Abdul-Wahab Mashat and Adel Awad. International Journal of Advanced Research, 3-2015

Biography:

Khadiga has completed her PhD on 6th February 2009 from Aristotle University of Thessaloniki; Greece. She is assistant professor in the Department of Geography in University of Juba and after the secession of South Sudan in 2011, she moves to University of Bahri. She has a contract to work as a faculty member in Imam Abdulrahman University, Dammam, KSA in 2016. She has many publications in the field of climatology and water harvesting. She has a good experience in teaching, while she was in Sudan she is a lecturer in three Departments; Geography, Agriculture and Environmental Studies. She was held a position of Head of Department of Geography since she was joined University of Juba in 2001, mean a while she had study leave to do her PhD thesis a broad in Greece in Department of Meteorology and Climatology, at School of Geology in the field of synoptic climatology.

Site selection for Rain Water Harvesting in valley Soba/Sudan Using GIS/RS

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This study has been handling for the site suitability selection for rain water harvesting (RWH) using Remote Sensing (RS) and GIS. The problem of the study was that the area experiences erratic and intense rainfall during the rainy season and dryness (drought) throughout the rest of the year. Intensity rainstorms with a short duration have become more frequent in the area since the last two decades [1]. The ever increasing world population is threatened by the ever continuing water shortage problem. According to World Water Council [2]. The overall objective of this study is to use GIS and RS techniques for selecting suitable sites for rain water harvesting in the study area, Spatial variations in landscape characteristics such as land cover, soil, slope and drainage basin characteristics are defined as important criteria for identifying selection rainwater harvesting sites. Water harvesting is the collection of runoff for productive purposes. Instead of runoff being left to cause disasters it is harvested and utilized. In the semi-arid drought-prone areas where it is already practiced, water harvesting is a directly productive form of soil and water conservation. Both yields and reliability of production can be significantly improved with this method [3]. The study revealed the potential suitability of water harvesting reservoir technique for East Nile Locality and in particular the valley soba area, framework output maps. The GIS integrated with ENVI software was proved to be an efficient tool in determining the potential sites for (RWH) technologies.

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Biography:

Ummhani has completed her PhD in first of April 2010 from Juba university Sudan assistant prof. till June 2018 from this date promoted to associate Prof. in university of Bahri. She has a contract to work as a faculty member in Qassim University, KSA in 2018. She has over 7 publications that have been reader over 300 times, and her publication concentrated on water management renewable energy environment topics.

Rainwater Harvesting (RWH): A potential climate change adaptation option in the Far North Region of Cameroon

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¹ Senior Expert, Climate and Natural Resources, Fokabs Inc, Canada

² Senior Expert, Climate and Low Carbon Development, Fokabs Inc, Canada

Climate change has increasing impacts on water resources around the world resulting in limited access to water resources in rural communities in the Sub-Saharan Regions of Africa. This study was aimed at assessing rainwater harvesting (RWH) systems in rural communities as an adaptive option to the climate of the Mayo Tsanaga Basin. A purposive sampling technique was used as described by [1]. Interviews were conducted with 5 Civil Society Organisations (CSO) water researchers and with 6 institutions having RWH systems. 9 focus group discussions (FGD) were conducted in communities with RWH systems 24 RWH systems were visited and basic economic parameters were measured. The data was cleaned and subjected to simple statistical analysis using MS Excel 2010 from which charts were generated. Respondents perceived RW for drinking differently. FGDs revealed that RW was readily used for drinking and in meeting other water needs. Only 10 RWH systems were functional and the volume of water collected by the community RWH systems served the communities opposed to institutional use. The calculated water supply potentials of the systems ranged from 0.2 m³ to 26.5 m³ with a water deficit range of 14.5 m³ to 10,943.2 m³, using an average daily water need applicable to the Sub-Saharan Region of 40L/person [2]. The calculated cost of RW harvested ranged up to 89 XAF/L against the paid water supply system (250XAF/m³) towns. A comparative analysis was done for an investment and aid/funding scenarios, using a life span of 25 years, a maintenance cost of 1.5% and a discount rate of 5%. The life cycle cost (LCC) analysis [4] revealed negative Net Present Values (NPV) in an investment scenario as oppose to NPVs in an aid scenario.

RWH is therefore a very important option to complement existing water sources as an adaptive strategy to climate change impacts on water resources for communities in the Far North Region. However, RWH systems be considered in an aid scenario and as a last option in an investment scenario. Furthermore, it is more cost effective to be adapted at a household and institutional level contrary to community RWH systems.

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Biography:

Ummhani has completed her PhD in first of April 2010 from Juba university Sudan assistant prof. till June 2018 from this date promoted to associate Prof. in university of Bahri. She has a contract to work as a faculty member in Qassim University, KSA in 2018. She has over 7 publications that have been reader over 300 times, and her publication concentrated on water management renewable energy environment topics.

Assessing The Impact Of Climate Entrepreneurship Programs In Renewable Energy Transition: A Case Of Kenya Climate Innovation Centre (KCIC)

Mikwa Zachary

Lead Sustainability Initiatives Officer at Kenya Climate Innovation Center (KCIC)

In its attempt to respond to climate change, Kenya is building a business case for climate change solutions by supporting the development of clean tech enterprises in renewable energy sector among other areas. The main sources of energy in Kenya average about 74.6% biomass, 19.1% Petroleum and 5.9% electricity. Renewable energy in Kenya has continued to gain popularity with an increase of 8.7% in the generation of electricity via wind power and geothermal by 6.1% in 2017 (KBS Kenya Bureau of Statistics, 2018) [1]. Climate entrepreneurship is part of social entrepreneurship where technical startups are used to come up with solutions for social, cultural and environmental challenges (Braunerhjelm, 2010) [2]. Climate entrepreneurship programs came into existence to bridge this gap by supporting climate entrepreneurs to build a business case and commercialize. Kenya Climate Innovation Center (KCIC) exists to support businesses in three sectors renewable energy, water and agribusiness and so far over 150 enterprises have received support from KCIC. Of the 150 enterprises, 97 enterprises have been in renewable energy, which is the strongest sector in KCIC. This paper shares the model of interaction between KCIC and climate enterprises and how the successful enterprises have contributed towards energy transition in Kenya.

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Biography:

Zachary is the lead sustainability initiatives officer at Kenya Climate Innovation Center (KCIC) where he supports clean tech enterprises with advisory services on green business models. His research interests are in environmental policy with a focus in climate finance and climate entrepreneurship. He holds an M.Sc. in Environment and Development Economics from LSE and is currently pursuing his Ph.D. in Environmental Policy at the University of Nairobi.



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