International e-Seminar on "Loss of Biodiversity: Global Environment & Health Challenges"

Shobhit Institute of Engineering & Technology Deemed to-be-University
EDUCATION EMPOWERS

e-Abstract Book

WORLD ENVIRONMENT DAY

June 5-7, 2021

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Vice-Chancellor

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Dean, SBELS

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Dr. Sudheesh K.Shukla
Dr. Saurabh Tyagi

Organized By
School of Biological Engineering & Life Sciences
Shobhit Institute of Engineering & Technology, Meerut
(A NAAC Accredited Deemed-to-be-University established u/s 3 of UGC Act 1956)
NH-58 Modipuram, Meerut-250110
Website: www.shobhituniversity.ac.in

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on
" Loss of Biodiversity:
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School of Biological Engineering & Life Sciences
Shobhit Institute of Engineering and Technology
(Deemed-to-be-University) Meerut, India

Shobhit Kumar
Chairman

MESSAGE

I am pleased to know that the University is organizing a 3-day International e-Seminar on the occasion of World Environmental Day on the topic "Loss of Biodiversity: Global Environment and Health Challenges" from 5-7 June, 2021. The man, environment, nature and biodiversity are all interrelated and dependent on each other. The extinction of species due to climate change, over exploitation, man's greed and species invasion are causing great damage to our biodiversity. India having 15 different agro-climatic zones represent a diverse range of biological species, which needs to be preserved in the interest of humanity and better health. Healthy nature will nurture healthy biodiversity and healthy life on this earth.

In current Covid-19 pandemic situation, a healthy and meaningful dialogue about environment, biodiversity and human health is the right topic of the seminar. I understand that 3-day interaction of international scientific community will give a new direction to younger generation for the protection of biodiversity, nature and the environment. I wish a great success for the seminar.

Shobhit Kumar

Shobhit Kumar
04.06.2021

Kunwar Shekhar Vijendra
Chancellor

SU-CHANCELLOR-OFFICE/2021-989

MESSAGE

I am delighted to note that the University is organize a 3-day International e-Seminar on the topic "Loss of Biodiversity: Global Environment & Health Challenges" on World Environmental Day from 5-7 June 2021.

Biodiversity, environment and human health all are connected together and the protection of biological species in this biosphere is in the interest of humanity. Healthy biodiversity provide healthy life and we need learn to live in and with nature. Every species in this biosphere has the right to live on this beautiful earth. The genetic and ecosystem diversity need to be preserved.

In this current Covid-19 crisis, we need an approach to become a part of solution, not the pollution. The e-Seminar will provide an excellent opportunity to scientists, researchers, academicians and students to interact with international scientific mix during this 3-day digital interaction.

My good wishes to the organizing team of School of Biological Engineering & Life Sciences of the University for the Success of this important research centric activity.

Kunwar Shekhar Vijendra
04-06-2021

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Amar P. Garg
Vice Chancellor
M.Sc., Ph.D., LL.B., F.B.S., F.P.S.I., F.S.M.P., M.N.A.Sc., F.N.R.S., CAS Fellow (U.K.), DAAD Fellow (Germany)
Sectional President (2020-21) - Environmental Science, 108th Indian Science Congress
Ex-Professor & Head, C.C.S. University, Meerut | Former-PVC, JNU, Jaipur

Dated: 04 June, 2021

It is my pleasant duty to welcome all participants and eminent keynote speakers in International e-Seminar on "Loss of Biodiversity: Global Environment and Health Challenges" on World Environment Day from 5-6 June, 2021 at Shobhit Institute of Engineering & Technology (Deemed-to-be-University), Meerut.

The organizers have rightly selected the most relevant topic in the present context of crisis of conservation of biodiversity in changing climate with respect to preservation of environment and prevention of human diseases. A large number of species have already disappeared due to habitat destruction, climate change including global warming, over exploitation by human, pollution (genetic, soil, water and air), alien species, diseases and various developmental and exploitation activities. Imbalance in biodiversity has led to threat to human life as evident from the recent SARS CoV-2 pandemic situation. There is an urgent need to recognize the rights of nature for healthy soil, healthy water and healthy air for sustainable happy longer human life on this beautiful earth. Healthy biodiversity is necessary for healthy life. During COVID-19 lock down, this e-Seminar will provide an excellent opportunity for active interaction with great international Professors and prominent environmentalists to discuss various issues of biodiversity conservation and prevention of diseases in humans. I hope that the participants will take fullest advantage of the presence of intellectual mix of environmentalists, biologists, medical experts, agriculturists and scientists working in diverse fields. Meerut is a beautiful historical city of India and its residents have rich cultural heritage, traditions and extra ordinary courage with diversified biodiversity being a Gangetic plain.

On behalf of myself and the University, I welcome all eminent keynote speakers and participants in this 2-day e-Seminar.

(Prof. Amar P. Garg)
Vice Chancellor

Prof. Dr. Rajiv Dutta, M.Tech (IIT-Kharagpur), PhD (BITS-Pilani)
Fellow of the Royal Society of Biology, London.
Fellow of the American Academy of Science & Technology, Reston, MO, USA.
Fellow of the International Academy of Science, Kansas City, MO
Dean- Academic Affairs and Dean, School of Biological Engineering & Life Sciences (SBE&LS)
Professor of Bioengineering
Shobhit Institute of Engineering & Technology (SIET), Deemed University, Meerut
Honorary Scientific Advisor, Serra BioLife Pty. Ltd., Melbourne, Australia

June 3, 2021.

Message

On behalf of the organizing committee of International e-seminar on **"Loss of biodiversity: Global Environment & Health Challenges"** on **the occasion of World Environment Day (05 June, 2021)** in Shobhit Institute of Engineering & Technology (Deemed to - be University), NH-58, Modipuram, Meerut -250110, INDIA, I am honored and delighted to welcome you all to the e-seminar. I believe the title chosen for the e-seminar is the need of hour. The technical program will be rich and diversified. The keynote speeches were selected from the stalwarts in the area.

Organizing an event takes enormous courage, endurance and dedication; I would like to express my gratitude and appreciation to the Chairman, Prof. Dr. Amar P Garg, Vice Chancellor, Shobhit Deemed-to-be-University, Meerut, who led an experienced as well as young organizing team members for the e-seminar. I am confident that there will be excellent deliberations during the e-seminar.

Finally, I do hope that you will have an enjoyable time and productive outcome from three days of e-seminar, and that you will leave with fond memories.

With my best wishes for a successful conference!

(Prof. Dr. Rajiv Dutta, *FSRB*)

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ORGANIZING COMMITTEE

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CO-CHAIRMANS
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School of Biological Engineering & Life Science, SIET, Meerut

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About the Organizer

SHOBHIT DEEMED UNIVERSITY, MEERUT, INDIA

Shobhit Institute of Engineering and Technology (popularly known as Shobhit University, Meerut), is a NAAC accredited deemed to-be university u/s 3 of UGC Act, 1956. Ranked among the top institutions of India.The University aspires to make academic issues and commitments as the key concerns of the young generation and thereby, make a significant contribution to the academic developments wherever they are in the world.

We believe that the essence of the University is to create, integrate and disseminate better understandings of the world around us through knowledge. Recognizing that students and faculty shift between and share all three roles, we challenge the notion that knowledge is static and insular. Instead, we welcome and enable a diverse and dynamic learning community of scholars, teachers, and learners.

We are committed to creating the best learning environment and provide the right equipment and facilities, to help our students to achieve their potential during studies. Our students learn in a variety of ways, including case studies, role-plays, and simulations. Because we know that no single approach can effectively address the range of challenges they'll encounter throughout their career, this diverse education is designed to give them the breadth and depth of skills and experience they'll need for success.

We are a research-intensive university that shares the values of high-quality teaching within an environment of internationally competitive research. We seek to provide a creative and supportive environment in which ideas are generated and can flourish.

To provide latest information about the things which are happening in science and technology, the University strategically plans and organizes workshops, seminars, conferences, and brain storming sessions at national and international level with the help of experts from academia, industry, and research organizations.

University Training & Development Centre understands that active engagement of the industry with the academia is vital for developing the required skills in the future professionals. To facilitate the industry in the current scenario of the skill gap on one hand and to enrich students with the industry exposure on the other hand; a one semester internship program has been incorporated in the course curriculum of maximum of the academic programs.

Today, Shobhit University is a preferred destination for recruitment among young universities in India. More than 200 renowned Corporate, Research Organizations and Institutions are patronizing our students by providing excellent job offers. The University has evolved into a Campus of Excellence. Our excellent talents are placed in the best of the corporate houses in India and abroad.

The University has developed the following Schools and Centre: School of Engineering & Technology, School of Biological Engineering & Sciences, School of Business Studies; School of Law and Constitutional Studies; School of Education; School of Humanities, Physical & Mathematical Sciences; Centre for Agriculture Informatics & Research; and Centre for Skill Development.

WORLD ENVIRONMENT DAY

(5th June 2021)

World Environment Day (WED) is a campaign celebrated every year by the people worldwide on 5th of June. This campaign was established to raise the global awareness among people about the environmental issues as well as take positive environmental actions. It is handled by the United Nations Environment Programme and was established by the United Nations General Assembly in 1972. It is a day to especially focus on the current environmental conditions to make environment better.

It focuses to bring people from all countries at one track to deal and combat with the climate changes and improve the management of forests. It is celebrated with many creative activities such as tree plantation, cultural activities by students, drawing, painting, quiz competitions, debate, lectures, essay writing, banner display, speech recitation, etc on topics related to the environment protection. Workshops (regarding sustainable project management) are also organized to encourage youths about the environment and climate change issues for safe future on the earth.

In 2009, an environment fair was held in Chennai and Bangalore with the activities like on the spot painting competition, training programmes for students over e-waste management, renewable energy devices, wildlife conservation, rain water harvesting systems, waste recycle and reuse processes, debates on rising global warming, biodegradable wastes, awareness drives about "go green" revolution, etc for eco-friendly infrastructure and energy efficiency to curb global warming and save natural resources.

About the conference

International e-Seminar on " Loss of Biodiversity: Global Environment & Health Challenges"

Since its beginning in 1974, World Environment Day has developed into a global platform for raising awareness and taking action on urgent issues from marine pollution and global warming to sustainable consumption and wildlife crime. It is celebrated on 5th June, every year. Millions of people have taken part over the years, helping drive change in our consumption habits as well as in national and international environmental policy. In order to celebrate this event, the theme of the International e-seminar is "Biodiversity and Human Welfare". We invite researchers, lectures, students, industries, governments, stakeholders, and decision makers to present their results and ideas especially on sustainable biodiversity utilization in "Bioenergy, Health, Foods, and Environment" fields.

Biodiversity is fundamental for human life and vital for the functioning of ecosystems. The loss of biodiversity as a result of human activities has become a central preoccupation among natural scientists, and many social scientists as well. Although we do not know the exact scale of the problem, in particular the extent to which human beings have been responsible for the loss of biodiversity as compared to the natural evolution, the process of species extinction, green house effects and critical changes in the earth's biochemical cycle are now increasingly emphasized.

The concept of human welfare is equally tangled. In general terms, it relates to the provision of improved conditions of living. Human welfare is linked with the preservation of biodiversity in varieties of ways. Biodiversity forms the basis of a global-life support system. Human beings have fulfilled many of their needs by taking advantage of the existence of many genes, species, as well as a "balanced" ecosystem. For instance, many plant species have formed the basis of food, fibre, medicines and many other useful items. Thus, global biodiversity survey found to be a fundamental necessity and suggests a comprehensive investigation and evaluation of the factors contributing to biodiversity and the establishment of a biodiversity monitoring network system.

Dr. Saurabh Tyagi **Dr. Sudheesh K. Shukla**

From the Desk of Organizing Secretaries

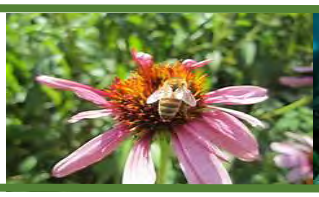
It is the great privilege for us to organize the International-*e*-Seminar on **"Loss of Biodiversity, Global Environment & Health Challenges" World Environment Day 05 June 2021** organized by School of Biological Engineering & Life Sciences at Shobhit Institute of Engineering & Technology, A NAAC Accredited Deemed to-be University-Meerut, during 05-07 June 2021. It has been a real honor to serve of this e-seminar.

In a wake to go digitalize, we have forgotten that our mother nature is vulnerable to technologies that are harming the environment. It is essential to save and rebuild the relationship with our mother nature, as the environment is made up of every living and non-living beings. Thus, every year on June 5, World Environment Day is celebrated to spread awareness to conserve the environment for a healthy and better future. It is celebrated across the globe to tell people that nature should not be taken for granted and must be respected for its values. With the corona virus outbreak and people being confined indoors, the environment and mother earth seem to have benefitted slightly. To increase awareness worldwide and beneficial action for the environment, we should organize various events like this.

We are organizing this e-seminar to bring together academician, researchers and exchange their innovative research ideas, research challenges, solutions and practical experiences in all areas of Biodiversity in different Ecosystem and Management, Climate change and Imbalance of Biodiversity, Biodiversity conservation and Sustainable Human Life, Conservation of endangered Flora and fauna, Global Policy for protection areas, Environmental Laws and Education Awareness. This e-seminar souvenir includes well an exciting collection of abstracts of key note speakers and e-posters resulting from a successful call for papers.

The e-seminar would not have been possible without the moral and financial support of Hon'ble Chancellor Sir. We are honored to have key note speakers from different best Universities/Institutes on this special occasion. We would like to express our deep gratitude to the members of the advisory committee, internal advisors and e-seminar team for their valuable work, opinion and expertise to ensure a very high quality e-seminar program. We are thankful to all our colleagues for their help to make it successful.
We are grateful to all the authors who responded to our call for papers and trusted the e-seminar with their work.

Keynote Address




Protection of Biodiversity to Prevent Future Pandemics

Amar P. Garg

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Loss of biodiversity in relation to genera, species and ecosystem leads to aggravation of transmission of infectious diseases from animals to humans mainly due to "dilution effect", however, a group of scientists do not agree with it. The examples of scientific studies with Lyme disease and West Nile disease reveal that there is a "biodiversity dilution effect" which results in increased infectious disease transmission from animals to humans. Recent transmission of H10N3 bird flu in humans from avian in China (Live Science, June, 2021) is a matter of investigation as why all new viral infections are being transmitted from animals to humans in China. The recent emergence of new infectious zoonotic diseases that jumped from animals to humans in 21st century like SARS, MERS, Zika, Ebola, SARS Co-V2 and several have also been correlated by environmentalists, medical experts, geneticists and the students of bioinformatics with growing human population and destruction of biodiversity that is coming in greater contact with more wild and domesticated animals than ever before. It is suspected that SARS Vo-V2 has been transmitted from bats to humans through intermediate host, probably camel or pangolins, however, much more researches are required as no direct relationship and or 100% genetic similarity has yet been found. Most of the great pandemics are caused by microorganisms that originated in wildlife. Smallpox, among the deadliest pathogen in the history of mankind, nearly killed third of the people it infected, descended from a virus native to camels. Measles was also from cows, most virulent strain of malaria *Plasmodium falcipararm* transmitted from great apes to human, presumably by an African mosquito that fed on gorilla. Bubonic plague (*Yersinia pestis*) was another example that killed one third of the Eurasian population, that was transmitted through fleas from the reserves of infections in rodents. Human activities affect ecosystems in various ways. First, large animals are eliminated, then medium sized while small remains and survives. Scientific reports reveal that small animals like rodents and bats

tend to be the very species that can pass infections to humans. Scientists have observed a clear link between decease in incidence of diseases with increase in host diversity in nature. Similarly, large plants extinct first followed by medium and smaller while microorganisms mutate very fast to survive in changing environment. Several models "biodiversity dilution effect" have been suggested and the scientists are still not of unanimous opinion. Our observations with microbes reveal that when we have a diverse group of microbes in a Petri dish, the population of pathogenic microbes is lesser than those where the microbial diversity is less. The competition and availability of diverse habitat play an important role. It appears that declining biological diversity may lead to increasing infectious disease risk in humans leading to more pandemics in future, however, it needs more deeper researches in diverse climatic conditions.

Biodiversity of medicinal plants illustrating the use of diverse bioactive principles for developing immuno-modulatory and resistance mechanism in indivduals against the spread of existing and emerging infections

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In today's scenario, where there is tremendous research going on for the development of vaccine, the plants and their active principles have been considered as the first remedial treatment against COVID'19 and thus against SARS-COV-2. The active principles provide immuno-modulatory activities and develops resistance against varied infections in the individuals. Citrus fruits are the source of highly beneficial bioactive compounds such as polyphenols, carotenoids, and vitamins which possessed antimicrobial and antioxidant properties, thus build the body's immune system. On consumption or processing, approximately 50% of the fruit remains as inedible waste, which includes peels, seeds, pulp, and segment residues. This waste still consists of substantial quantities of bioactive compounds that cause environmental pollution and are harmful to the ecosystem because of their high biological oxygen demand. In recent years, citrus cultivation and the production of

processed foods have become a major agricultural industry. In addition to being a substantial source of economy, it is an ideal and sustainable and renewable resource for obtaining bioactive compounds and co-products for food and pharmaceutical industries. The present study illustrates about various methods of extraction, conventional and modern, as well as separation and isolation of individual bioactive compounds from the extraction mixture and their determination. In the present investigation, the various methods of extraction, conventional and modern, as well as separation and isolation of individual bioactive compounds from the extraction mixture and their determination. The bioactive principles extraction from citrus fruit and peel waste can be utilized as a basis to develop/formulate novel drugs for the treatment and cure of several functions and diseases. Thus, the study illustrates the biodiversity of fruits and thus the diverse compounds for development of effective formulations.

Interaction between environmental factors and genetic susceptibility of SARS COVID-19

Dr. Ajit Kumar Saxena
Department of Pathology/ Lab Medicine,
All India Institute of Medical Sciences, Patna

Environmental factors influence the genetic susceptibility of individuals to emerging new particles such as the SARC Covid-19. This pandemic has emerged as the biggest health crisis all over the World in 21st century. The disease is caused by virus of the *Coronaviridae* family and shows the variation for cellular susceptibility. Major question arise why the mortality varies in the different regions, in different age groups and different sex of the World? Although, many drugs and vaccines are currently under clinical trials, there is no currently approved treatment except vaccine. However, the efficacy of the vaccine varies up to 80-90% depending RNA or Spike based vaccines. Certain ethnicities such as African-Americans have been found to be at a higher risk and males seem to be higher both in numbers as well as severity of cases. Risk factors that can be related to the molecular landscape of COVID-19 infection as well as those related to environmental, genetic and occupational conditions are discussed.

Environmental adaptability is key factor in prevention of relapse of recurrent epithelial cancer - A case study

Dr. Ather A

AAH Natürlich.GmbH – Germany

Scientific head for Regenerative Medicineby non invasive, nondrug therapy

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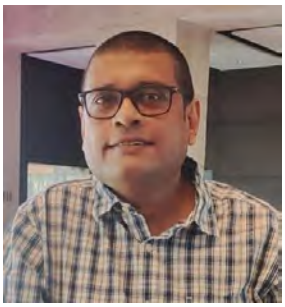
Relapses can have devastating consequences for people with mental disorders such as schizophrenia, bipolar disorder, depression, or an anxiety disorder. After every relapse, it may become increasingly difficult to regain control over the symptoms. For this reason, it is especially important for people with a mental disorder to do all that is possible to reduce the risk of a relapse.

Scientific research suggests that, in many cases, long-term treatment with medication can substantially reduce the risk of relapse. If you are reluctant to take your medication because the schedule is too complicated or because you are suffering from intolerable adverse effects, speak to your family doctor or psychiatrist about this. He or she may be able to simplify the schedule, decrease the dose, or change you to another medication that suits you better. Do not simply stop taking your medication without having first discussed and planned this. Unfortunately, taking your medication at the dose prescribed by your doctor is often the single most important thing that you can do to prevent a relapse.

In summary, social support seems to moderate genetic and environmental vulnerabilities for mental illness, possibly by effects through other psychosocial factors, such as fostering effective coping strategies, and through effects on multiple neurobiological factors. It will be important for psychiatric researchers to conceptualize, test, and apply effective interventions specifically aimed at increasing social support for psychiatrically ill or at-risk populations. This represents an important challenge for our field.

Induction of post COVID Mycosis in West Bengal



Dr. Arup Kumar Mitra

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Mycosis is not a very new problem in West Bengal, commonly it occurred after rainy season and also in immunocompromised patients or patients suffering from HIV or post-operative cases and patients taking steroid drugs. This time like the rest of India, in West Bengal post Covid mycosis has been a common phenomenon. It has got a name of Black fungus or Mucoromycosis, though the fungal members are not *Mucor* only, from the morphology, it was evident that it included *Rhizopus*, different species of *Aspergillus*, *Pencillium* and also mitosporic fungi *Fusarium*. The initial cases were reported from North Bengal, later it spread in other parts including Kolkata city. There have been 24 confirmed deaths all over West Bengal during the last month and 36 suspected cases. The primary target for this disease seems to be patients with co-morbidity like diabetes and other ailments. Apart from that, the indiscriminate use of steroids over long period of time has actually made them immune compromised. The source of infection being oxygen cylinder from industrial source and its hydration attachment, even there has been cases reported from the ICU of different Government hospitals. The organs affected include mucous membrane, skin, eye, sinuses, throat and even the lung. It becomes systemic crosses the blood brain barrier and attacks the brain causing fatality. The treatment includesintravenouscaspofungin, terbenafine, amphotericin B, they are primarily ergosterol blockers but the problem being that they are not found in bulk amount in the market and people are ignorant. When the treatment is starting, already it is too late. So the only way to prevent the disease is little cleanliness and less use of steroid. Already the Covid second wave has caused enough damage, it's our moral duty to prevent this additional problem.

Biodiversity Conservation a Must Need for Our Conservation

Debashis Banerji

Baba Amte Centre for People's Empowerment,

SPS, Bagli, Distt Dewas MP, India

At present, harms to our ecosystem, due biodiversity destruction is no more a speculation. The obvious impacts are globally, adverse climate change and locally, in specially drylands of India, heavy loss of ground water levels.Initially gradual and now rapid climate change and the Corona Catastrophe are clear warnings of that.

Impact of climate change in our dryland area of Bagli Tehsil, Distt Dewas, Madhya Pradesh, India, is being clearly observed in the form of gradual change in rainfall pattern, beginning about a decade back, affecting farming adversely. Normally, the NW monsoon, would start in Kerala around end May/First week June and reach here in about 20 days. Farmers would be ready for their Khareef crop and would start farming by end June/ first week July.In last few years, this has been disrupted severely, with delayed rains, untimely rains etc., This has severely affected the farmers, specially, small and marginal farmers, the majority farmers and major food sources of nearly 70 % of India, our drylands. This situation became all the more deleterious, as, due to deforestation, the rain water harvesting capacity of the once forested rural watersheds declined severely. Once, the wells used to have some water even in the Rabi cropping season, and be an asset to even dryland farmers. Some decades back, due heavy deforestation of the Dry Teak Forest area, the wells would dry up, soon after the rainy season, leaving no scope for farming and leading to outmigration of villagers and acute poverty.

We at Samaj Pragati Sahayog, a group of people of Economics, Social Science, Life Science, and Civil engineers etc. initiated community based Rain Water harvesting methods in rural watersheds, of Bagli Tehsil, Distt Dewas MP. The interventions consisted of from up slope down, rows of trenches, contour bunds,gully plugs, Nalahbunds, small dams, farm bunds, farm ponds etc.,Within 5 years there was sufficient rise in water level, leading to filled wells, increase in lifespan of village streams, extension of farming to rabi season and consequent 90 % reduction in out migration.

This water conservation intervention was linked to a sustainable dryland agriculture, with less water intensive crops, as far as possible with farmer made organic manure, like NADEP, Sanjivak etc., varieties of food and cash crops with reusable seeds and organic pest repellants as, neem oil, dasparni (ten wild plant/weed leaf extract) etc.

All these measures were through empowered village people and therefore community based.

As, the water harvesting interventions, simulated the rain water retaining capacity of once existing forests, the villagers realized the value of forest protection and preservation. This led to quadrat analyses of some remaining forest patches, studying life cycle of forest tree species, development of nurseries and community based forest protection and afforestation initiatives. Most relevant contribution in all these initiatives was the massive participation of women. In parallel with above watershed interventions, a major initiative was formation of participatory women's Self Help Groups, which helped in expansion of our work in the area.

Seeing these successful results of our holistic watershed development, of early 90s, we opened a Baba Amte Centre for People's Empowerment, in Village Neemkheda of Bagli Tehsil in 1998. At this centre, NGOs, Govt workers and interested groups are empowered in different aspects of rural development and has helped us in upscaling our work from micro to macro level. Through such means we are also able to spread awareness about protection and prevention from the present SAARS.CoV2 pandemic crisis.

Biodiversity and COVID-19

Dr. Deepa Ruhela

Associate Research Scientist, University of Maryland,

Baltimore, Maryland, USA, 21201

Like Science knows no limits and illuminates globally. So do our very lifestyle, there are, however, other forces at play such as social and economic changes, human behavior, catastrophic events like war and famine and tampering with natural evolution, the biodiversity. The artifice we played for human comfort has been the greatest threat to earth biodiversity including every plant and animal species. Due to humans' temptations with wildlife, it altered the compositions of wildlife

communities that harbor pathogens. Bacterial and protozoans linger a bit longer and due to their distinctive metabolism and interventions of antibiotics and to some extent good hygiene practices and vaccination doing great job to eradicate diseases caused by them which are threat to human species. Our only real competitors remain the viruses because of their genetic and metabolic machinery entanglement as evident by recent pandemic COVID-19. Bats are main host for aCoV and bCov. Bats evolved their peculiar physiology and immune system, so they became eventually resistant to these viral pathogens due to anthropized environments such as houses, barns, cultivated fields, orchards. The expansion of the ecotonal areas through human activities such as farmland, and settlements can alter pathogen niches by bringing together humans, vectors, and reservoir hosts (wildlife or domestic) thus increasing contact, and the risk of transmission. Evidence for an association between disease emergence and ecotones has been documented for several zoonoses such as Nipah virus encephalitis, influenza, rabies, Hantavirus pulmonary syndrome. Bat species are among the most numerous wildlife mammals that easily adapt to anthropized rural and urban environments and can find niches compatible with their roosting and hunting needs: house lights attract many insects at night, offering easy prey for insectivorous bats, while houses and barns offer shelter for cave-dwelling bats, while orchards and fields attract frugivorous bats. Among the viruses, Filoviruses such as Marburg and Ebola and SASRCoV-2 which belong to beta coronaviruses, can replicate at the bat flight temperatures of 7-41◦C, indicating that fluctuation in temperature does not affect their replication that is why we saw COVID-19 surge in tropical/subtropical/Temperate countries like India, south America, Italy, North America and originated in China, Wuhan through bat colonies for lab work in bat caves which ranges across southern China. Moreover, bats display a unique interferon system (IFN) that might explain their ability to coexist with pathogens. In general, mammals possess a large IFN locus that comprises a family of IFN-a genes expressed only following an infection. Conversely, in bats only three IFN-a are expressed, but constantly and constitutively. This could be a highly effective system for controlling viral replication, which helps explaining bats' resistance to viruses. In addition, bats lack the known PYHIN (PYRIN and HIN domain-containing) genes within the inflammasome pathway. Natural killer immunoglobulin-like receptors (KIRs) are absent or significantly reduced in some surveyed bat species, potentially limiting disease and damage following infection. Moreover, bats have very limited bone marrow or lack it at all, with the

consequence of a low or absent production of B-cells, making bats asymptomatic carriers. Another characteristic is their commensal relationship with the viruses. The pool of viruses identified in the bats' enteric samples may help their microbiome to enhance immunity. All these factors can work in combination, and they can explain how, diverse pools of CoV quiescence's can survive in bat populations. Virus genetic variability in bats the aspects that permit virus persistence in bats also contribute to their diversity and to the potential emergence of new viral species. As a result of flight for short periods of time, bats can accumulate ROS species which may have mutagenic effects. In the case of coronaviruses, the accumulation of ROS species could potentially overwhelm proofreading repair and/or altering viral polymerase fidelity, leading to virus species diversity, and therefore to cross-species transmission. The constitutive expression of the IFN in bats may favor the selection of viral mutation that possess enhanced resistance to the antiviral defense pathways, providing a replication advantage after cross species transmission. Recombination frequency of coronavirus 25-30% for the entire genome could make bats important reservoirs for coronavirus recombination and virus evolution, much like birds and pigs are for influenza viruses. The recombination hot spots around the spike genes and if there is mutation occurred at Furin clevage site keep making SarsCoV-2 virus more virulent which had evident by Indian variant of COVID-19 during second surge or it may be lab made since its chimeric of SHCO14-CoV/SARS1. Only after 14-20 times mutation at spike - Furin cleavage site which sits in middle of spike protein makes SARSCoV-2 highly virulent and more adaptable to human host. The spike protein has two subunits with different roles S1- recognizes the virus's target, a protein called angiotensin converting enzyme-2 (ACE-2) which studs the surface of cells lining the human airways and S2- helps the virus once anchored to the cell, to fuse with the cell's membrane. Then virus hijacks human protein -making machinery to generate new viruses. At S1/S2 junction sits Furin cleavage site responsible for its exact unwinding and binding to host cell receptor ACE2. Furin human cell surface cleaves (PRRA proline-arginine-arginine-alanine), which is present at the core of SARS2s furin cleavage site, which is essentially required to bind to human host, so, why SARSCoV-2 has this PRRA sequence not any other virus, since its mutation due to biodiversity manipulations or intentionally inserted to increase virus infectivity. The transmission of the viruses in the bats' colonies can occur through different ways depending on the bat and virus species considered i.e., aerosols, contact with feces, urine, blood, or

other body fluids, or by bite. On the other hand, the absence of key inflammatory mediators in bat species provides no selective pressure to minimize these responses, which will favor a massive and pathogenic inflammation response in a new host as seen with both SARS-CoV, MERS-CoV and COVID-19 infections in humans.

Destruction of Nature is the Key Factor for Pandemics of COVID-19

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A class of diseases called zoonoses-those which jump between animal and human populations. Ebola, SARS, MERS, HIV, Lyme disease, Rift Valley fever and Lassa fever are all examples of zoonotic diseases. Covid-19 ['CO' stands for 'corona,' 'VI' for 'virus,' and 'D' for disease, and 19 represents the year of its occurrence] is the latest - and one of the most devastating - zoonotic diseases to affect us in generations. Today, 60% of all infectious diseases in humans are zoonotic. Most of these are transmitted by wild animals, but others enter human populations through livestock. Most of the zoonotic diseases are caused by Coronavirus. Corona represents crown-like spikes on the outer surface of the virus; thus, it was named as a coronavirus. They are minute in size (65–125 nm in diam.) with a ssRNA, size ranging from 26 to 32kbs in length. Only α- and β- coronaviruses have the ability to infect humans. ß-coronaviruses (SARS-CoV-2, SARS-CoV and MERS-CoV) genome comprises of the 5′-untranslated region, open reading frame encoding non-structural proteins, structural proteins including spike, envelop, membrane, and nucleocapsid proteins, accessory proteins and the 3′-untranslated region. The arrangement of envelope protein and presence or absence of a particular accessory protein show key variation between SARS-CoV-2, SARS-CoV and MERS-CoV.

In the past one hundred years, the human population has increased almost 4-fold and the world has witnessed an unprecedented decline in the natural environment. More than half of the world's tropical deforestation is driven by four commodities namely, beef, soya, palm oil and wood products. They replace mature, biodiverse tropical forests with monocrop fields and pastures. As the forest is degraded piecemeal, animals still living in isolated fragments of natural vegetation struggle to exist. When human settlements encroach on these forests, human-wildlife contact can increase. The vegetation and wildlives are hosts to countless species of viruses and bacteria, most unknown to science. Those microbes can then accidentally infect new hosts, such as humans and domestic livestock. The exploitation of wild animals - as sources of food, traditional medicines and exotic pets – are creating a "perfect storm" for the spill over of diseases from wildlife to people. The United Nations Environment Programme (UNEP) and the International Livestock Research Institute (ILRI) argue that to prevent the next pandemic, countries must urgently integrate human, animal and environment health expertise and policy - a one-health approach to protect us and protect the planet.

Wetland – An ultimate biodiversity hotspot

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Wetlands and Biodiversity is the theme for World wetlands Day 2020. Wetlands cover 6.4% of Earth's surface and 3.4% of Indian landmass. Wetland is the "Lands transitional between terrestrial and aquatic systems where the water table is at or near the surface land is covered by shallow water. Wetlands are not viewed as wastelands. Wetlands contribute to a healthy Environment in many ways, i.e. keeping water table high and stable, mitigate flood and trap suspended solids and attached nutrients. Water is the precious natural resource of the Earth, i.e. to increase water conservation "Slow the flow, savewater". Water is the primary factor controlling the Environment and the associated plant and animal life.Thus Wetlands is referred as the "Kidneys of the Earth." The problem of good water pollution due to toxic metals has begun to cause concerned now in most of

the cities. The toxic heavy metals entering into the ground water lead to geo-accumulation, bioaccumulation and bio-magnifications. Because of their potential accumulation in bio-systems through polluted, food chain accumulation has become a burning issue in recent year. Therefore, a better understanding of heavy metal sources; their accumulation in the soil water plant system and its effect is the important issue of present day research on risk assessments.

Bio Diversity in Gladiolus and its role in boosting Indian economy and protecting environment

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The modern gladiolus cultivars offer a diversity of colors, shapes and sizes. Its beautiful inflorescences have a long lasting blooming period and make it an important cut flower crop. It is used as border plant, pot plant, for bedding purpose in gardens and for display and as a cut flower. Mostly corms and cormlets are used as plant propagation material. Seed propagation is used in hybridization programmed only. Its cultivation is more paying particularly around big cities because of its ready market. In India farmers raise gladiolus during March-April in the hills, Sept-October in the plains and throughout the year in Bangalore region of Karnataka. Owing to the increase In trade related to tourism, rapid industrialization, developing trends for social and business gathering, improved economy and change in taste, urge for modern and sophisticated living, use of these attractive but flowers has become an integral part of living. Thus, there is an ever-increasing demand for gladiolus flower.

The improvement in gladiolus has remained more or less stationary in India in the recent past due to non-availability of germplasm of divergent forms. However, the universal approach in its breeding has been unidirectional in most of the countries. For making further improvement in number of florets per spike, there have been consistent efforts on the part of breeders and floriculturists in the cultivated gladiolus for the characters attributed to number of florets per spike. In starting and

improvement therefore it is essential for plant breeder to asses the population available from this point of view, as there is no report on variability estimates over different environments. Improvement of plants depends upon the magnitude of genetic variability of different quantitative characters. Therefore the measurement, evaluation and manipulation of genetic variability in desired direction become extremely important in any yield improvement programme. The extent of genetic variability in a specific breeding population depends upon the genotypes included in it. Heritability and genetic advance are important selection parameters and heritability estimates along with genetic advance are normally more helpful in predicting the gain under selection than heritability estimates alone. However, it is not necessary that a character showing high heritability will also exhibit high genetic advance.

The correlation coefficient gives ideas about the various associations, existing between yields and yield components. Path coefficient explores that relative distribution of both direct and indirect effects of yield contributing characters on number of florets per plant. Thus the knowledge of character association and path coefficient is essential for simultaneous improvement of yield and yield components.

The occurrence of genotype environment interaction has long provided a major challenge for obtaining complete understanding of the genetic control of variability. The study of genotype environment interaction in its biometrical aspect is thus not only important from the genetically and evolutionary point of view but also very relevant to the production problems of agriculture in general and plant breeding in particular. Due to high genotype environment interaction plurilocal and pluriannual experiments are required especially when the plants are grown under those conditions, which are different from the breeding area. The selection of stable varieties to be used as a parent is a prerequisite in a breeding programmed. For planning and effective selection strategy understanding the inter relationship among yield and its components is of vital significance.

Gladiolus, a bulbous ornamental is the second most important cut flower grown from storage organs. It is being cultivated in almost all countries of the world where spring and summer conditions are favorable, Time of planting. The plating density is critical. At too high a density spike length will be reduced and flower quality impaired. Under poor light conditions the density of corms should be reduced. The following are corm size/density guidelines.

Corm Size (Cms.)	Number of Corms (per square meter)
6-8	60-80
8-10	50-70
10-12	50-70
12-14	30-60
14+	30-60

The planting depth will vary with soil type and soil temperature. Under low temperature conditions planting are at 5 – 10 cm depth. Under high temperature conditions the planting depth can be increased to 10 – 15 cm.

Effect of corm size

Larger corm size (12 cms and upwards) produce taller and stronger stems, a heavier spike, more uniform flowering and a shorter cultivation period.

Under light deficient conditions the larger corm sizes will generally give a higher flowering percentage.

A 12 – 14cm. corm will flower 2 – 3 weeks earlier than 8 – 10 cm corms. The cultivation period is also affected by temperature.

Temperature	Cultivation duration days
12^0c	110-120
15^0c	90-100
20^0c	70-80
25^0c	60-70

Yield of spike

Yield of spikes depends upon the cultivar. Some cultivars produce one spike and some cultivars produces 3 – 4 spikes from the single plotted corms.

Yield of spiked also varies in accordance to time of sowing, manuring, dosage and distance from row and corm to corm. The number of spikes is greatly influenced by the size of corm. A large sized corm may produce 3 – 4 spikes / corm.

Chromosomal Diversity

There are different opinions about the number of species. Number of species varies from 156-180 the majority of the species are found in South Africa. These species are diploid (2n = 30) and are known as cape species. Some species belonging to Europe are Polyploids (2n = 60 – 130). Some species are spread all over Africa & Mediterranean regions.

Species Diversity.

G. auraniacus: Plant height is 90 cm: spike length is 30 cm. Florets are arranged loosely in a spike. The florets are bright orange – yellow to ting with red.

G. blandas: Plant height is 30 – 45 cm. Number of leaves are 4. Number of florets is 4 – 8 and floret colour is White or tinged with red or light pink.

G. byzantinus: Plant is 60 cm long. Number of florets / Spike is 6 – 10 arranged sparsely. Florets are of red colour**.**

G. cardinals: Plant height is 90 cm and colour of the floret is scarlet. Stems are stout

G. Cruentus: Plant height is between 60 and 90 cm. The florets are more or less bell shaped and bright scarlet. The base of the floret throat may be yellow white with red speckles.

G. dracocephalus: the florets of this species are multicolored the yellowish petals have pale purple – red lines with the base of the petals green with purple spots.

G. Primulinus: It bears fur to five florets per spike which are loosely arranged. Florets are hooded and are prim. Rose red in colour.

G. Psittacinus: This species produce 10 to 12 florets/spike. The florets are hooded & bright red in colour having yellow throat with scattered red spots.

G. tristis: Number of florets per spike are 3- 4 yellowish – white in colour with fragrance.

G.tristis var. concolor: The florets are normally plae yellow, but sometimes white in colour.

G. trimaculatus:

(a) Uses of biodiversity in gladiolus

- Source of food: It has been found that the corms of psittacinus hybrids contain high amount of

Carbohydrates : 65.4-78.61%
Protain : 12.6-18.5%
Fat : 58%
Ash (Sulphated) : 3.48%
Pentasan : 2.91%

- Africans use the corms of the Gladiolus edules by roasting them.
- In Bassa (Africa) Gladiousquartinianus corms are used as food when pounded in water with Guinea-corn flour and into a cooking beverage.

Gladiolus spicatus is used as food by Lakoja tribe (Africa) and G. Zimbesiacus by Njelek-vas (East Africa). Thepeople residing at higher altitude mountains relish the flowers of certain species viz:

- *Gladiolus Saundersil, G. ecklonnii, G. papilio, G. cruentus and G. natalensis*. Used as uncooked salad by nipping of the anthers.

(b) Sourse of medicines

Gladiolus Crassifolius is used for headache and lumbago (the whole plant is crushed, heated and applied to affected part).

G. Saundersi (cooked corms) mixed with food is effective against diarrhoea. The crushed and ground corms of Gladiolus ecloni are decocted and drunk to get rid of rheumatism and allied pains.

Ancient Greeks used the roasted corms of G. Italicus as food.

Composition of Gladiolus

Types of Gladiolus

- **Prims**
- **Exotic**

- **Fragrant**
- **Miniatures**
- **Exhibition**
- **Prims: -** The gladiolus belonging to this type has 15-17 florets on the stem and 5 -6 florets remain open after withering of the first floret.
- **Exotic: -** The Gladiolus which does not look normal is called exotic gladiolus.

Categories of exotic type

- **Bird of paradise**
- **Laciniated**
- **Dragons Face ups**
- **Double**
- **Doublet**
- **Star**
- **Orchid**
- **Reflexes**
- **Bird of paradise:** The florets are few in number and flat, giving starfish appearance. The stems are quite stout and short and Tepals are very long (15 cm).
- **Laciniated: -** It is similar to bird of paradise, except that the petals are irregular at the edges.
- **Dragons: -**It fails to open without some assistance and starts rotting before openings.
- **Double: -** It has more than six sepals and petals. These gladiolus cultivars are mostly sterile, and give a good shape. The first double Gladiolus was introduced by Arthur C-korner in 1947 it is said that doubles are mutant of 'Maid of orleans' and named it is as "Multiple No 1"
- **Doublette: -**The centre of 200 - size floret is filled with little reddish petalloid and anthers. The net effect is of a cream with its mouth full of granted watermelon.
- **Starflower: -**These are originated probably from the use of species G. Colviellei by Frank Unwin of Cambridge. These have star shaped petals and are more suited for floral arrangements.

- **Orchid flower: -** the florets are small and delicate and look like cattleya orchid in shape and colour. The petals are tough in texture and narrow e.g. Alice Abbot; Red orchid.
- **Reflexes:** In this type, three – flower petals curve back in curl or spiral until they press against the stem. This gives the floret a very open and unusually exotic appearance and quite distinctive shape.
- **Fragrant:** The fragrant cultivars viz: Lucky star, perfume, ummer fragrance and Acacia were mainly used for evolving modern fragrant cultivars

4. Miniature (decorative)

Medium sized (300 size) flowers called Miniature gladiolus. These are very useful in home decoration and are easy to transport because of its size. It has robust petal strength and strong attachment. It has all colour spectrums, even the greenery, bluest, brownouts and grayest with beautiful colour combination blotches, throat marks and Pico tees and radially striped.

5. Exhibition large flowered

The cultivars having at least twenty-one florets on a strong stem and seven floret open at a time with 500-900 size, balance, symmetry, consistency of floret forms and petal structure is to be considered exhibition size.

Useful plants for conservation of biodiversity, healthcare and removal of Ganga river pollution

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The Ganga River is the largest and very important river basin of country as well as the world. The Ganga River has been considered as the most sacred river of India in Veda and puran. It is called as "Ganga Maa" or "Mother Ganga" or "Ganga Ji". People of world believe that bathing in the holy water of Ganga washes all the past sins of a person. It has a symbol of purity, and for Mokshha. It has long history of reverence in India and it is often called Holy Ganga. The total length of the river is about 2510 K.M. One of the largest groups of human population belts on earth is built around the

Ganga. It is originated from Bhagirathi from Gangotri glacier in the Uttarakhand. The level of pollution in the Ganga River has reached alarming proportions. Two types of point sources like, surface drains carrying municipal sewage or industrial effluent, pumping stations and sewage system from industries etc are found. The point source can be measured. Second is non point source which cannot be measured such as runoff agriculture field carrying chemical and fertilizers, run off from area used for dumping of solid waste and open defecation, mass bathing, floral offerings etc. According to study nearly 89 million liter of sewage is disposed into Ganga River from the 12 municipal towns that fall along its route till Haridwar.

The present paper highlights some of the potential plant species like *Achyranthes aspera, Acorus calamus, Aegle marmelos*, *Ajuga bracteosa, Arisaema tortuosum, Aristolochia indica, Asparagus racemosus, Azadirachta indica, Bacopa monnieri, Boerhavia diffusa, Bombax ceiba, Cassia fistula, Cassia tora, Celastrus paniculatus, Curculigo orchioides, Cyperus rotundus, Diospyros exsculpta, Emblica officinalis, Euphorbia fusiformis, Ficus religiosa, Gloriosa superba, Helminthostachys zeylanica, Hemidesmus indicus, Tephrosea purpurea, Terminalia chebula, Tinospora cordifolia, Trminalia bellirica, Withania sominifera* etc. are utilized for the treatment of various diseases and disorders by the rural and local people for meeting their day today health care. The paper also discuss some potential plants species like viz., *Typha latifolia, Phragmites australis, Colocasia esculenta, Polygonum hydropiper, Alternanthera sessilis* and *Pistia stratoites* etc for removal of Ganga water pollution with mechanism through which pollutants is removed significantly in the larger interests of humanity .

Climate Change and its Impacts–Adaptation and Mitigation options to conserve the Ecosystem

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Climate is changing, primarily as a result of human activities and we are adding greenhouse gases to the atmosphere that is driving the climate to a warmer state and thereby impacts the ecosystem balance. The warming is more pronounced and is evident in the long-term observations. It is great challenge to human health and safety and quality of life and economy of the country. India's average temperature has risen by around 0.7°C during 1901–2018. The summer monsoon precipitation (June to September) over India has declined by around 6% from 1951 to 2015, with notable decreases over the Indo-Gangetic Plains and the Western Ghats. Climate change is associated with various adverse impacts on agriculture, water resources, forest and biodiversity, health, coastal management and increase in temperature. Decline in agricultural productivity is the main impact of climate change. A majority of population depends on agriculture directly or indirectly. Climate change would represent additional stress on the ecological and socioeconomic systems that are already facing tremendous pressure due to rapid industrialization, urbanization and economic development. This presentation analyzes the impact of climate change and its various aspects in the Indian context with respect to agriculture and how these impacts can be minimized through better adaptation and mitigation strategies, so that a balance in ecosystem can be maintained.

Natural Resources Management and Biodiversity Conservation under Enhanced Greenhouse Effect

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Climate change and global warming is one of the most widely discussed topics now a day and is a cause of concern to everyone. Climate change induced extreme weather events such as floods; droughts are inflicting severe damage to crops, fodder and livestock, besides inflicting steady damage to natural resources (Soil, Water), *Flora and fauna*. Enhanced emission of greenhouse gases especially carbon dioxides facilitates global warming and trigger extreme weather events as per the prevailing micrometeorological conditions. Thus, climate change has an important implication for existing soil and water resources and biodiversity. Climate change affects habitats of several species, as for instance even a change in average temperature and air moisture can have a significant effect upon ecosystems. Climate change is expected to modify the timing and magnitude of runoff and soil erosion because of its unpredictable nature. Therefore, global warming has a long term implications on ecological processes. Hence, it is a high time to adopt a pragmatic approach to preserve the natural resources and conserve our biodiversity from such degradation. Climate change has important implications for future planning of soil-water resources management. Therefore, it is pertinent to adapt climate smart agriculture and to solve potential water resources problems for human's existence and well-being. Despite our efforts to understand specific impacts of enhanced greenhouse gases induced climate change and global warming, research and information on the impacts of climate change with reference to soil-water management and biodiversity conservation remains inadequate. Our research experience indicates that natural forests and grasslands behave as a sink to atmospheric CO_2 and thereby ameliorate global warming impacts. Therefore, it is important to protect natural forests (*Sholas*) and grasslands and also to develop alternative strategies and

policies to convert the barren land in to pasture and forests through suitable afforestation programme with proper follow up. Also, it is imperative to implement water harvesting structures like ponds besides conserving natural ponds. Soil conservation measures like bench terracing, contour bunding, vegetative barriers etc., need to be implemented to protect and conserve our precious soil from surface runoff. Therefore, the present study aims to elaborate the implications of global warming on soil-water and biodiversity and suggests possible ways to mitigate the global warming impacts to protect the natural resources and biodiversity in the dynamic ecosystem.

Economical model based on changes in environment

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"The supreme reality of our time is … the vulnerability of our planet."

—John F. Kennedy (1917–1963)

The awareness of environmental pollutions and other problems have taken a significant role in society at large, including impact on life of human and non-human being. The economical impact of flow of circular economy has been discussed along with the effect of all factors of production. All economic theory is based on the circular flow model, which establish and modelling the relationship between economic activity and the environment. Another opposite direction and impact happen between environment and the economic activity.

Pollution refers to environmental damage that does not extend far from the polluting source and typically is confined to a single community. Although the negative effects are unlimited in scope, they nonetheless pose a risk to society and can be difficult to control.Climate Change, i.e., Global

pollution is difficult to control, both because the associated risks are widespread and because international cooperation is needed to achieve effective solutions.

At any point in time, several environmental objectives must be met with a limited number of economic resources. An important element of an environment risk management is the regulatory approach used by government. Government policies call for direct regulation of pollution are indicative of a command-and-control approach.Another element is determination of the most effective time plan for policy initiatives.

Many policy instruments are like market incentives, those are classified into major categories, such as, pollution charges, subsidies, deposit and/or refund systems, and pollution permit trading systems. The appropriate level of analysis for evaluating the cost of an environmental initiative is incremental costs.

Introduction:

Over the past several decades, the awareness of environmental pollutions and other problems have taken a significant role in society at large, including impact on life of non-human being and human being, and its impact on social life and economical life, etc. The world has become more aware about natural environment issues and more sensitive to the implications of *ecological damages*. The effect on macro and micro economy needs to be studied, to develop the economic model and government policies formulations, at large.

Circular Flow Model of Economy:

All economic theory is based on the circular flow model, which establish and modelling the relationship between economic activity and the environment.Figure 1 depicts the circular flow model of economy as below.

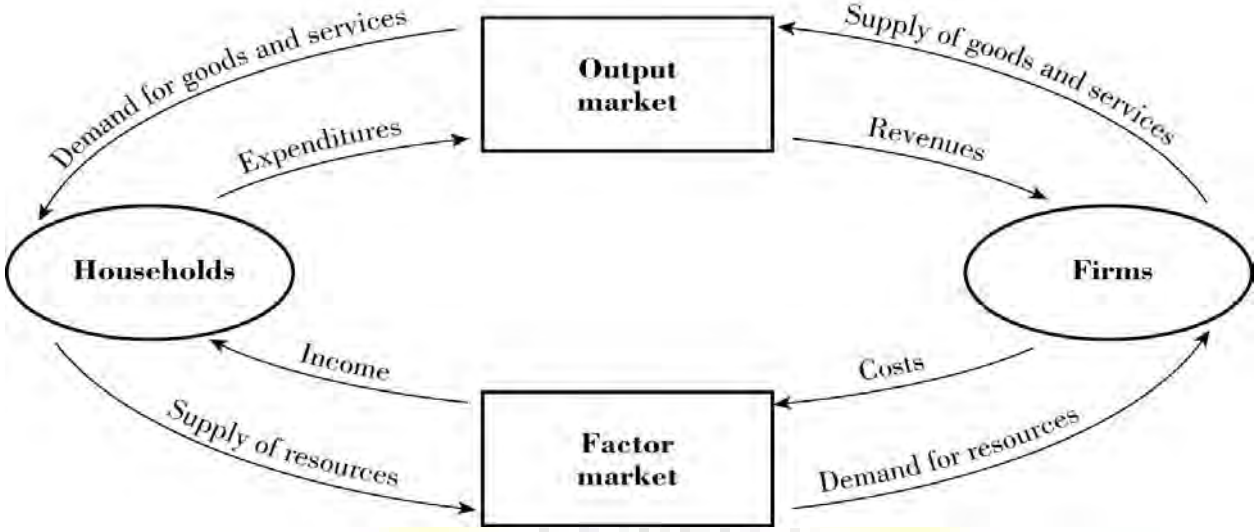

Fig. 1: Circular Flow model of Economy

The above figure introduces how the flow operates, holding ceteris paribus. Notice that real flow (i.e., the nonmonetary flow) runs counterclockwise between the two market sectors, households (or consumers) and firms (or producers). Households supply resources or factors of production to the factor market, where they are demanded by firms to produce goods and services. These commodities are then supplied to the output market, where they are demanded by households. Running clockwise is the money flow. The exchange of inputs in the factor market generates an income flow to households, and that flow represents costs incurred by firms. Analogously, the money flow through the output market shows how households' expenditures on goods and services are revenues to firms.

Environmental Economics:

A second set of linkages runs in the opposite direction, in the case of circular flow model of economy, from the economy to the environment. Figure 2 depicts the *Material balance method* applicable for factor markets in economy at large, as indicated below.

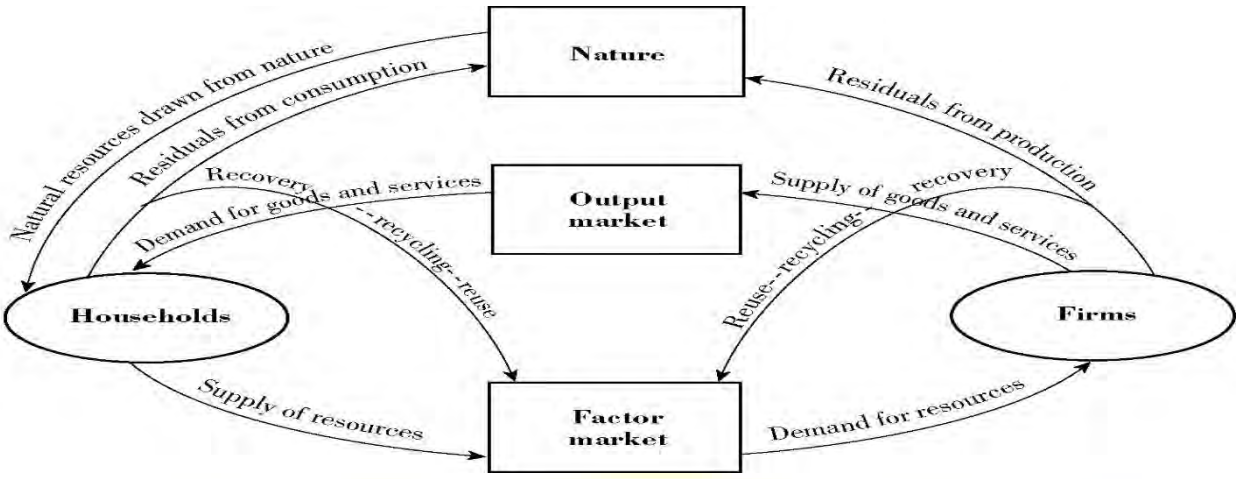

Fig. 2: Material Balance Method

This flow illustrates how raw materials entering the system eventually arereleased back to nature as by-products or residuals. Most residuals are in the form ofgases released into the atmosphere, and in the short run, most are not harmful. In fact, some are absorbed naturally through what is called the assimilative capacity of theenvironment. For example, carbon dioxide emissions from the combustion of fossil fuels (i.e., oil, coal, and natural gas) can be partially absorbed by the earth's oceans and forests.Other released gases are not easily assimilated and may cause harm, even in theshort term. There are also liquid residuals, such as industrial wastewaters, and solid residuals, such as municipal trash and certain hazardous wastes—all of which are potential threats to health and the ecology. Notice in Figure 2 that there are two residual outflows, one leading from each of the two market sectors, meaning that residuals arise from both consumption and production activity. This set of flows is the chief concern of environmental economics.

Pollution:

Pollution refers to environmental damage that does not extend far from the polluting source and typically is confined to a single community. Although the negative effects are unlimited in scope, they nonetheless pose a risk to society and can be difficult to control. A common local pollution problem is urban smog. Visible asa thick yellowish haze, smog is caused by pollutants that chemically react in sunlight.Another pollutionproblem that is receiving increasing attention is solidwaste pollution. Poor waste management practices can allow contaminants such as lead and

mercury to leach into soil and water supplies. Third important example is acidic deposition, which arises from acidic compounds that mix with other particles and fall to the earth either as dry deposits or in fog, snow, or rain. Acidic deposition is commonly known as acid rain.

Climate Change, i.e., Global pollution is difficult to control, both because the associated risks are widespread and international cooperation is needed to achieve effective solutions. Consider, for example, the problem of global warming, also known as the greenhouse effect. Global warming occurs as sunlight passes through the atmosphere to the earth's surface and is radiated back into the air where it is absorbed by so-called greenhouse gases (e.g., carbon dioxide). Although this warming process is natural, activities such as fossil fuel combustion add to the normal level of greenhouse gases, which in turn can raise the earth's natural temperature. These climate disruptions may affect agricultural productivity, weather conditions, and the level of the earth's oceans—all effects that are worldwide in scope.

Risk Assessment, and Management:

At any point in time, several environmental objectives must be met with a limited number of economic resources. This means that as problems are identified, they must be prioritized. In general, this is done through scientific assessment of the relative risk to human health and the ecology of a given environmental hazard, this procedure is known as risk assessment. The assessment must determine whether a causal relationship exists between the identified hazard and any observed health or ecological effects. If causalityis determined, scientists then attempt to quantify how the effects change with increased exposure to the hazard. These findings are critical, because they determine whether a policy response is necessary and, if so, how immediate, and how stringent that policy should be.

Government Policy Formulation:

An important element of risk management is the regulatory approach used bygovernment. Policies for direct regulation of pollution are indicative of a*command-and-control approach*. This form of regulation uses rules or standards tocontrol the release of pollution. In practice, standards either set a

maximum on thenumber of residuals polluters may release or designate an abatement technology that allsources must use. In either case, polluters have little or no flexibility in deciding howthey comply with the law. The command-and-control approach has been the predominantly used in the United States over the past several decades, but in recent years, more economicincentives have been integrated into strategic policy plans. This suggests a shifttoward a *market approach* to policy.

The market approach is incentive-based, meaning it attempts to encourage *conservationpractices or pollution-reduction strategies* rather than force polluters to follow aspecific rule. Many policy instruments can achieve this result, such as a fee on pollutantreleases or a tax levied on pollution-generating commodities. The common parameter is that they tap into natural market forces so that polluters' optimizingdecisions will benefit the environment.

A market approachdoes it strategically through the use of motivationat the time of designing environmental policy. For example, if a profit-maximizing firm were discharging a chemical into a river, a marketapproach might be to charge that polluter a fee for every unit of chemical released. Inso doing, the firm would have to pay for the damage it caused, which would erode itsprofits. This tactic is sometimes called the *"polluter-pays principle."* The expectedoutcome is that the profit-maximizing firm will reduce the chemicals it releases, usingthe least-cost method available. The favourable outcomes are that society enjoys thebenefit of a cleaner environment and that the associated costs to achieve that gain are minimized.

Another element of risk management decision making is determining the most effective time plan for policy initiatives. One approach is to target policy at more immediate, or short-term, problems. These types of initiatives are called management strategies since their purpose is to manage an existing problem.

An alternative approach addresses the potential of future deterioration and is therefore preventive in purpose. This long-term strategy is referred to as pollution prevention.

Policy Evaluation Criterion:

Several risk management strategies have been devised to guide these important policy decisions. These strategies use criteria to evaluate policy options. In general, these criteria are based on measures of risk, costs, or benefits—either singularly or in comparison to one another. Two criteria that are economic in motivation are allocative efficiency and cost-effectiveness. *Allocative efficiency* requires that resources be appropriated such that the additional benefits to society are equal to the additional costs incurred. *Cost-effectiveness* requires that the least number of resources be used to achieve an objective. Environmental justice or an environmental equity criterion that considers the fairness of the risk burden across geographic regions or segments of the population.

Environmental problems:

Economists model the environmental problems as market failures by using either the theory of public goods or the theory of externalities. If the market is defined as "environmental quality," then the source of the market failure is that environmental quality is a public good. If the market is defined as the good whose production or consumption generates environmental damage, then the market failure is due to an externality.

Environment problems occur when a third party is affected by the production or consumption of a commodity. Such a third-party effect is called an externality. If the external effect generates costs to a third party, it is a negative externality. If the external effect generates benefits to a third party, it is a positive externality.

Instruments:

The primary distinction between the market approach and the command-and-control approach is the way in which environmental objectives are implemented, as opposed to the level at which those objectives are set. From a practical perspective, standards-based objectives are set at a socially desirable level rather than at an efficient level. Where the market approach parts company with the command-and-control approach is in how it attempts to achieve those objectives, that is, in its design of policy instruments.

Many policy instruments use market incentives, it is helpful to classify these instruments into major categories: pollution charges, subsidies, deposit or refund systems, and pollution permit trading systems. Table 1 below describe eachcategory.

Table 1: Categories of Instruments

Instrument	**Description**
Pollution charge	A fee charged to the polluter that varies with the quantity of pollutants released
Subsidy	A payment or tax concession that provides financial assistance for pollution reductions or plans to abate in the future
Deposit or Refund	A system that imposes an up-front charge to pay for potential. pollution damages that are returned for positive action, such as returning a product for proper disposal or recycling
Pollution permit trading system	The establishment of a market for rights to pollute, using either credits or allowances

Environment Cost:

The appropriate level of analysis for evaluating the cost of an environmental initiative is *incremental costs*. The rationale is to allow a comparison between post-policy expenditures and their pre-policy level, which we call the baseline. Starting with the basics, we know that environmental costs must be defined in incremental terms. The motivation for using incremental variables is to capture changes brought about by policy. In this case, the relevant change is the increase in costs associated with policy induced improvements in environmental quality. Incremental costs are calculated by first identifying the existing level of environmental expenditures, then estimating the costs after the policy is implemented, and finally finding the difference between the two.

Economic costs are a more accurate measure of resource utilization than are accounting costs, since they include both explicit (i.e., out-of-pocket) costs and implicit costs. However, since the latter are

not readily identifiable, analysts often derive incremental cost values based solely on explicit expenditures.

The explicit costs of implementing an environmental policy include the administrative, monitoring, and enforcement expenses paid by the public sector as well as the compliance costs incurred by virtually all sectors of the economy. Those associated with the use of economic resources—land, labour, and capital—are rent, wages, and interest, respectively. Since these resources are traded on the open market, expenditures are based on market-determined input prices. However, these expenditures are not made simultaneously, and some are less controllable than others in the short run. Recognizing these distinctions, economists classify costs into two components:

(1) Fixed costs, which are not controllable in the short run and do not depend on production levels, and
(2) Variable costs, which have the opposite characteristics. In the context of environmental policy implementation and compliance, the accounting equivalents of these categories are capital costs and operating costs, respectively.

Implicit environment costs are those concerned with any non-monetary effects that negatively affect the society's well-being. Examples include the value of diminished product variety arising from a ban on certain inputs, the time costs of searching for substitutes, and the reduced convenience that environmental control policies might impose. The social costs of any policy initiative are the expenditures needed to compensate society for the resources used so that its utility level is maintained. This compensation would have to account for all price, output, and income effects that arise from a given regulation.

The *engineering approach to expenditure estimation* relies upon the knowledge of experts in abatement technology. Based on the state of the art in abatement, engineers and scientists are called upon to identify combinations of equipment, labour, and materials needed by polluters to comply with a policy mandate. Then, capital, and operating costs for all feasible abatement designs are

estimated. Finally, the analyst selects the least-cost model from among these technology-based designs and uses the result to estimate the aggregate incremental cost for all affected polluting sources.

Conclusions:

The paper presenter has discussed the circular flow of economy, and its linkages with Environmental economics through the use of Material Balance Method. Scientific assessment of the relative risk to human health and the ecology of a given environmental hazard has been described as a procedure of risk assessment. The assessment must determine whether a causal relationship exists between the identified hazard and any observed health or ecological effects.

Government policies are needed for direct regulation of pollution are indicative of a command-and-control approach and/or market approach.

The market approach is incentive-based, meaning it attempts to encourage conservation practices or pollution-reduction strategies rather than force polluters to follow a specific rule. Many policy instruments can achieve this result, such as a fee on pollutant releases or a tax levied on pollution-generating commodities. Many policy instruments use market incentives, it is helpful to classify these instruments into major categories: pollution charges, subsidies, deposit or refund systems, and pollution permit trading systems.

The appropriate level of analysis for evaluating the cost of an environmental initiative is incremental costs. Incremental costs are calculated by first identifying the existing level of environmental expenditures, then estimating the costs after the policy is implemented, and finally finding the difference between the two.Economic costs are a more accurate measure of resource utilization than are accounting costs, since they include both explicit (i.e., out-of-pocket) costs and implicit costs.The engineering approach to expenditure estimation relies upon the knowledge of experts in abatement technology. Based on the state-of-the-art in abatement, engineers and scientists are called upon to

identify combinations of equipment, labour, and materials needed by polluters to comply with a policy mandate.

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Save Plants - Save Life

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The earth is surrounded by a thick layer of gases that work like a blanket and keeps the planet warm permitting the plants, animals and microbes to live. In the absence of gas layer the earth would be colder by 20–30°C and less suitable for life. Due to an increase in temperature across the world the climate is changing gradually causing the heating up of earth called Global Warming. Global warming is caused by some gases which are called 'greenhouse gases'. The three most important greenhouse gases are carbon dioxide, methane and nitrous oxide. In recent years these gases have increased dramatically due to human activity. The earth is a 'closed system' producing everything that is required for growth and survival of all resident organisms including humans. The nature operates chemical cycles such as the carbon cycle to control and balance these gases. All the carbon atoms rotate through a complex series of processes in the carbon cycle. However, there is a great

threat to the survival of plants due to rise in CO_2 and temperature. If the global temperature rises by 1.8°C with respect to the year 2022, the proportion of favoured and disadvantaged regions in terms of species richness would still remain in balance. But it is said that we are heading for a rise in temperature of up to 4°C. If it is so, there would be losses of plant species richness in some regions and changes in other regions.However, it is rather difficult to predict the degree to which the biodiversity of any given region will adapt to new conditions, or whether additional species will migrate into favoured regions, or whether disadvantaged areas will suffer losses of species in mass. The adaptability of species and their interactions in the ecosystem can exert great influence on their distribution.

Water resources are also shrinking day by day and in future there may be great scarcity of drinking water. The Ganga is the most sacred river of Hindus and is also a lifeline to millions of Indians who live along its course and depend on it for their daily needs. The *Ganga* is considered as the blood of Hindus. It begins at the confluence of the Bhagirathi and Alaknanda rivers. The Bhagirathi is considered to be the true source in Hindu culture and mythology but Alaknanda is longer. The headwaters of the Alakananda are formed by snowmelt from such peaks as Nanda Devi, Trisul, and Kamet. The Bhagirathi rises at the foot of Gangotri Glacier at Gaumukh. The Ganga is a trans-boundary river of India and Bangladesh. The 2,525 km river rises in the western Himalayas in Uttarakhand and flows south and east through the Gangetic Plain of North India. However, people are not aware of conserving plant, animal and microbial diversity, rather are disturbing the natural balance. We have to be cautious and aware to save the natural resources otherwise there shall be a great threat to our progeny in future and their survival.

Biodiversity point-of-view: integration with COVID-19 effect

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Global spread of COVID-19 in a very short time has brought a remarkabledrop off in maximum vehicle, industrial traffic and tourism activities. Restricted anthropogenic interaction with nature and natural resources such medicinal plants and plant diversity during this pandemichas appeared as a golden opportunity for nature and environment to flourish and grow in their own way.National Aeronautics and Space Administration (NASA) developed a computer models to generate a COVID-free 2020 for comparison, scientist found that since February 2020, pandemic lockdown have reduced worldwide nitrogen dioxide (NO_2) concentrations by nearly 20%.

Key words: COVID-19, Natural resources, anthropogenic interaction,

Introduction

The Coronavirus, for example, is a zoonotic virus that might have jumped from animal to human, wreaking havoc on our modern-day society. The way humanity has reacted to the virus then turns around and affects our immediate surroundings. In this way, COVID-19 affects the environment. However this relationship also works the other way round: the environment too, has profound effects on the infection rate of COVID-19. Humanity is caught in the middle of this web, and even now,a year after the epidemic went global, the general public still has only vague ideas about how this interconnectivity functions.

Perhaps the most important issue about COVID-19 and the environment is the question of how COVID-19 is affecting the present environment. As people all over the world settle into quarantine, traffic levels decrease and non-essential businesses close temporarily. In addition, lockdown will decrease overcrowding and the concentration of human activity, particularly in urban areas. The decrease in human activity is changing the air we breathe as CO2 and other emission levels go down. Decrease in travel will also play quite a vital role in changing air quality and

emission of levels of air pollutants. In short, COVID-19's impact on the human population's lifestyle choices will cause changes in every aspect of the environment that human activity is tied to. This includes not only air pollution levels, but also water quality and wildlife biodiversity.

The memory of the fear associated with the virus, as well as the habits that people picked up during the shift to quarantine will linger long after the pandemic abates. Humanity's outlook of the future is rapidly changing as the pandemic continues, and there seems to be more good than bad to this difference.

Perhaps the most important issue about COVID-19 and the environment is the question of how COVID-19 is affecting the present environment. Environmentally, the Covid-19 outbreak also has constructive effects. Studies startedin the home environment during the outbreak increased Home Office applications. Thiswill have an effect that will reduce carbon dioxide emissions by reducing the mobilityof people in their external environment. Many countries in the world have switched todistance education due to corona virus (Zhou et al. 2020). Social mobility, which causesmany carbon emissions, such as student services, has also decreased with distance education.In addition, since the scientific events, meetings and political events started tobe held in the form of a remote conference, environmental emissions have decreasedglobally. In this context, those who are accustomed to the efficiency of teleconferencingand distance education are expected to increase the number of these activities afterthe outbreak (Rohwer-Kahlmann 2020). In most countries, there has been a lockdownwith people not allowed to move around leading to a reduction in greenhouse gas emissions.In the course of the Covid-19 outbreak, the greenhouse gas emission reductionis observed during the restrictions of the states, such as China and Italy (CDP 2020).A reduction of approximately 25% of carbon emission is reported in China (Myllyvirta2020). It is also reported that air pollution (such as nitrogen dioxide and carbon dioxideemission) is reduced in many regions (McMahon 2020).

Observations

Positive impact of COVID 19 on the environment:

- Geting better air quality through reducing CO_2 emissions by reducing the mobility of vehicles. A worldwide reduction of nearly 25% of carbon (C) emission is reported.

- A decline in greenhouse gas emissions such as nitrogen dioxide (NO_2) and carbon monoxide (CO).
- Increase in ozone (O3) level (probably due to lower titration of O3 by NO) has been reported.
- Decline air pollution but there were significant differences between the pollutants. It has been observed that the most significant reduction amounts are in black carbon and nitrogen dioxide (NO2), while a low decline occurs in the particulate matter with a diameter of less than 10 (PM10).
- Ecosystems are being significantly recovered. In many big cities the residents are experiencing a clear sky for the first time in their lives.

Negative impact of COVID 19 on the environment:

- Increased medical wastes resulting from the increased medical activity. It was stated that for the period when the outbreak peaked in Wuhan, an average of 240 tons of medical waste was produced daily in hospitals and this value was 6 times higher than normal value.
- Masks made of polypropylene, a type of plastic, and it is very difficult to get rid of it in nature as it does not decompose.
- Increase demand for online shopping for home delivery. Consequently, organic and inorganic waste generated by households has increased.
- Reduction in waste recycling

Often, there has been an increased demand for personal protective equipment (PPE). The demand has forced companies to work overtime to keep up, the increased factory use has increased the pollution they create. Also the materials the masks are made out of are harmful for the environment. Many people have chosen to use single use masks over cotton and reusable ones which has added to the clinical waste in our seas and oceans. This has a negative impact on our marine ecosystems, endangering the animals and plants that live in those waters. There also has been more water usage, people have started to wash their hands more often, take longer showers and wash their clothes/dishes more often. Water is a finite resource and it is important to use it responsibly. It is predicted that water usage will return to normal once the lockdown rules are lifted.

Perhaps the most important effect of the pandemic on human activity is how the pandemic is changing industries. There has been an increase in robotics use and automotive equipment. As many workers were forced to work from home and as factories were shut down companies started to look for alternatives and replacements. Many have turned towards Industry 4.0 technology; this includes 3D printing and artificial intelligence. Before the pandemic the shift towards using more robots had already begun but Covid-19 has acted as a catalyst pushing it forward faster, One industry making major changes is the mining industry, companies such as Resolute Mining have started to shift their entire production to automated machines controlling them through a central control centre. Another industry is the medical industry, many hospitals in the world have looked into using robots in order to maintain sanitation and decrease the spread of the virus.

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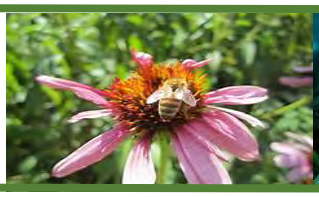


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Biodiversity Conservation & Sustainable Human Life

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Humans use the planet's resources such as forests, oil and minerals. Many of these resources have accumulated or have grown over thousands or even millions of years! The 2010 WWF living Planet Report estimates that we'll need the equivalent of two planets by 2030 to support human populations if we continue with our current consumption patterns! Where will we find that second planet? What happens ifwe don't find it? What alternatives are there?

Sustainable human development is about living on earth without taking more than that can be naturally replaced. It is about good health, good living conditions and long-term wealth creation for everybody. All these things must occur within the carrying capacity of the planet. To understand sustainable development, think about its three pillars: "economicwealth", "social equity" & "environmental health"; or in other words "profit", "people" &"planet" all three are linked to each other.

Present deliberation deal with the Biodiversity Conservation & Sustainable Human Life.

Climate change and its consequences: a threat to Earth

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Earth's temperature is increasing day by day due to mismanaged practices of human being. This increase in temperature is the reasons for the major change in weather pattern, frequent cyclones, tornadoes, and uneven rainfall. Due to change in climatic conditions and global warming world is

facing a lot of problems like melting of ice from poles and glaciers, sea level rise, loss of biodiversity, floods, drought, and climate refugee.

This climate change is also forcing people to leave their place either due to long drought condition or floods. These people are called as Climate refugees or Climate Exodus, and thiswill be a big challenge for the world in coming future. It is expected that approximately 2 billion people will be climate refugee and will seek asylum to the area having sufficient natural resources by 2050. A lot of people are migrating from their places to the other places of the world legally or illegally. These people may create imbalance in the ecosystem and will put the stress on the natural resources.

Climate Change are not only dangerous to the biodiversity but also it is a big threat to Earth and survival of humans on this planet.

Current status of Persistent Organic Pesticides (POPs) Management in India

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Although pesticides have provided considerable economic profits by increasing the manufacture and yield of textile and food and preventing vector-borne infections, indication recommends that their practice has harmed environmental and human health. Pesticides are found in the entire surrounding, and their traces are observed in water, air and soil sources. They continue to be used domestically and in the agriculture area despite hexachlorocyclohexane (HCH) and dichlorodiphenyltrichloroethane (DDT) ban in India. The discussion of the production and consumption of the Persistent Organic Pesticides (POPs) and the maximum residual limit and availability of POP in water, air, and soil have been done. The part of POPs in the India region is examined to emphasise the worldwide spread of POPs and their effect on surrounding areas and countries. India is one of the leading suppliers to the global dispersion in POPs. It may be inferred that HCHs and DDTs have severely contaminated the human population and Indian environment;

however, the lack of data on other POPs makes assessing their environmental exposure and nationwide human challenging. The meta-analysis of time tendencies found no indication of an overall decay in HCH and DDT residues in the body and environment.

Loss of Biodiversity and Health Challenges

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The earth is home to a diverse array of living organisms, whose genetic diversity and relationships with each other and with their environment constitute our planet's biodiversity. Biodiversity is the 'foundation of human life' on earth. Biodiversity includes variety and variability among living organisms from all sources including ecosystem and ecological complexes in which they occur, and it comprises diversity within species and in ecosystems. The distribution and magnitude of the biodiversity that exists today is a product of over 3.5 billion years of evolution, involving speciation, migration, extinction and more recently, human influences.It helps in producing more productive and stable ecosystem capable of surviving in stress condition.

Warm tropical regions between the Tropic of Cancer and Tropic of Capricorn on either side of Equator have since long provided the most suitable habitat for living organisms. Countries residing in this area are known as mega diversity countries.India has a great wealth of biological diversity in its forests, wetlands and in its marine areas. Our country accounts for two hotspots i.e. Eastern Himalayas and Western Ghats which figure in top eight most important hotspots (of biodiversity) of the world.

Biodiversity supports human and societal needs, including food and nutrition security, energy, development of medicines and pharmaceuticals and freshwater, which together underpin good health. Medicinal resources of the tropical forests are important in human health. It also supports economic opportunities, and leisure activities that contribute to overall human wellbeing. It is Ecological life support as it provides functioning ecosystems that supply oxygen, clean air and

water, pest control, waste water treatment and many ecosystem services. Higher biodiversity controls the spread of certain diseases as pathogen will need adapt to infect different species. Therefore, rapid biodiversity loss accompanies high incidence of pathogenic diseases.

The entire basis of evolution is underpinned by appearance of some species and disappearance of other; extinction is thus a natural phenomenon. Biologists estimated that 99.9 % of all species that have ever existed are now extinct. Rate of extinction as estimated today is 10 to 100 times higher than natural extinction rate of 1-10 species per year due to habitat loss, introduction of non-native species, pollution, over exploitation and global climate change. Chiefly the environmental deterioration constitutes the drastic effects on biodiversity. A changing climate endangers whole ecosystem and entire species. The continuing loss of biodiversity is underpinning our ability for poverty reduction, food and water security, human health and the overall goal of leaving nobody behind. The report, published since 2005 by the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES), warns of grave consequences to humanity from mass die-offs and degradation of nature. Nature makes human development possible but our relentless demand for the earth's resources is accelerating extinction rates and devastating the world's ecosystems. Human action has significantly altered more than two-thirds of the environment.

Biodiversity loss is hurting our ability to combat pandemics.The increasing frequency of disease outbreaks is linked to climate change and biodiversity loss. The frequency of disease outbreaks has been increasing steadily. Between 1980 and 2020 there were 12,324 recorded outbreaks, comprising 49 million individual cases and affecting every country in the world. A number of trends have contributed to this rise, including high levels of global travel, trade and connectivity, and high-density living, but the links to climate change and biodiversity are the most striking. At the same time, new infectious diseases appear to be emerging at an increasing rate. They include new diseases such as severe acute respiratory syndrome (SARS) as well as reemerging diseases that have expanded in geographic range, such as West Nile virus, Corona Covid-19 etc.. A common feature of emerging infectious diseases is that they are associated with anthropogenic changes to the environment.

Deforestation has increased steadily over the past two decades and is linked to 31% of outbreaks such as Ebola, and the Zika and Nipah viruses. Deforestation drives wild animals out of their natural habitats and closer to human populations, creating a greater opportunity for zoonotic diseases - that is, diseases that spread from animals to humans. More broadly, climate change has altered and accelerated the transmission patterns of infectious diseases such as Zika, malaria and dengue fever, and has caused human displacement. Movements of large groups to new locations, often under poor conditions, increases displaced populations' vulnerability to biological threats such as measles, malaria, diarrheal diseases and acute respiratory infections. Corona virus has pandemic potential.

There is scientific evidence to support this relationship. The loss or extinction of large predators because of hunting and land-use change can increase the population of a particular vector or host. This loss can result in a greater prevalence of pathogens among hosts, and, consequently, pose an increased risk of transmission to humans. It has also been shown that the loss of specialist predators can affect the health of animal populations, as diseased individuals can survive longer and increase the potential for transmission. Conversely, when nonnative species are introduced into a system, they can alter ecosystems, impact biodiversity, and change native host–parasite dynamics. Introduced pathogens and vectors can also cause high levels of mortality in wildlife and humans. With much of their life cycles occurring outside of the human host, waterborne and vector borne pathogens are particularly sensitive to environmental conditions. For example, eutrophication and overfishing can contribute to an abundance of intermediate snail hosts of schistosomiasis. Some studies suggest that species and habitat diversity can reduce the transmission rates of vector borne diseases. Empirically based models have also been developed that suggest increasing rates of *Borrelia burgdorferi* tick infection, the pathogen associated with Lyme disease, as host biodiversity declines.

Land-use changes can lead to multiple impacts on disease transmission, especially if vector species adapt to newly created niches in different ways. It has been found that numbers of *Anopheles darlingi*, the most efficient vector of malaria in the Peruvian Amazon, and human biting rates were higher in deforested sites than in forested areas, independent of population density. Shifts in biodiversity on all levels, from genes to ecosystems, may play a role in infectious disease

transmission. More research is essential to help decision-makers assess the effects on human disease transmission from changes in biodiversity.

Innovative technologies are critical in the search for new vaccines. One promising area of research is gene-encoded antibodies that create "factories" in our bodies to make antibodies against specific pathogens. Another is monoclonal antibodies (mAbs), typically used to treat existing disease, but which can also prevent infection. Successful drug development is not always about advanced synthetic biology - there is also a link to nature-based solutions and biodiversity as researchers are increasingly "reverting to nature" to look for new therapeutic options. An estimated 50,000 to 70,000 plant species are harvested for traditional or modern medicine, while around 50% of modern drugs have been developed from natural products that are threatened by biodiversity loss.

Through sponsored long-term research, pilot studies, and EPA-initiated projects, we are anticipating the results on- Improved understanding of the mechanisms that link biodiversity change and risks of infectious disease; Identification of the anthropogenic or social factors that affect biodiversity loss; Use of monitoring and predictive tools to reduce the incidence of human infectious diseases; Improved strategies and communication that can encourage changes in human behavior to help reduce biodiversity loss and to decrease exposure to disease risks; Improved analysis of land-use planning that considers environmental and human health impacts. Technological advancement is not possible without a rich biodiversity. Environmental biotechnology applications also depend on biodiversity e.g. bioremediation etc. New technologies offer hope in the search for countermeasures - but protecting the natural world must play a part, too.

An Overview of Climate Change and Adoption of Green Technology

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Emanation of green house gases into atmosphere causes the climate change and the accountability of the decrease of the greenhouse gas emissions deception mainly with the industrialized world, though the growing countries are likely to be the source of an increasing proportion of potential emissions. The predictable climate change under various scenarios is likely to have implications on food production, water supply, coastal settlements, forest ecosystems, health, energy security etc.

According to the surveys, the global mean temperature may increase between 1.4 and 5.8 degrees Celsius (OC) by 2100.The most successful way is to implement a sustainable development pathway by shifting to the environmentally sustainable technologies. Adoption of the green technology towards the expansion of the sustainable technologies for the current problem of the Climate change impact is challenging path.

Keywords: Climate change, green house effect, ecosystem, social impact, green technologies.

Dust storms: Climate change and Biodiversity

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Dust storm is a frequent natural phenomenon that occurs during summer and hazardous to the environmental and economic sustainability of human society which also plays a vital role in global climate change. Every year nearly 2000 million tons of dust are emitted into the atmosphere; majorly from natural sources. Mineral dust deposition provides a nutrient supply (such as iron and other trace

elements) to the marine ecosystem which affects the Earth's biogeochemical cycle significantly. In addition, dust aerosol has also potential to affect the Earth's radiation budget directly or indirectly and perturb the monsoon pattern. Thus, in the present talk, I will discuss the dust storm characteristics, transportation pathways, and their role in climate change and biodiversity.

Keywords: Dust storm, radiation budget, climate change, biodiversity.

Biodiversity conservation and health security in traditional society from a hotspot

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Forests are the reservoirs of biodiversity.More than 700 million people in India depend on forests and agriculture for their sustenance. It is noted that over 250 million people depend on forests for food, fodder, fuelwood, timber, medicines, fibres and other non-timber forest products. Forest protection and landscape restoration can lead to a range of benefits including biodiversity conservation, provisioning and ecosystem services and enhance livelihood opportunities for local communities. The success and viability of restoration projects can, only be ensured through community participation.

Manipur a state in NE corner of India, a global hotspot of biodiversity has a rich flora and fauna. Manipur State comprises of 1961 species of angiospermic plants from 962 genera and 198 families and accounts for 11 percent of country's floral diversity. It is exceptional for her rich cultural diversities with traditional and indigenous knowledge systems.

In the state, age old practice of slash-and-burn cultivation, changed the character of vegetation, from primary to secondary. Landuse change in the state resulted in degraded landscape and barren hills. The forests fire, practice of shifting cultivation, impact of climate change, development activities, urban sprawl are impacting on the plant populations adversely, leaving the species as endangered,

vulnerable and rare. Eco-restoration of these degraded forest ecosystems is the need of the hour.The long term process of acceptance of importance of biodiversity has been initiated in the hill communities with remarkable success as the Conservation and sustainable use of biodiversity and sharing benefits from its commercial utilisation with local people are the needs of contemporary society. There is a need to formulate, implement and monitor comprehensive management plans for different components of the biodiversity of Manipur. Article 8(j) of the Convention on Biological Diversity recognizes contributions of local and indigenous communities to the conservation and sustainable utilization of biological resources.

Protecting the whole range of biodiversity in landscapes, forest patches, sacred lakes, hills, sacred and totem species is the traditional management system practiced since times immemorial in Manipur, local communities play an integral role in protecting forests and restoring forest and tree cover.The germplasm protected by the community in diverse range of habitat types adapted to edaphic conditions is very significant in view of threats due to various anthropogenic pressures and of immense or potential significance

From Manipur 1200 medicinal plants have been reported with 430 species of local traditional medicinal uses. Many medicinal plants are locally used as vegetables and fruits.The traditional system of medicine includes an array of plants that provide health security to the rural populace of Manipur. The paper reports some plants of diverse utility protected by the community including medicinal plants with their uses recorded during the recent explorative survey as immunity boosters during the Covid-19 pandemic indicating that the impacts of the COVID-19 pandemic extend to global biodiversity and its conservation.

Key Word: Forests, restoration, Hotspot, biological wealth, management, Medicinal plants, pandemic.

Wetlands restoration – a blueprint for India

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Wetland degradation resultant from urbanisation, industrialisation, excessive use of inorganic fertilizers, hydrologic alterations like dam construction, eutrophication and climate change etc. has wreaked havoc water and ecological security issues in many countries globally. Accordingly, issue of wetland rehabilitation and restoration have assumed serious dimensions. In the special context of wetland ecosystems, remotely sensed data from orbital platforms have been extensively used for the inventory, monitoring and preparation of management action plans. Recent, research has focussed on assessment of many bio-optical parameters such as turbidity, chlorophyll and trophic state which are indicators of wetlands health and integrity. GIS tools have also shown their utility in studying structural components of wetlands, catchment fragmentation, wetland biodiversity conservation, wetland rehabilitation and restoration using landscape ecological principles.

Environment Management in Integrated Steel Plant

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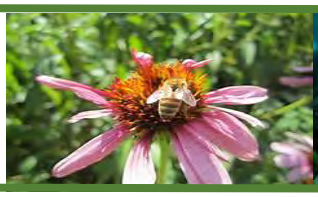
Environment management in integrated steel plant are important in steel companies are required to install specified pollution control equipment's/facilities and also operate well within the prescribed Standards/Norms in respect of air, water and noise pollutions as also solid waste generation & utilization will help to regulate and design strategies to foster environmental improvements for the benefit of the firm and the ecology.it is also help to awareness of environmental rules and

regulations. While modernization & digitization era optimise use of natural resource and minimise pollution load. Hazardous waste elimination, online air quality and effluent quality Monitoring will enhance Environmental performance.

Key-words: prescribed Standards, waste generation, digitization, modernization, Hazardous waste.

Abstract




Sustainable Development Goals

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The 2030 Agenda and the Sustainable Development Goals (SDGs) prominently feature institutions, both as a cross-cutting issue in many of the goals and as a standalone goal (SDG 16). The World Public Sector Report 2019 looks at national-level developments in relation to several concepts highlighted in the targets of Goal 16, which are viewed as institutional principles: access to information, transparency, accountability, anti-corruption, inclusiveness of decision-making processes, and non-discrimination. The report surveys global trends in these areas, documenting both the availability of information on those trends and the status of knowledge about the effectiveness of related policies and institutional arrangements in different national contexts. It also demonstrates how the institutional principles of SDG 16 have been informing the development of institutions in various areas, including gender equality and women's empowerment (SDG 5). By reviewing key challenges and opportunities for public institutions in the context of the implementation of the 2030 Agenda at the national level, the report also aims to inform efforts by all countries to create effective institutions to deliver the Sustainable Development Goals.

Synthetic Seeds for Conservation and Regeneration of Endangered Plant Species- As You Sow So Shall You Reap

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The last five decades witnessed a rapid decline of biodiversity and loss of natural habitats of several plant species. However, it was also an era of significant progress in biotechnology which opened

prospects for multiplication and conservation of plant species. Synthetic seed technology is an important technique that involves selection of a competent explant and encapsulating it in a suitable matrix for germination and conversion into a vigorous plantlet. This technique has been successfully implemented for propagation and long term conservation and storage of various medicinal, vegetable and forest plant species. The method is of high value for species which produce non-viable seeds, recalcitrant seeds and have limited seed production. The endangered species face several such challenges and bottlenecks in reproduction and establishment in natural habitat. The synthetic seed technology is an effective tool for production, cryopreservation and reintroduction of endangered plant species. Hence, this technique is a boon for revival and survival of endangered plant species and can save them from potential extinction.

Effect of different herbicides on soil microbial diversity, biochemical reactions and succeeding crop

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Herbicides have become obligatory for increasing the agricultural production by maintaining the cropped and non-cropped area free from weeds. These accounts for 24 and 47.5% of total agrochemicals used in India and at global level. According to World Health Organization, in developing nations alone there are three million cases of agrochemical poisoning every year. In general, herbicides are formulated in such a way that they degrade from the environment after completion of their intended work, but a few of them persist in the environment and pose a serious hazard to soil microbial diversity, biochemical reactions occurred in the soil and may have persistence effect on succeeding crop in terms of low germination percentage, phytotoxicity *etc.* Mostly used herbicides like atrazine, isoproturon, 2,4-D, alachlor, butachlor, metachlor, metribuzin, sulfosulfuron, pyrazosulfuron, metsulfuron methyl, fluazifop-butyl, oxyfluorfen,

paraquat *etc.* negatively affect the growth, activity, total biomass and population of different beneficial microorganism in soil. Some other herbicides like organophosphates, dinoterb, terbutryn, simazine, prometryn, bentazone, bromoxynil *etc.* negatively affect soil biochemical processes driven by microbial and enzymatic reactions. Sulfosulfuron, imazethapyr, mesosulfuron + iodosulfuron, chlorimuron ethyl *etc.* have persistent negative effect on succeeding crops. Application of optimum dose of herbicides, proper spray techniques, rotational use of herbicides with different mode of action, use of bio-herbicide, application of FYM, green manuring are some of methods which can be adopted for reducing the herbicide toxicity to soil microbial diversity and succeeding crops.

Biodiversity and Health

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Biodiversity the variability of life has significant values for us all that we understand from its utility for our Survival, Commercial, Scientific and cultural values. The biodiversity is at stake because of the human activities. Traditional plant medicines serve 80% of the world's population. Loss of one tree species a day results in loss of 3-4 potentially valuable drugs every year (costing $ 600 million).Forests are the store house of Biodiversity yet as mentioned in 1986 Forest Policy still we do not have in India 33% forest cover in plains and 67% in the hills, so there is need for Restoration of degraded forests. The paper advocates for the measures enhancing environmental awareness promoting biodiversity conservation.

Pseudo Mangrove – An integral part of Sundarban

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Mangrove forests are inimitable, delicate and highly effective ecosystem in the sea – land interphase, where all the flora, fauna and microorganisms adapt the enviornment of tropical intertidal zone. This tidal wetlands of Sundarban harbours variety of flora and fauna. And among them are the diversified and dynamic Pseudo Mangrove Plants. Pseudo Mangroves or Mangrove Associates are the non-exclusive species that are disseminated not only in the Mangrove Ecosystem but also in terrestrial and aquatic habitats, which are also termed as semi – mangroves. There are around 40 different species of Pseudo Mangrove Plants, i.e, *Hernandia nymphaeifolia, Clerodendrum inerme and Suaeda maritima* etc to name a few. These Semi mangrove species physically serve as a mitigator between the marine and terrestrial ecosystems and protects the shorelines from destroying through storms, winds, cyclones, waves and shocks. Moreover, Pseudo Mangroves survive through stressful conditions, e.g., harsh environments, high moisture and salinity, intermittent tidal water, diverse microorganisms and insects, by producing various bioactive compounds, e.g., alkaloids, flavonoids, steroids, tannins and triterpenes which are extracted from different parts of the plant, i.e, bark, stem, root, leaf and flower. Extracts from mangrove species have proven activity against human, plant and animal pathogens.

The bioactive compounds present in pseudo mangroves may play important role as an anti-cancer, anti-inflammatory, anti-fungal, anti-bacterial and anti-microbial agent. The secondary metabolites of semi mangroves helps in inhibiting the growth of breast cancer cells via apoptosis, thus, may be potentially developed as the candidate for chemotherapeutics. Pseudo mangroves are exploited for timber for dwelling the building and boats, for fuel-wood for cooking. This community thickets the water quality and prevents coastal erosion They have well developed salt filtration system and complex root system to tolerate salt water interaction and wave action. However, this biodiversity are being threatened because of several reason like excessive exploitation by humans, erosions, bioinvation and pollution etc. It is high time to safeguard the pseudo mangroves of Sundarban, as they play an integral part of Mangrove Community.

Keywords:
Pseudo mangroves, Secondary metabolites, Mangroves, Semi mangroves, Sundarban, ecosystem and environment, flora, fauna and microorganisms, bioactive compounds, antimicrobial, anti-cancer, anti inflammatory, erosion, mangrove species extracts.

Ethnobotanical Properties of Plants Used by Rural Community in District Rajasthan, India

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Bioresources and humans have intimate relationship since past and depending upon each other for existence. Now days, greater emphasis is being laid on the traditional knowledge regarding application of bioresources in the indigenous healing practices by tribal / ethnic people science ancient time. About 70-80% of world's rural population depends on traditional / indigenous drugs for their primary health care. The percentage of the population using traditional medicines for primary health care in developing countries is 60-90% than that in developed countries (23-80%) India has one of the oldest, richest and most diverse cultural traditions associated with the use of medicinal plants in the form of traditional system of medicine. However, no proper documentation of such remedies exists. Recently, many developing countries have ventured into studies of traditional medicines, devoting significant attention to migrant communities in industrialized countries.

The World Health Organization (WHO) defines this traditional or folk medicine as "the sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness".Interviews were conducted on regular basis of local people, who had knowledge on the ethnobotanical uses of various parts of these plants. Many plant species were reported to be in use among the rural people of

different community of the study area. The survey provided a veritable source of information related to ethnomedicinal uses of plants in the area proposed for study

Keywords Ethnobotany, Conservation, Traditional knowledge

Quantitative analysis of Dominance Trends in Macrophytes in Kongba River, Manipur, North-East India

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The wetlands comprise an integral part of the indigenous socio-ecological system that has strong links with the traditional ecological knowledge available within the communities (Jain et al.2011). The investigation on phytosociological study was carried out in Kongba River, Manipur lying between latitude 23.80^0N to 25.68^0N and longitude 93.03^0E to 94.78^0E having a catchment area of 120 km^2 approximately. Quantitative analysis of Importance value index (IVI) attributes showed highest value in *Polygonum lapathifolium* (site I) and *Ipomoea aquatica* (site II). In sites III, IV and V highest IVI was found in *Lemna perpusilla*. Some of the species like *Monochoria hastata* exhibited very low value of IVI in site I, II and III whereas minimum value of IVI in sites IV and V was reported for *Sagittaria sagittifolia* and *Enhydra fluctuans* respectively as they were recorded in very little numbers localized in small pockets. Smaller plants make aggregation therefore their density and abundance are usually very high whereas larger plants exhibit low values of these parameters. The study revealed that 12 (twelve) species are consumed by the local people for their dietary needs and also used as medicines. The most demanding species which are believed as immune booster since times immemorial comprise of *Sagittaria sagittifolia*, *Colocasia esculenta*, *Oenanthe javanica*, *Ipomoea aquatica*, *Polygonum barbatum*. These species are found in limited abundance and available only in the growing season so the demand of the local people cannot be fulfilled. Also, there is decline of wetland species in recent years due to climatic changes and the

erratic rainfall that may cause flood or dry condition.8(eight) species are reported to be of folkloric medicinal uses .4(four) species are used as green manure with no reported folkloric medicinal uses.5(five)species are used as fodder and medicines. The wetlands of the state can provide good income to the local communities. Sustainable harvest protocols for all wetland species should be adopted and needful training program should be imparted to the local people. The results of the study have implication for efficient eco-restoration of the wetland ecosystem through sustainable management and conservation of species in wetland areas.

Key words: Quantitative analysis, importance value index, macrophytes, wetlands

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A Unique Polyextremophillic *Bacillus subtilis* BRAM_G1 from the waters of Ganges at Gangotri

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Gangotri, the Origin of the river Ganges is situated in Uttarakhand, at an altitude of 3,415 meters from sea level, on the Greater Himalayan range. The waters of Ganga pious as it is, harbors a huge biodiversity of microorganisms. Isolated from that water is this novel strain of *Bacillus subtilis* BRAM_G1 (Accession Number: MW006633), which was found to be tolerant to a huge plethora of extreme conditions ranging from temperature (from -20°C to 110°C), ultraviolet radiation(79200 $\mu Ws/cm^2$), pH(1-12), pressure, salinity to heavy metal concentrations(arsenic, lead, iron etc.). Thus, *Bacillus subtilis* BRAM_G1 was termed as a polyextremophile, which implies that an organism is able to survive in multiple stressed conditions, in comparison to just extremophiles which are known to survive in a single extreme condition, such as halophiles that can survive in highly saline conditions. This strain of *Bacillus subtilis* BRAM_G1 is not only a polyextremophile but possesses a number of other attributes that makes it very useful in the fields of agriculture, medicine and industrial enzyme production. It was found to produce different kinds of plant hormones such as auxins, gibberellins, cytokinin etc, siderophores, volatile organic compounds, liquid biocontrol

exudates, and could also solubilize potassium and fix atmospheric nitrogen that catered efficiently to the needs of the plant. The in vivo results corresponded to the in vitro results of plant growth promotion activity where application of *Bacillus subtilis* BRAM_G1 in *Zea mays* (Kohinoor 595) *and Capsicum frutescens* (HPH-4968) showed increase in both growth and reproductive parameters. The strain was also found to produce industrially important enzymes such as collagenase, amylase, laccase etc. and pharmaceutically important enzyme such as lipase. Thus, *Bacillus subtilis* BRAM_G1 is a unique strain of polyextremophilic bacteria with multifaceted applications.

Keywords: Polyextremophiles, plant growth promotion, *Bacillus subtilis,* agriculture, industry.

Impact of Climate Change on Plant Biodiversity

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Plant biodiversity is the full species of plants on Earth. Plant biodiversity is directly linked to ecosystem. It helps in maintaining the ecological balance. It plays an important role in the function of an ecosystem by providing many services like nutrients and water cycle, soil formation retention, resistance against invasive species, pollination of plants, regulation of climate as well as pest and pollution. But due to anthropogenic activities the global climate has changed since last few decades. Climate change is the main reason disturb or loss of plant biodiversity. A small change in the climate can lead to the extinction of vulnerable and sensitive plant species. Climate change result in the impact on the plant biodiversity like change in the phenological behavior like breeding period etc., increase the forest fire and pest attacks. This change adversely affects entire ecosystem.

Keywords- Plant biodiversity, climate change, ecosystem and human activities.

Study of Impact of COVID-19 on Biodiversity

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Biodiversity is total group or total sum of all the living organisms that exist on our earth and we also know how rapidly and vigorously our biodiversity was affected by humans before this COVID-19 Pandemic but this abstract covers the information about biodiversity and COVID-19_that is the impact of COVID-19 Pandemic on our biodiversity. As we know everything has its advantages and disadvantages both but in this case COVID-19 has bring positive impact on our diversity. As the emergence of COVID-19 has underscored the fact that when we destroy the system that supports human life and this is the fact of today that humans are responsible for the exploitation of nature as well as biodiversity for the fulfilment of their needs. The COVID-19 pandemic affected the environment inevitable as there is reduction in human pressures on the natural eco system because of lockdown of social and economic activities. Moreover, globally there have been pollution problem throughout the world but due to lockdown of this pandemic the challenge of pollution is reduced with improved air quality as industries and transports shut down. Along with this there would be reduced impact on marine system because of decline in shipping worldwide. Study says that during the total lockdown the No2 content substantially decrease on an average by 40 and 20-30% over the world. Besides this the water of oceans, rivers and lakes is now improved and raise up to better quality due to decrease in human activities during this lockdown. At present the pandemic has done a great favor to the atmosphere, environment and biodiversity at large.

Effect of climate change on distribution and water resistance mechanism in seasonal populations of the tropical drosophilid-*Zaprionus indianus*

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Seasonally varying populations of ectothermic insect taxa from a given locality are expected to cope with simultaneous changes in temperature and humidity through phenotypic plasticity. Accordingly, I investigated the effect of saturation deficit on resistance to desiccation in wild caught flies from four seasons (spring, summer, rainy and autumn) and corresponding flies reared in the laboratory under season-specific simulated temperature and humidity growth conditions. Flies raised under summer conditions showed approximately three times higher desiccation resistance and increased levels of cuticular lipids compared with flies raised in rainy season conditions. In contrast, intermediate trends were observed for water balance-related traits in flies reared under spring or autumn conditions but trait values overlapped across these two seasons. Furthermore, a threefold difference in saturation deficit (an index of evaporative water loss due to a combined thermal and humidity effect) between summer (27.5 mB) and rainy (8.5 mB) seasons was associated with twofold differences in the rate of water loss. Higher dehydration stress due to a high saturation deficit in summer is compensated by storage of higher levels of energy metabolite (trehalose) and cuticular lipids, and these traits correlated positively with desiccation resistance. In *Z. indianus*, the observed changes in desiccation-related traits due to plastic effects of simulated growth conditions correspond to similar changes exhibited by seasonal wild-caught flies. Results showed that developmental plastic effects under ecologically relevant thermal and humidity conditions can explain seasonal adaptations for water balance-related traits in *Z. indianus* and are likely to be associated with its invasive potential.

Keywords: *Zaprionus indianus*, Desiccation resistance, phenotypic plasticity, Energy metabolites, Seasonal variation.

A Study on the diversity of Bacterial Flora Found in Regular Commercial Grade Compost and Bioferilizers

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The increasing incidences of drastic genetic drifts, aided by the large scale use of chemical fertilizers, agriculture sector has seen an overall disruption in their biodiversity. This has escalated the inclination towards various organic modes of practices that helps in sustaining the biodiversity of the agricultural niches. One such potent method is the use of biofertilizers and compost which are known for aiding various plant growth and for hosting innumerable number of microbial flora. Reports suggests microbial load in compost varies from 1.6x 10^6 and 1.2 x 10^7 cfu/ml for bacteria. (Adegunloye D.V., *et al*, 2007). Keeping this background in mind, this study was conducted to isolate and characterize the bacterial flora found in regular commercial compost and biofertilizers. For this, commercial grade biofertilizers were procured and 5 major promising bacterial strains were isolated. 16S ribosomal RNA gene partial sequencing revealed the strains to be *Bacillus paramycoides* strain DBBA_P1 (NCBI acc: MZ227489), *Bacillus paramycoides* strain DBBA_K1 (MZ227495), *Bacillus luti* strain DBBA_BT1 (MZ229975), *Bacillus wiedmannii* bv. *thuringiensis* strain BDBA_BM1 (MZ229894), *Bacillus paramycoides* strain BDBA_SXCM4 (MW917244). The strains when tested for their plant nutrient solubilisation (NPK), growth hormones (IAA, GA3), stress hormones (ACC deaminase), hydrolyases (cellulase, urease, protease etc.) production showed promising results. They also showed high affinity for iron chelation by their siderophore production which ensured their biocontrol nature as well. The strains were separately tested for their biocontrol properties against common pathogens like *Colletotrichum* sp. confirming their biocontrol capabilities (for both liquid and VOCs). And finally an elaborate *in vivo* setup was established on two common seasonal vegetable Okra (*Abelmoschus esculentus*) and Chili (*Capsicum frutescens*), where, both in mixed consortia form and individual form the strains were applied. Physical data of various phenotypic parameters of the test plants collected at weekly interval showed the consortia showing best result when applied in direct Luria Bertani broth cultures, closely followed by consortia when

applied mixed with commercial grade compost. Thus, this study holds immense possibility in future with further physical data assessment and biochemical characterization.

Keywords: Commercial biofertilizers, plant growth promotion, biocontrol properties, consortia

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Climate Change and Community radio

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Environment and development are often seen at the cross-roads. These are considered diametrically opposite to each other. But the buzz-word of the 21st century, "the sustainable development", has somehow emerged as one of the solution to this controversy. The concept of sustainable development incorporates the process of social and economic betterment that satisfies the needs and values of all interest groups in the present times without foreclosing the options of development for future generations. Uttarakhand is naturally a disaster prone area. Farmers are also suffering various problems due to this climate. In this case, community radio can empower the farming community to disseminate the message related to climate and advisory services etc. Community radio can be an empowering tool while providing agro-climatic advisory services.

Key words: Climate change, community radio.

A study on effect of wastewater (effluent) on environment and bio-diversity

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The goal of wastewater management is the protection of the environment in a manner with public health and Bio-diversity. The waste water discharge from industries are major source of pollution and affect the ecosystem. Untreated waste water generally contains high level of organics, pathogenic micro-organism and toxic compounds leading to environmental pollution. The waste water consisting of toxic materials can not be discharged into the environment.

In addition, there are some of the other consequences: Destruction of biodiversity, water pollution depletes aquatic ecosystem and more vulnerable to climatic warming. So, it is the need of present scenario to treat waste water for the protection of the environment and bio-diversity. In present study catalytic wet air oxidation technique (CWAOT) is used to treat the waste water. With this previous aim, the study was carried out to treat the wastewater (organic/ in-organic) or toxic content of industrial effluent from chemical industries using thermal and catalytic liquid phase oxidation process to treat the toxic content of industrial effluent from chemical industries. So, in the present work wastewater (effluent) must be treated before final disposal.

Keywords: CWAOT, Effluent, Wastewater, Bio-Diversity.

Effect of global warming on agriculture and soil health

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Global warming is a gradual phenomenon of the climatic change in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect caused by increased levels of carbon dioxide,CFC's , and other pollutants, which modifies the weather balances and ecosystems for a long time. It is directly linked to the increase of greenhouse gases in our atmosphere, worsening the greenhouse effect. Latterly the temperatures have been rising day by day and causing more danger for human, animals, plants and our enivorment. Negetative impacts of global warming includes the reduced growth period such as high level of temperature rise, sugar content ,bad coloration and fruit stability in agricultural crops. Continuing effect of global warming declines in soil moisture can increase the need for irrigation in agriculture and lead to smaller yields and even desertification, with potentially dramatic impacts on food production.

Climate change will reduce the amount of organic matter in the soil, and increasing its vulnerability to erosion and other degradation processes as well. Extreme downpours can lead to run off and erosion. Adverse effects of global warming due to increase in carbon dioxide concentration may be out weighed by increase photosynthesis as doubling carbon dioxide can increase photosynthesis in soyabean , wheat and maize by 35, 25and 10 percent. Agriculture is most vulnerable and uncertain global warming comparsion to other enterprises. Developing countries including India is a present undergoing rapid transformation due to changing demands, markets and agricultural technologies.Pace of these changes in likely to increase in coming future. Increasing demands on agriculture due to competition for resources. Need for integral approaches and assessment of agricultural transformations, prepare for adaptation and mitigation even on the cost of environmental degradation of environmental degradation. Agricultural production is adversely affected by climate change, livelihood and food security in India would be at risk. Therefore, future challenges will be more complex and demanding.

Keywords: Global warming, Agriculture, Greenhouse gases, Degradation.

Advantageous of vermitechnology (Organic fertilizer) on human health

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Biodiversity, the diversity of life on Earth, is essential to the healthy functioning of ecosystems. Vermitechnology technology contains bio-oxidation and balance of organic matter through contact between earthworms and microbes. Although microorganisms are primarily responsible for the biochemical decomposition of organic matter, earthworms play an important role in the process by fragmenting and conditioning the substrate, increasing the surface area for the growth of microorganisms, and altering their natural movement. These days' fertilizers have become important to modern agriculture to feed a growing population. Chemical fertilizers are widely used in modern agriculture, in order to improve crop yields. The increase in crop yield depends to a large extent on the type of fertilizer used to supplement the essential nutrients of the plants. Fertilizer application is required to replace crop land nutrients that have been consumed by previous plant growth with the ultimate goal of increasing productivity and economic returns. Today, there is much focus on the impact of increased use of chemical fertilizers on the soil environment. The effect of using chemical fertilizers on agricultural lands has been observed not only in terms of soil quality but also on the survival of the soil organisms that live there.

Earthworms are a major component of soil fauna in a variety of soils and climates and participate directly or indirectly in biodegradation and stabilization through the formation of humus and various soil processes. Vermitechnology is beneficial for plant health, growth, soil fertility, plant yield and human health which produces safe and more nutritious food.

Keywords: Biodiversity, Vermitechnology, earthworms, fertilizer, chemical fertilizer.

Challenges and Opportunities of Internet of Things in smart Agriculture: A Review

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Agriculture is the basic need of any country. Almost everyone in the world is directly or indirectly concerned with agriculture. Due to increasing population, the available area for agriculture is continuously decreasing and pollution leading to decrease the quality of products which are grown in agriculture fields. All these concerns lead the farmers to do suicide or to leave their occupation. The integration of smart technologies with agriculture seems to improve the quality of agriculture and gives us hopes to develop agriculture. It is also very much needed step, as this occupation is the most lacking occupation regarding technological developments. Internet of Things is the most advanced technology, and nowadays available very easily to get integrated with almost all traditional and manual methods to perform tasks.

In this paper we have reviewed research work of many peoples who are integrating Internet of Things to various agricultural tasks and operations. It has been noted that the technologies available for the artificial intelligence of Robotic machines used in Agriculture are not cheap and user friendly so that a farmer can easily operate them. A successive solution to educate the farmers and in this aspect and advance the technology slowly by the use of Internet of Robotic things simultaneously is proposed in this review paper. The Internet of things-based smart agriculture technology is very promising but complicated and require a lot of hardware, software, cost, and network.

Keywords: Smart Agriculture; Internet of Things; Internet of Things applications; Smart Drones; Internet of Robotic Things; Smart Farming.

Biodiversity loss; a threat for Environment and Human Health

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Biodiversity or biological diversity involves the occurrence of different types of ecosystems, different species of organisms and their variant like biotypes, ecotypes and gene adapted to different climates and environments of different regions including their interactions and processes. India comprises only 2.4 % of the world's land area, its share of the global species diversity is around 8.1 %, which makes our country one of the 12 mega diversity countries of the world. Around 45,000 species of the plants and twice as many of animals have been recorded from India. The biological wealth of our planet has been declining rapidly and the accusing finger is clearly pointing to human activities. Biodiversity, ecosystems and the essential services are the central pillars for all life on the planet, including human life and are the main sources of food, essential nutrients, medicines, medicinal compounds, fuel, energy, livelihoods, cultural and spiritual enrichment. They also contribute to the provision of clean water, air and perform critical functions including the regulation of pests and disease to that of climate change and natural disasters. Major losses in biological diversity can harms the environment by creating an imbalance in the world. Ecological issues such as global warming, deforestation, pollution, overfishing, and overpopulation are the main cause for imbalance humans, nature, and species of other organisms. Environmental health concerns have focused on toxicological and microbiological risks to health from exposures, such as air pollution or contaminated waters. Environmental hazards creates severe impact on human health including global climate change, the health risks posed by stratospheric ozone depletion, loss of biodiversity, changes in hydrological systems, supplies of freshwater, land degradation and stresses on food production systems. Earth's rich biodiversity is essential for the survival of mankind. So, we also have a moral

responsibility to take good care of earth's biodiversity and pass it on in good order to our next generation. Multidisciplinary research, sustainable development goals and targets addressing health, food, freshwater security, climate change and biodiversity loss. Such approaches can provide valuable insights into the drivers of disease emergence and spread, contribute to identifying previous patterns of disease risk, and help predict future risks through the lens of social and ecological systems and provides long term nutritional security. Such challenges require necessitate engagement of many stakeholders, including governments, civil society and nongovernmental and international organizations. Integrative approaches to maximize resource efficiency as well as conservation, health and development including assessment of environmental health exposures and needs to better understanding of the health services provided by biodiversity.

Keywords: Biodiversity, Climate change, Natural disasters, Environmental health, Human health, Food security.

Construction of Anicuts in Gorges and Their Impact on Riparian Biodiversity

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Small anicuts have been constructed in the protected areas for beautifying the place to attract tourists. These anicuts provide sufficient water hole for animals. But, these cemented anicuts harm the riparian forests in such a way that many green, tall and massive trees start drying. Riparian forests are divided into three zones on the presence of trees. These zones are: - 1.) Upstream riparian forests near the water, 2.) Midstream riparian forest slightly away from water edge 3.) Downstream riparian forest. The impact on upstream riparian forests has been caused by siltation in which old aged trees and other plants i.e. *Terminalia arjuna, Syzygium cumini, S. heyneanum, S. jambolanum, Pheonix sylvestris, Ficus recemosa* and *Salix tetrasperma* start drying and then dying. Slitation holds flowing

water with the result oxygen level is less. On account of this result trees become dehydrated so that number of leaves, flowering and fruiting is less. Trees like *Mangifera indica, Madhuca indica, Buchanania lanzan, Dendrocalamus strictus,* away from water edge (but water falls within HFL) are also affected. Mosses, ferns and sciophytic plants, grow in partial shade or low light level also starts disappearing. Dryness has been occurred in the downstream riparian forests. In this region the growth of trees starts decreasing and ferns spread shrink. These factors cast inferior impact on the ecosystem.

It has been concluded that the site selection has been done in such a way that minimum plants have affected. Expect from different places, anicuts are constructed only in one place.

Vermicomposting: Maitaining soil health & waste management

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The various organic wastes and biodegradable waste fed by earthworm and they excrete out the fine mucus coated faecal pellets called vermicompost, excreta of earthworm known as vermicast or blackgold. Vermicompost is a safe, non-polluting and one of the most economical and convenient ways of solving the waste disposal problems and recycling of organic waste.

Good quality compost is produced in a short period depending upon on the number of earthworms. About 4-5 kg of wastes can be composted by 1000 worms (approximately 1 kg) in a day. The commonly used earthworms are like *Eudrillus sp., Eisenia sp* etc. It is an excellent form of natural fertilizer free from chemical inputs It improves physical, chemical and biological properties of the soil and it improves aeration, texture and tilth there by reducing soil compaction. Improve nutrient

status of soil both macro and micronutrient such as N, P, K, Mg, Ca, Fe. Vermicompost contains 17-36 % humic acid and 13-30% fulvic acid of total concentration of organic matter. It promotes better root growth and nutrient absorption. Vermicompost has high porosity, aeration, drainage, and water-holding capacity. Plant growth hormones namely cytokinins and auxins are found in organic wastes processed by earthworms. They also release certain metabolites, such as vitamin B, vitamin D and similar substances into the compost. Earthworm effectively harness the beneficial soil microflora destroy soil pathogen and convert wastes into vitamin, enzymes, antibiotics, protein, anti-fungal properties. Earthworms accelerate the mineralization (C:N-15:5) rate and convert the manures into casts with higher degree of humification, as a result high porosity, aeration, drainage, and waterholding capacity which play important role in maintaining soil health by decomposition of biodegradable waste turning in eco-friendly natural fertilizer.

Effects of inorganic and organic fertilizers on leaf micro-morphological characteristics of *Sesamum indicum* L. plant

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A comparative study was carried out to evaluate effect of different fertilizers on leaf micro-morphology of sesame plant. The experiment consists of five treatments: T1- Control (without fertilizer or manure), T2-urea as inorganic fertilizer, T3- combined application of urea and DAP (Diammonium phosphate) as N+P treatment, T4-Vermicompost and T5-Biofertilizer+vermicompost. The experiments were evaluated in complete randomized design with four replications. Leaf epidermal features revealed that the anisocytic stomata type and amphistomatic leaf conditions were common to both surfaces. The epidermal cell number was maximum observed in T4 (vermicompost) treated plants at both adaxial and abaxial surfaces. Stomata number per unit area, stomatal index (%) and trichome number were observed higher in T3 (N+P) treatment. Stomata size and guard cell area were observed highest in T1 (control). The results considered that some epidermal attributes as

stomata type, trichome number, stomata size and guard cell area are stable and not influenced by fertilizer responses while epidermal cell number, stomata number per unit area and stomatal index were significantly influenced ($p \leq 0.05$) by inorganic and organic fertilizer (manure) treatments. Results suggested that the foliar epidermal attributes were affected by different fertilizer and manure treatments and thus depend upon fertility conditions of soil.

Phytochemical production from *in vitro* established cultures of *Eclipta alba* L. (Hassk): An approach towards sustainable development

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Plants are the enormous source of phytochemicals of medicinal value. The population of many of medicinal plants are depleting to low number at an alarming rate as a result of anthropogenic pressure and habitat destruction. Sustainable use of biodiversity is a crucial requirement of present and future to reduce various environmental impacts on nature. Exploration of *in vitro* culture, for mass multiplication and production of useful, structurally complex and high value natural therapeutic compounds is considered preferable over the collection of medicinal plants from their natural environment. *Eclipta alba* is one of the very important medicinal plant. The secondary metabolites derived from this plant have played an essential role as medicine since time immemorial. The shoot multiplication from the nodal explants cultured on 0.65% (w/v) agar gelled modified Murashige and Skoog (MS) medium having 3% (w/v) table sugar, 1.0 mg/l 6-benzyl aminopurine and prepared in tap water indicates that *in vitro* culture of *E. alba* could be established at low production cost. Extract of *in vitro* regenerated shoots showed presence of phenolics, flavonoids, antioxidant and antimicrobial activity. Thus, it is concluded that the use of plant tissue culture technique for biomass

production provides a way to protection of habitat and sustainable use of biodiversity in production of therapeutically useful phytochemicals.

Response of different irrigation levels and moisture conservation techniques on relative water content (RWC), water use efficiency and productivity of wheat (*Triticum aestivum*)

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A field experiment entitled "Effect of Different Moisture Conservation Techniques on Nutrient Availability, Water Use Efficiency and Productivity of Wheat (*Triticum aestivum*)"was carried out at the Crop Research Centre of Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut, and U.P. during Rabi season of 2018-19. The experiment was laid out in a split plot design considering the irrigation levels as main plot and moisture conservation techniques as sub plot treatments with three replications. The irrigation levels consisted of I_1–(5 irrigations at CRI, tillering, booting, milking and dough stage), I_2–(3 irrigation at CRI, tillering and booting stage), I_3–(2 irrigation at CRI and booting stage) and moisture conservation techniques consisted M_1–Control (no moisture conservation techniques), M_2–Rice residues @ 5 ton ha^{-1}), M_3–application of Pusa hydrogel (3kg /Acre), M_4- seed treatment with *Pseudomonas fluorescens* (PF6) @ 4 g kg^{-1} seed, M_5- Seed treatment with *Pseudomonas fluorescens* (PF2) @ 4 g kg^{-1} seed and M_6- Seed treatment with (IRRI-1) @ 4 g kg^{-1} seed. The soil of the experimental site was sandy loam in texture, low in available nitrogen and organic carbon, medium in available phosphorus, potassium, and zinc and, alkaline in reaction. Wheat variety HD-2967 was grown as a test crop. Result reveal that relative water content increased with I_1 (5 irrigation) and I_2 (3 irrigation). The improvement in grain yield 8.74 and 17.38 % over I_2 and I_3 respectively was due to maximum supply of water under I_1 (5 irrigation). Water use efficiency was higher under I_3 (2 irrigation) compare to various irrigation level

during the study a decreased in the frequency of irrigation from I_1 (5 irrigations) to I_2 (3 irrigation). Among the moisture conservation techniques, relative water content, water use efficiency, straw and grain yield of wheat was recorded with the application of rice residue incorporate @ 5 ton ha^{-1}. Similarly yield attributes.

Keywords: Rice residues, Pseudomonas fluorescens, Moisture conservation techniques.

Bending the curve of global freshwater Biodiversity loss:

An emergency recovery plan

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Increased efforts are required to prevent further losses to terrestrial biodiversity and the ecosystem services that it provides. Ambitious targets have been proposed, such as reversing the declining trends in biodiversity; however, just feeding the growing human population will make this a challenge. Here we use an ensemble of land-use and biodiversity models to assess whether—and how—humanity can reverse the declines in terrestrial biodiversity caused by habitat conversion, which is a major threat to biodiversity. We show that immediate efforts, consistent with the broader sustainability agenda but of unprecedented ambition and coordination, could enable the provision of food for the growing human population while reversing the global terrestrial biodiversity trends caused by habitat conversion. If we decide to increase the extent of land under conservation management, restore degraded land and generalize landscape-level conservation planning, biodiversity trends from habitat conversion could become positive by the mid-twenty-first century on average across models (confidence interval, 2042–2061), but this was not the case for all models. Food prices could increase and, on average across models, almost half (confidence interval, 34–50%) of the future biodiversity losses could not be avoided. However, additionally tackling the drivers of land-use change could avoid conflict with affordable food provision and reduces the environmental effects of the food-provision system. Through further sustainable intensification and trade, reduced

food waste and more plant-based human diets, more than two thirds of future biodiversity losses are avoided and the biodiversity trends from habitat conversion are reversed by 2050 for almost all of the models. Although limiting further loss will remain challenging in several biodiversity-rich regions, and other threats—such as climate change—must be addressed to truly reverse the declines in biodiversity, our results show that ambitious conservation efforts and food system transformation are central to an effective post-2020 biodiversity strategy.

Biodiversity of Rajasthan

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Forest & Wildlife with a wide variety of trees and animals are found in the subcontinent. From the early days of the great King Ashoka, trees and forests have received protection. In the Thar Desert especially the Thar Desert of Rajasthan has rich and diversified social cultural heritage and distinct flora & fauna. There are rich floral and faunal composition in several areas which are to be protected and managed on a sustainable basis as they are not only provide useful material but also important for a unique ecosystem. Rajasthan climatic conditions are very harsh despite of these the flora and fauna of the region are very rich. ON one hand it has *Prosopis cineraria* and other tree along with *Lasirus cindicus* and several other grasses. Fauna is also very rich from Godawan to Chinkara and many more. People respect the local flora and fauna due to their religious belief and thus its biodiversity is always remain rich. Detailed information about Desert Biodiversity, challenges and future is discussed.

Keywords: Flora and fauna, Grasses, Biodiversity, Religious faith.

The Global Goals for Sustainable Development: Dialogues and Decarbonising the energy system

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The Sustainable Development Goals are a collection of 17 interlinked global goals designed to be a "blueprint to achieve a better and more sustainable future for all". The SDGs were set up in 2015 by the United Nations General Assembly and are intended to be achieved by the year 2030.

We can inspire and channelize the future generations through ***SDG Activate Talk Series*** (SDG4 - Quality education) where we can collaborate with ideologies of dignified lecturers and other dignitaries along with the boosting ideas of working researchers to inculcate their ideas and suggestions to achieve SDGs. Through this we would like to motivate people for plantation drive (SDG15- life on land) and **decarbonise** the energy system through energy efficiency and electrification by **Hybrid heating** and **waste heat recovery** (SDG -7, 12 & 13).

Keywords: SDG Activate Talk Series, Decarbonization

Effect of El Nino wave on Mangrove Diversity of Sundarbans

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El Nino is the warming up of ocean surface along eastern and central tropical Pacific Ocean which influences the temperature, precipitation rate and wind movement in the Indian sub-continent (specifically West Bengal and Orissa) and Bangladesh. Monsoons and cyclones in Indian sub-

continent is greatly influenced by El Nino and Southern Oscillation. The El Nino Southern Oscillation (ENSO) leads to cyclogenesis across Bay of Bengal due to development of low pressure zone created by warm ocean currents. The intensity and frequency of cyclones along coastal areas of West Bengal, Orissa and Bangladesh also depends on El Nino. Mangrove forest which flourish in coastal areas of sundarban under high salt concentration in West Bengal, India and south- west of Bangladesh are prone to these cyclonic storms. The mangroves support a rich biodiversity and is highly productive in terms of nutrient contribution and forest biomass. The mangroves withstand climatic variations due to El Nino and serves as a protection against cyclonic storms. The sturdy roots of mangroves not only binds the soil and prevent soil erosion but also protects the varied biodiversity of sundarban from natural calamities and it's high time to protect and preserve mangrove for a greater cause. Cyclones, rising water levels due to tidal upsurge and associated increased salinity have negatively impacted the biodiversity of the mangrove forest of sundarban. About 1600 square km area of mangrove forest of Sundarban was damaged by cyclone Amphan developed due to El Nino effect over Bay of Bengal. Adaptation of scientific strategies to withstand climatic changes are required save the mangrove forest and their varied biodiversity.

Keywords: Mangroves, Sundarban, El Nino, biodiversity.

Corrosion combating with green inhibitors

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Corrosion is a constant and continuous problem, often challenging to eliminate, would be prevented more practical and achievable than complete elimination. Corrosion processes develop fast after disruption of the protective barrier and are accompanied by several reactions that change the composition and properties of both the metal surface and the local environment. Control of metals is of industrial, cost-effective, environmental, and aesthetical importance. The use of inhibitors is one

of the best options for protecting metals and alloys against corrosion. Organic corrosion inhibitors have prompted the search for green corrosion inhibitors as they are biodegradable and do not contain heavy metals or other toxic compounds. Besides being environmentally friendly and ecologically acceptable, plant products are low-cost, readily available, and renewable. The development of computational modelling backed by wet experimental results would help understand the mechanism of inhibitor action, their adsorption patterns, the interface of inhibitor metal surface, and are responsible for developing designer inhibitors with an understanding of the time required for the release of self-healing inhibitors. The inhibitors like plant extracts presumably possess biocompatibility due to their biological origin.

Preserve Biodiversity: Keep our world colorful

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Bio-diversity or Biological diversity is a term to describe the variety of life on earth. It refers to every living thing including plants, animals and humans etc. It forms a complete ecological system in which we are a part and are dependent on this system for our own existence. Biodiversity provides functioning ecosystems that supply oxygen, clean air and water, pollination of plants, pest control, wastewater treatment and many ecosystem services. Biodiversity loss is typically associated with more permanent ecological changes in ecosystems, landscapes and the global biosphere. Reduced biodiversity means millions of people face a future where food supplies are more vulnerable to pests and diseases and where fresh water is in irregular or short supply. Main cause for biodiversity loss is climate change associated with global warming. It alters temperature and weather patterns. It also impact plant and animal life. It is expected that the number and range of species which define biodiversity will decline greatly as temperature continue to rise. Degraded ecosystems are missing species, groups of species, or even whole functional groups. Sowing native seeds or transplanting

individual plants is one step in restoring biodiversity. We can restore biodiversity by supporting local farms, save the bees, plant local flowers, fruits and vegetables etc. Most biodiversity resources are consumed by humans, so it is their primary responsibility to preserve and protect biodiversity to protect the earth. The richness of the species, the ecosystem, the environment and the sustainable growth of life on earth is important.

Keywords: biodiversity, ecosystem, health, climate change, sustainable etc.

Biodiversity and India: As I knew it

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Plant biodiversity has economic social, and ethical value for human land, it is a fine natural resource and it is currently being eroded or lost by over exploitation and unsustainable human practices. Biodiversity Conservation seems to be more important due to the globalization of the world economy and also for survival of the world as a balance habitat. Biodiversity of an eco-system is an important aspect of the economy of any nation. Plant, Soil, water, micro and macro fauna, climatic condition, forest cover and biodiversity are concern which likely to be dealt in determining the renewable natural resource flow of an economy. Sustainable development relies on economic development alone with the fundamental aim of conservation of environment. India is one of the twelve mega diversity country in the world. The country possesses about 8 percent of global biodiversity occupying the 10th position in terms of plant species, out of the 25 hot spots of biodiversity in the world. India is one of the most genetically prosperous nations in the world and its diversity includes about 47.513 plant species (including flowering and non-flowering plants), which counts more than 114% of the world's known flora. India ranks tenth in the world in terms of plant diversity, it is one of the 12 mega diversity centers of the world. Out of 34 biodiversity hotspots of the world, India has

four biodiversity hotspots namely, Eastern Himalayas Western Ghats, Northeast India and the Andaman Islands and Nicobar Islands within its political boundary.

Non-occupational Exposure to Petroleum Extraction Issue is big problem for Environmental Health

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Petroleum extraction may cause extensive environmental impact that can affect health of living organism. It produces a variety of volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), and inorganic compound contaminants. In some oil-producing host communities, most flaring and venting systems are located in close proximity to residential areas and/or farmlands, and the resultant emissions potentially contribute to global warming as well as some local and/ or regional adverse environmental impacts. The extraction of hydrocarbons from shale formations using horizontal drilling with high volume hydraulic fracturing has led us to the availability of new sources of fossil fuels but there are also some important issues which have been raised concerning the safety of the process relative to public health, animal health and our food supply. At the same time unconventional oil and gas (UOG) poses various known and unknown risks to public health and the environment, including water quality, and quantity concerns air quality problem and methane leaks, health effects concerns.

Keywords: Petroleum, Hydrocarbon, Environmental health.

Identification and selection of cellulosic fungi for cellulosic degradation of rice straw

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In this study for successfully degradation of rice straw, we are isolated the potential fungus from rice straw (20gm) which is packed in nylon bag (5*10) cm within the soil and at the same time on soil surface at same place up to the time of 90 days in the field. During the period of 90 days we are isolated total 115 funguses from rice straw at two different temperatures i.e. 25 and 37 degree Celsius by dilution, plating, pouring method and moist chamber method. All Isolated 115 fungus screened and to identified by their morphology (color, shape of spores and conidia, appearance) in the laboratory by slides culture preparations and were seen under the microscope (Leica EC4,10X/0.25)and with the assistance of text keys (Barnett et al). We are located that the bulk of *Fusarium* species (60) at the moment *Aspergillus* species (30), *penicillium* species (18) and *Trichoderma* species (7).Further aimed these isolated funguses utilized in the degradation of rice straw by secretion of their lignocellulosic enzymes at different temperature and time interval by solid state fermentation.

Keywords: Lignocellulosic, solid state fermentation, Rice straw, *Fusarium, Aspergillus, Penicillium, Trichoderma.*

In vitro effect of nitrogen on micropropagation of endangered medicinal plant: Swertia chirayita Roxb.Ex Flaming

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The effect of nitrogen was investigated on the organogenesis of Swertia chirayita (Gentianaceae) to overcome the challenges related to its cultivation. The best callogenic response was observed on root explants inoculated onto MS medium supplemented with BAP along with 2,4-D after Five weeks of culture, subsequent transfer of callus multiplication on same composition of conditions of photoperiod and complete darkness present the best results in term of the callus multiplication. Callogenic culture subculture onto modified MS medium supplemented with inorganic nitrogen sources i.e NH_4NO3), KNO_3 with BAP were observed. 88% shoot organogenesis after 8-12 weeks following culture. Moreover 90% of them were able to re-grow when sub-cultured on same media. Sixteen weeks old cultures multiple shoots were transferred on MS medium with IAA for rooting find out to be best. Survival of 90% was achieved when rooted plantlets were successfully established in substrate containing sand, vermicompost and garden soil in equal proportion for hardening and acclimatized.

Ecological restortation for future sustainability in a changing environment

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Our planet earth is blessed with a rich biodiversity. Millions of species of flora and fauna live symbiotically with each other creating a healthy ecosystem. Most of the world's diversity happens to be inside the developing countries that need support to make their conservation capacity. The rapid urbanisation and industrialisation is however a boon for the human race but it is coming out as a bane for the biodiversity. The waste products generated in the industries are dumped into the nearby surroundings or aquatic bodies. This waste is highly toxic and carcinogenic in nature that may include various coloured dyes, heavy metals (such as Cr, Cu, Cd) etc that are non-biodegradable and affect both the flora and fauna. Thus, they need to be eliminated from our ecosystem to protect our biodiversity. The process of adsorption comes out be an eco-friendly and cost effective alternative for the removal of these harmful effluents. The two modern inventions in the field of chemistry namely nanomaterials and metal organic frameworks prove to be the best candidates for this purpose. Various polymeric nanosystems may be developed such as graphene, carbon nanotubes etc for the efficient removal of heavy metals for the water systems. Metal organic frameworks are a class of adsorbents that may be used the efficient capture of the dye residues owing to their tunable porosity, ultralow density and large surface area. These work on the principle of host guest chemistry and form non-covalent interactions with the dye molecule thus capturing and eliminating it. Thus, these modern advancements of chemistry may contribute in the conservation of the biodiversity.

Imbalance of Biodiversity & Threat to Human Life

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Biodiversity, or biological diversity, is a term that refers to the number of genes, species, individual organisms within a given species, & biological communities within a defined geographic area, ranging from the smallest ecosystem to the global biosphere. Biodiversity loss describes the decline in the number, genetic variability, & variety of species & the biological communities in a given area. This loss in the variety of life can lead to a breakdown in the functioning of the ecosystem where decline has happened. Loss of floral biodiversity is resulting in heavy increase of earth's temperature & becoming a cause of global warming. It is typically associated with more permanent ecological changes in ecosystems, landscapes & the global biosphere. Natural ecological disturbances, such as wildfire, floods & volcanic eruptions, change ecosystems drastically by eliminating local populations of some species & transforming whole biological communities. Such disturbances are common & ecosystems have adapted to their challenges. The biodiversity & health connection is a relevant issue in both the ecological & healthcare world. The policy makers, planning bodies, & residents should encourage reasonable ways to accomodate the health of both humans & plants in an ecosystem that respects the symbiotic relationship we have developed. Encouraging proactive & preventive healthcare, improving supplemental treatments that include nature & biodiversity using advanced technologies & enhancing urban design can significantly improve human lives.

Effect of Fertilizers on Human health and Environment

Shobhit pandey*

In developing country like India, a marketable surplus of agriculture is the most important factor which influence the economic development of a country. To meet the demand of agriculture goods adequately and to feed the increasing population, the phenomenon of Green Revolution came in to existence. Green Revolution, allowed developing countries like India to overcome continual food scarcity by producing more food and other agriculture products by using high-yielding varieties of seeds, modifying farm equipment, and substantially increasing use of pesticides and fertilizers. For an optimum production of agriculture produce and to feed the growing population, application of chemical fertilizers and pesticides has became necessary. Such type of agriculture practices allowed growth and sustainability of food grains but at the same time have the major impact on the environment and human health. This articles provides a sketch of effect of chemical fertilizers and pesticides on human health and environment.

Keywords: Green Revolution, Fertilizers, Pesticides, environment Human health.

Effects of different methods of extraction and antimicrobial activity of *Zingiber officinale* (Ginger) against *Escherichia Coli* and *Bacillus*

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Different methods of extraction were used and centrifugation method was found best in the study. The result was found best with ginger. This abstract presents the advantage and disadvantage of different extraction methods. Extraction is the first step to separate the natural products from the raw materials. Extraction method include solvent extraction, distillation method, pressing and sublimation according to the extraction principle. In this study we use Ginger (*Zingiber officinale*);

Family-*Zingiberaceae*. Ginger (*Zingiber officinale*) is widely cultivated for its medicinal uses and a condiment. The antimicrobial properties of extract of *Zingiber officinale* against enteric pathogen were investigated by using agar well diffusion method. The sensitivity of the test organisms (*E.coli and Bacillus spp*.) to water extract of *Zingiber officinale* was indicated by clear zone of inhibition around the well .The diameter of the zone was measured using a scale .water extraction of ginger showed the high range inhibition zone (7.86mm) in Bacillus species rather than in E.coli showed lower inhibition zone (6.89mm).

Environmental Issues and Sustainable Development: In India

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Environmental issues in any country are linked to its level of economic development, natural resource availability, and population lifestyle. The increasing degradation of the environment in India is due to population increase, poverty, urbanisation, industrialization, and other associated problems. In many sections of the country, environmental issues have become serious, and they cannot be ignored. The main environmental issues in India are air and water pollution, especially in metropolitan cities and industrial zones, degradation of common resources, which has a negative impact on the poor because they rely on them for their livelihood, threat to biodiversity, and an insufficient solid waste disposal and sanitation system, all of which have negative consequences for health and infant mortality. Efforts are being undertaken in India to manage the environment in a sustainable manner. Provisions for environmental understanding and conservation have been created at all levels of school. Many centres across the country offer specialised environmental management training. Environmental awareness programmes have been launched through the media. India is a member of several international environmental organisations. UNEP is currently running a number of programmes for enhancing environmental quality, the government has recently been stressing the employment of regulatory and economic mechanisms in tandem. For proper management of

environmental quality and to promote sustainable development in the country, coordination between government agencies, NGOs, and the general public is required.

Keywords: Biodiversity, Environmental Issues, Degradation, Sustainable Development.

Arsenic: A Global Environmental Challenge

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Arsenic is a biologically active metalloid that is one of the few metals that the human body can digest. Arsenic's widespread existence in nature, as well as manmade sources such as agricultural and medicinal use, has resulted in continued human exposure to this poisonous and carcinogenic element. Skin problems, intellectual disabilities, and malignancies of the lung, liver, and kidneys are among the ailments that highly exposed people are susceptible to. Around 200 million individuals are subjected to potentially hazardous levels of arsenic around the world, prompting intensive research and mitigating attempts to fight this widespread public health problem. The current research gives an up-to-date look at the worldwide community's arsenic-related concerns, including current sources of arsenic, worldwide disease burden, arsenic resistance, and deficiencies of ongoing mitigation strategies, as well as prospective next actions.

Keywords: Arsenic, Contamination, Environment, Resistance, Mitigation

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Determination of Physico-chemical Properties of River Yamuna Water for Health and Sustainability

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The river Yamuna is an important perennial river of the Indo-Gangetic plains and largest tributary of river Ganges. The present research designed to work out monthly oscillations in the hydrobiological parameters of river Yamuna water at Yamuna Nagar, Haryana, India. Yamuna Nagar is a district of Haryana state located south-east of the state capital Chandigarh and known for the cluster of plywood units. The recent spurs in Industrial units in and around the city have resulted in severe pollution issues and public health concerns. The river Yamuna is running through the Yamuna Nagar and forming the eastern boundary with district Saharanpur, Uttar Pradesh. The assessments of water quality analyzed using digital thermometer, digital pH meter, volumetric and titrimetric methods. The mean findings reflected that the water temperature (ºC), dissolved oxygen (mg/L), pH, hardness (mg/L), alkalinity (mg/L) and acidity (mg/L) fluctuated between 11.6–30.2ºC, 3.1–6.0mg/L, 6.4–7.5, 84.6–162.8mg/L, 67.9–121.9mg/L and 11.7–26.9mg/L respectively. The industrial effluents, agricultural pesticides, manmade activities and seasonality biased correlation in spatial fluctuations of hydrobiological parameters of river Yamuna water was noticed and substantiated using advanced numerical tools. The documented examination insisted for urgent necessary steps towards systematic and strategic management of river Yamuna to overcome these imperceptible scarce and restore the natural quality of incredible water resources.

Keywords: Haydrobiology, River Yamuna, Hydrobiological parameters, physicochemical attributes, incredible natural resources, Dissolved oxygen.

Biosynthesis and characterization of silver nanoparticles using lemon leaves extract

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Green synthesis method of nanomaterials is rapidly growing in the nanotechnology field; it replaces the use of toxic chemicals and time consumption. The eco-friendly synthesis of nanoparticles through various biological means helps to explore various plants for their ability to synthesize silver nanoparticles (AgNPs). In this present investigation, an aqueous extract of fresh leaves of lemon plant was used for the synthesis of silver (Ag) nanoparticles at room temperature. AgNPs were characterized under UV-vis spectrophotometer, FTIR and PSA. The observation of the peak at 453 nm in the UV-vis spectra for leaves synthesized silver nanoparticles reveals the reduction of silver metal ions into silver nanoparticles. Further, The FTIR analysis was performed to identify the possible functional groups involved in the synthesis of silver nanoparticles. The size and stability were detected using particle size analyzer and zeta potential analysis. The polydispersity index and zeta-potential were found to be 0.30 and -24.70 mV, respectively. It can be concluded from the present findings that, the biosynthesis of silver nanoparticles from the leaves extract of lemon plant can be used to achieve the controlled synthesis of metal nanoparticles. It is eco-friendly synthesis and cost effective also.

Keywords: Green synthesis, AgNPs, Leaves extract, lemon, characterization.

Health-Related Quality of Life of Hepatocellular Carcinoma Patients: A Review

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Hepatocellular carcinoma (HCC) remains a global burden ranked sixth most common cancer and fourth related cause of cancer mortality. HCC patients had a worse HRQoL than the general

population, including in those with early-stage HCC. There have been dramatic changes in the prevention, diagnosis, and treatment of HCC such as TACE, trans-arterial radioembolization with Yttrium-90 (Y-90), radiofrequency (RFA), microwave (MWA) and cryoablation, irreversible electroporation (IRE), percutaneous ethanol injection (PEI), high-intensity focused ultrasound (HIFU) and stereotactic body radiotherapy (SBRT) but HCC remains uncurable HRQoL is becoming a major factor for evaluating therapeutic interventions in patients with diseases that are difficult to cure to help patients remain symptom-free, or at least to reduce the disease burden. In this study we review on supportive interventions that address the HRQoL of HCC patients.

Keywords: Hepatocellular carcinoma, Quality of life, Treatments.

Saving environment from dye laden effluents

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Textile industries are major source of water pollution, dyestuffs have proven to be problematic as these are most difficult to treat and recover from aqueous solution. Each year, textile mills worldwide discharge millions of gallons of dye-laden effluents, leading to significant adverse environmental impact affecting the aquatic life by affecting the dissolved oxygen. Conventional treatment techniques involve physical, chemical and biological treatment methodologies. But these techniques have many disadvantages including more reagents, energy necessity, low selectivity, high operational cost and generation of secondary wastes that are difficult to be disposed. There is a need to find out the low cost, easily available, and effective adsorbents for removal of dyes. There are number of natural materials which are used as adsorbent such as wood, clay, peanut shell, neem powder and potato peels etc. In this study, neem leaves has been utilized as a low cost adsorbent for the removal of Methylene blue (MB) dye from an aqueous solution using batch experiments. The objective of this work is the study of adsorption of dye solution methylene blue using low cost adsorbent like neem leaves powder. Liquid phase adsorption

experiments were conducted. Batch adsorption studies are carried out by observing the effect of experimental parameters, namely amount of adsorbents, dye concentration and contact time. Optimum conditions for dye removal are studied like contact time required, amount of adsorbent and dye concentration. Spectrophotometric technique was used for the measurement of concentration of dye before and after adsorption. The removal data were fittedon Langmuir adsorption equations. The results generated by this work can be used for determination of optimum conditions for adsorption of dye in aqueous solutions. Dyes are present in mixture form in various Industrial effluents like Textile Industries, Sewage water, water treatment plants.

Epidemic prevention and mitigation: Conservation of biodiversity and containment policies

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In a general equilibrium dynamic economic set-up, this abstract proposes a first model that integrates the relationship between biodiversity loss and zoonotic pandemic risks. Poissonan leaps in economic variables are used to model the occurrence of pandemics. The planner can take action in the economic and epidemiological dynamics in two distinct ways: first, by making the decision to conserve a greater amount of biodiversity to reduce the likelihood of a pandemic, and second, by minimising the death toll through a lockdown policy, which has the unintended consequence of negatively affecting labour productivity. The policy is assessed using a social welfare function that takes into account society's risk aversion, aversion to volatility, impatience, and generosity toward future generations. The model is solved directly, and the best policy is presented. The optimal policy's relationship to natural, productivity, and preference parameters is examined. The ideal lockdown is more severe in civilizations that place a higher value on human life, while the optimal

biodiversity conservation is greater in civilizations that are more "ahead looking," with a low discount rate and a high level of benevolence toward future generations. Furthermore, cultures that are willing to tolerate a significant loss in welfare in order to combat pandemics are also undertaking a lot of preventive

Keywords: Biodiversity, COVID-19, Prevention, Epidemics, Poisson processes

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Impacts of Climate Change on Sugarcane Production and Mitigation Strategies

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Sugarcane (Saccharum officinarum L.) is an economically important crop, cultivated in the tropical and subtropical grass widely grown for sugar production worldwide and is the major source of sugar. Sugarcane is cultivated in more than 20 million hectares in tropical and subtropical region of the world, producing up to 1.3 billion metric tons of crushable stalks about 65 percent of the world's sugar (sucrose) supply is from sugarcane. Sugarcane is a major crop for sugar and bioenergy production around the world. Increased emissions of greenhouse gases and global warming caused by climate change enhance the frequency and severity of extreme weather events. Because of relatively limited adaptation capacity, high susceptibility to environmental hazards, and poor prognosticate and mitigating techniques, climate change is likely to have significant effects on sugarcane production around the world, particularly in poorer nations. Sugarcane production may have been negatively affected and will continue to be considerably affected by increases in the frequency and intensity of extreme environmental conditions due to climate change. The extent to which climate change affects sugarcane is related to geographic location and adaptation capacity. Sugarcane production in various countries, as well as challenges for sugarcane production in climate change, are being studied in order to understand the effects of climate change on sugarcane

production and to propose strategies for mitigating the adverse effects of climate change and enhancing sugarcane production productivity and growth.

Keywords: Sugarcane, Mitigation, Climate Change, Environmental Hazards

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Coordination chemistry and environmental problems

Veer Tanwer

It is the intention of this work to review the literature involving the synthesis of coordination polymers of varying dimensionality utilizing a class of chelating ligands comprising of (2-pyridyl) alkylamine-appended carboxylates performed in by me. From the standpoint of functional aspects, i will focus on the structural properties of the chosen systems. In essence, i will provide a snapshot of this research field. This information sets the stage ready to appreciate the scope of this investigation and also the uniqueness of the ligands chosen in the present work. The design of new organic ligands capable of coordinating metal ions efficiently deserves an appreciation but the ultimate challenge is the use of such ligands to develop new interesting chemistry of greater importance. The coordination chemistry of the environment represents a useful approach to the understanding of chemical properties of a system. The coordination chemistry of these systems differs in three respects: most complexes do not involve transition metals, most complexes are labile, and the ligands. Principles of coordination chemistry are applied to some contemporary environmental problems.

Dunaliella: an attractive algal source for sustainable production of bioactive compounds

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The current environmental challenges have alarmed the scientific communities to look for more sustainable alternatives in order to reduce the burden on existing non-renewable sources of food and energy. Algae have emerged to play a pivotal role in modelling sustainable development by providing biofuels, bio-H_2, animal feedstock and food for human consumption. *Dunaliella* is one such model-alga which has been studied widely for its halotolerant nature and abiotic stress management. It sequesters atmospheric CO_2 and fixes it into carotenoids, polyunsaturated fatty acids (PUFAs), dietary fibres and essential amino acids. Commercially, it has been majorly employed for β-carotene extraction due to its antioxidative properties. The recent molecular advancements and availability of genomic data have paced up its development as a sustainable microscopic bio-factory for bioprospecting of bio-pigments, biofuels, glycerol, essential fatty acids, recombinant proteins and foreign drugs for application in pharmaceutical and nutraceutical industry. Apart from this, *Dunaliella* has also been employed for wastewater treatment due to its anti-microbial properties and biomonitoring of heavy metal toxicity in waterbodies. At present, several biorefinery protocols are being optimized for increasing the reproducibility of *Dunaliella* cultures in cultivation units for improving per unit yields. These coupled with biotechnological tools can result in high-performing strains which can outperform the conventional sources. Thus, *Dunaliella* beholds prodigious prospects as a sustainable source of bioactive compound synthesis to meet the pressing market demands meanwhile also dipping the ecological load on agricultural land, water resources and waning fossil fuels.

Imbalance of biodiversity and threats to human life

Mehrukh Iffat

Biodiversity is a degree of variation of life on earth. Biodiversity also refers to the number or abundance of different species living within a particular region. People depend on biodiversity in their daily lives but the ways human used it are not always appreciated .Human health ultimately depends upon ecosystem products and services like fresh water, food, fuel sources etc. which are required for good human health and productive livelihood but changes in ecosystem services affects livelihoods.

Human affects biodiversity on many levels that causes imbalance or loss of biodiversity .The main cause of the loss of biodiversity can be attributed to the influences of human beings on the world's ecosystem. In facts human beings have deeply altered the environment.

Alteration and loss of the habitat, introduction of exotic species and genetically modified organisms, pollution, climate change, overexploitation of resources are some of the cause of loss of biodiversity.

There is growing concern about the health consequences of biodiversity loss. Loss in biodiversity may limit discovery of potential treatments for many diseases and health problems. Biodiversity loss also means that we are losing many of nature's chemicals and genes that have already provided human kind with enormous health benefits.

Biodiversity & COVID-19

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The COVID-19 pandemic is impacting all components of human society. The pandemic continues to be fast in most countries. Our world is ever-changing, and therefore the conservation community should be able to respond. The pandemic presently makes it not possible for several organizations to interview, hire, train, house, and supervise seasonal workers. Unless internment measures are reduced dramatically within the next few months, an entire cohort of scholars could so miss out on these opportunities.

If the pandemic lasts into consequent year, declining enrollments at universities, and in conservation and ecology courses, could have longer-term negative consequences. Additional optimistically, education and analysis in ecology, conservation, and environmental studies could seem additional enticing and meaningful to adolescents who are alerted to the worldwide environmental crisis by this pandemic and created tuned in to the links between variety conservation and human well-being.

This pandemic touching variety currently. Conservation derives a lot of of it's public support from the accessibility of untamed nature in protected areas, however reduced human pressures within the hottest parks are smart for sensitive species. it's time to reimagine our relationship with nature and place nature at the center of our decision-making. Our world is ever-changing, and therefore the conservation community should be able to respond.

Sorghum (*Sorghum bicolor* L.) intercropping system under water stress condition

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An experiment was carried out on "Sorghum (Sorghum bicolor L.) Intercropping system under water stress condition" was undertaken during kharif 2019 at Soil Conservation and Water Management Farm, C.S. Azad University of Agriculture and Technology, Kanpur. Experiment was conducted on Sowing of sole sorghum (45 cm)apart planting, sole greengram (45 cm) by apart , sole blackgram (45 cm) by apart, sole soybean (45 cm) by apart, Sorghum + greengram (3:1), Sorghum + greengram (1:1), Sorghum + blackgram (3:1), Sorghum + blackgram (1:1) and Sorghum + soybean (3:1), Sorghum + soybean (1:1) were done on July, 15 during 2019. At the time of sowing, greengram, blackgram and soybean seeds were treated with Rhizobium culture.

On the basis of results it reveals that Ridge method was found better than Flat sowing method of sowing in all respect of growth parameter and yield attributes. In case of fertility levels RDF alongwith2t FYM was proned better in respect of yield attributes, yields, and profit and water use efficiency. Thus, it may be concluded that hybrid maize crop under the ridge sowing method and RDF along with 2 t FYMha-1 performed better underrainfed conditions.

Ayurvedic studies of Medicinal Plants used in COVID 19 disease

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SARS-CoV-2 is a pandemic disease which can be novel Virus as corona virus named as Acute Respiratory Syndrome Coronavirus2 (SARS-Cov-2). This disease is spread over globally all over the world. This extends and spread to all the human beings. This virus is started in Wuhan lab (Virology lab) china. The aim of this paper is to cure or prevent the Covid 19 disease using Medicinal plants which will be available in forests or few are which are available near to our house.few of the medicinal plants like Allium Sativum L. Garlic, Ginger, Nigella sativa L. (Black Cumin), Curcuma longa L. (Turmeric), Ocimum sanctum L. (Tulsi), Piper nigrum L and Phyllanthus emblica L. (Amla). So now this current situation most of the people are focussed on vaccine studies many pharmaceutical companies had completed these studies. But there are only few studies are done in the ayurvedic medicine of COVID 19. Ayurvedic medicine had lot of scope in all over the world. Most of the chronic diseases had medicines in Ayurveda. So as like for this Covid 19 viral infection also have many of many medicines in Ayurveda. For this ayurvedic medicine doesn't have any side effects because this medicine is completely pure natural product. And also these medicine is cost free and healthy for body.

Keywords: SARS-CoV-2, Allium Sativum L. Garlic,Ginger, Nigella sativa L. (Black Cumin), Curcuma longa L. (Turmeric) , Ocimum sanctum L. (Tulsi), Piper nigrum L and Phyllanthus emblica L. (Amla) , vaccine studies, Ayurvedic medicine, COVID 19, natural product.

An overview of major environmental laws in India

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Protection and conservation of the environment and sustainable use of natural resources and its need is reflected in the constitutional framework and are enforced by the legal system in India. Indian Constitution casts a duty on every citizen to improve and protect the environment. The Ministry of Environment and Forests was established in 1985, lays down the legal and regulatory framework for environmental protection. Some of the important legislations for environment protection are:

• The National Green Tribunal Act, 2010 (No. 19 of 2010) (NGT Act) has been enacted with the objectives to provide for establishment of a National Green Tribunal (NGT) for the effective and expeditious disposal of cases relating to environment protection and conservation of forests and other natural resources

• The Air (Prevention and Control of Pollution) Act, 1981 (the "Air Act") is an act to provide for the prevention, control and abatement of air pollution and for the establishment of Boards at the Central and State levels with a view to carrying out the aforesaid purposes.

• The Water Prevention and Control of Pollution Act, 1974 (the "Water Act") has been enacted to provide for the prevention and control of water pollution and to maintain or restore wholesomeness of water. The Water Act prohibits the discharge of pollutants into water bodies beyond a given standard and lays down penalties for non-compliance.

• The Environment Protection Act, 1986 (the "Environment Act") provides for the protection and improvement of the environment. The Environment Protection Act establishes the framework for studying, planning and implementing long-term requirements of environmental safety and laying down a system of speedy and adequate response to situations threatening the environment.

• The Wild Life (Protection) Act, 1972 was enacted with the objective of effectively protecting the wild life of this country and to control poaching, smuggling and illegal trade in wildlife and its derivatives. The Act was amended in January 2003 and punishment and the penalty for offences under the Act have been made more stringent.

• The Forest Conservation Act, 1980 was enacted to help conserve the country's forests. It strictly restricts and regulates the de-reservation of forests or use of forest land for non-forest purposes without the prior approval of Central Government.

• The Public Liability Insurance Act, 1991 was enacted with the objectives to provide for damages to victims of an accident which occurs as a result of handling any hazardous substance.

• The Biological Diversity Act 2002 was born out of India's recognises the sovereign rights of states to use their own Biological Resources. The Act aims at the conservation of biological resources and associated knowledge as well as facilitating access to them in a sustainable manner.

Keywords: NGT Act, Air Act, Environment Act, Biological Diversity Act 2002, Wild Life (Protection) Act, 1972.

Impact of Imbalance biodiversity on human health

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Earth is a complicated inter dependent system of life forms, habitats and their interaction. Biodiversity is the life-supporting system for our earth. The air we inhale, the water we drink and the food we eat all are dependent on the Earth's wealthy biodiversity. It provides us with nutrition, canopy, medications and apparel. Each and every in this earth depend on biodiversity in their daily lives. It also plays a very significant role in human nourishment through its influence on world food exhibition, as it demonstrates the sustainable productivity of soils and delivers the genetic resources for all crops. According to WHO about 40% of the global economy is based on biological products and services. More than 50% of all commercial medicines used today come from nature. About 80% of the poor people in developing countries are dependent on traditional medicines from nature. Human activities are disturbing both the structure and functions of ecosystems and varying native biodiversity. Vital processes affectencing the infectious disease reservoirs and transmission include, deforestation; land-use change; water management. Biodiversity provides precious services that

cannot be replacable or duplicated. Reduction in biodiversity means millions of people are dealing like situation where food supplies are more vulnerable to pests and disease, and where fresh water is in short supply. For humans that is worrying. So it's a situation where needfull work should be done for saving our ecosystem in balanced form.

Keywords: Biodiversity, Activities, Services, Ecosystem, Human health.

Biodiversity & DNA barcoding

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DNA barcodes offer a quick and accurate means to recognize species and to retrieve information about them. This tool also has the potential to speed the discovery of the thousands of plant species. Individual taxonomists are also generating DNA barcodes for specific groups of plants as either trials for sequencing success using the standard markers or as part of their basic molecular phylogenetic investigations in which the DNA barcode markers are used for understanding evolutionary relationships. Although many of these "DNA barcodes" may not receive the official GenBank DNA barcode designation, they are all adding to the library of sequences that complement the standard DNA barcode markers.

Recently major efforts have begun to generate DNA barcodes for unexplored floras and faunas. Nuclear and chloroplast barcodes indicated that these markers were highly successful in identifying plants at the genus level and chloroplast markers demonstrated best species discrimination. In addition, DNA barcoding method offers significant advantages over traditional monitoring and evaluation, particularly for evaluating protected areas and for environmental assessments. Hence, in furure DNA barcoding method can be used as an additional instrument in biodiversity conservation and management.

Wireless Patient Physiological Parameters Monitoring System (Internet of Things-IoT Technology based)

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Nowadays, Internet of Things' (IOT) is more popular and is playing an important role in all industries especially in healthcare sector and soon it will become a leading application across the globe and will influence our daily life especially in rural areas. Maximum population of the world lives in the rural areas of the economically developing countries and are neglected of taking the benefits of latest healthcare technology. IoT means the interconnections of all the devices via internet. In our day to day life while using the internet we are getting the facilities of operating, controlling, data collection and analyzing of devices from anywhere around the world. In this modern era, due to the successful growth in Healthcare Industry, many researches, scientists and Biomedical Engineers are carried out many researches on these IOT concept and several techniques have been widely applied in order to provide best medical assistance with cutting edge technology to provide less effort and low cost healthcare services. 'Telemedicine' and 'Remote Patient Monitoring' are some other techniques used in the healthcare industry which comes under the applications of IOT in Healthcare. Basically, all these concepts helps us to monitor the patients without being with them physically or in other words 'Remote Monitoring', which gives enough space for both patient and healthcare providers and many more advantages physically and economically. In this project, performances of IOT based Healthcare Monitoring System in various environments are studied. The related techniques in the literature are reviewed in order to understand the existing techniques and the functions of such systems. This type of IOT based healthcare Monitoring system will effectively work in pandemic situations like Covid-19 like pandemic. Patients affected by covid-19 will get monitored remotely with this System; Patient physiological parameters like SPO2, Heart Rate, Temperature, Blood pressure can be monitored remotely without attending physically by the doctors or paramedical staff. This will bring drastic change in reducing rush of patients at different hospitals, and also help in doctors to get rid of from being affected from the deadly COVID-19 virus. As Indian medical association had also confirmed that around 594 doctors died during the 2nd wave of Covid 19

pandemic in our country India, it is also said alone 107 doctors died in Delhi on line of duty, overall 1300 doctors are died on line of duty during fighting with Covid 19 since the pandemic begins in India .The doctors and paramedical staff are directly involved with the COVID19 patients and results in great loss to healthcare community. IoT technology will reduce the death rate of doctors and paramedical staff. When IoT comes into existence in healthcare system and started communicating IoT devices, that time the system was only used to maintain the digital identity of the patient. Nowadays the whole scenario has changed when working with IoT and now becomes more productive in providing better healthcare system because the communication between the doctors and the patients has been tremendously improved with the help of mobile apps. These apps are developed by the respected companies by which doctors can monitor the patients remotely with the help of many wearable Medical sensing devices, incase if any problem happened or any symptoms occurred to the patient, at the same time the doctor approaches the patient and helps him to give appropriate treatment without any delay.

Now at the present time IoT has become more useful and productive in the healthcare sector and using many wearable sensors, microcontrollers, thermal cameras etc to help in analyzing and sending the data that has been collected by the sensing devices to the cloud and down linking the same data to end users (DOCTORS). Combinations of IoT into Medical Devices are counterproductive in healthcare systems. IoT improves the quality and patient care especially elderly patients and infants and will be more useful in current pandemic like Covid-19 ,with the help of IoT Technology Covid-19 patients can be monitored efficiently and remotely real time basis by the doctors and end users , using different wearable Sensors will help in maintaining thousands of patient's data , the said patients data can be computerized and will help the hospital administration to capture the data anytime. IoT Technology can also help Doctors to monitor Patients on real time based on centralized desk board within the hospital and track down the location of patients by using RFID and different software technology.

The Role of Telemedicine during COVID-19 pandemic Crisis management in developing Countries

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Healthcare is a priority for every country and it is a right of every citizen of any country to get the best possible treatment, Telemedicine has played an important in bringing the healthcare facilities at the corner of the globe and improving access to the healthcare in the resource constraint areas. In many developing countries shortage of trained medical staff and lack of proper infrastructure including latest state of technology for diagnosis and treatment of diseases, telemedicine has emerged as an important tool for treatment especially during COVID19 pandemic management crisis. In telemedicine technique sharing of knowledge between the doctors, paramedics or any healthcare worker has been benefitted with the advent of the technology during COVID19 crisis management. Thus helping each other and sharing knowledge and the behaviour of line of treatment, immediate attention to the life saving protocols preparation during emergencies with the specialists has been addressed and accessed by the telemedicine technology in most of the developed countries. Thus resulting less health care workers are least affected by the virus and treatment protocols to the patients with different line of treatment according to the condition of the patient being monitored and information of treatment shared with the specialists or else as well.

The provision of continuous medical education of health care personal and the advancement in the development of information and communication technologies that emerges new forms of virtual association at a distance, the evolution of telemedicine reach us today as a tools of sharing information and knowledge to the individual or to the patients rather to transport patients to the canters for treatment where the specialists are available resulting implications in particular for remote and under- served areas. The practice of telemedicine helps to gather information data of any diseases and impact of any health programme implemented anywhere across the globe also the data base for management of patient information, behaviour of diseases through artificial intelligence,

mode of treatment of diseases screening and awareness of any medical programme in far- flung areas.

The objectives of this research is to develop an ipath model or a platform for remote areas or under-served areas to reach the health care facilities by the evolution of concept of Telehospital technology (an upgraded version of Telemedicine) integrate telemedicine which facilitates medical consultation, Knowledge exchange and continuous medical education on a globe scale. A particular emphasis was put forward on the applicability and accessibility for users from any corner of the globe with limited infrastructure and connectivity. The complete package of tools and techniques will be developed and will be demonstrated for implementation .The diagnostic equipments will be integrated and results shall be transmitted for diagnosis for the specialities opinion and accessed by the specialities also the patients history shall be digititally stored, updated ,archived, transmitted and reviewed by the specialists across the globe. The tele OPD services shall be attended by the patients in telehospitals as scheduled or fixed appointment for speciality consultation, concept of Telehospital is vast and its implementation is possible with limited resources and it has a solution of management of COVID 19 crisis. The concept of Telehospital is suitable in particular to strengthen existing collaborations and support medical professionals especially in isolated areas and during COVID19 pandemic management by virtual presence of Global Specialists and integrated technology. The concept of Telehospital is need an hour and future of health care is health informatics, patients may access to the information for treatment and diagnosis now for future may be the degree in MD in telemedicine shall be introduced and the healthcare systems reach to the corner of the globe and its implementation is the area of research.

A comprehensive Study on tannase producer in relation to soil properties of Paschim Medinipur district

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Tannase an enzyme is produced by the plants and different types of microorganisms, is industrially used as catalysts in the manufacture of Gallic acid, beverages and food processing. The Tannase, also known as tannin acyl hydrolase (EC 3.1.1.20) hydrolyse the tannic acid into glucose and gallic acid which have many applications. Tannin plays an important role in plant system by providing them resistance against microbial attack. Higher tannin content of plant materials is associated with resistance from microbial attack. There are only some microbial genera which have the ability to degrade tannins by the production of tannase (an enzyme that degrade tannin).There are so many fungi which have ability to produce tannase but have only few bacterial genera which can degrade tannin to produce tannase. The objectives of this study are to find out the good bacterial tannase producer as well as study of soil parameter in in forest area of Paschim Medinipur District. It has been found that the forest soil of Salboni, Jhargram, Garbeta and Binpur shows high number of tannase producer. On the other hand the total microbial load of the above mentioned area is comparatively lower than other places. It has also been found that the pH of the said areas are too low and varies from 4.0-5.0. Organic carbon content of the studied soil areas are also too much low percentage (3-4/gram soil). We have isolated two tannse producer namely- Enterobacter cloacae (DBS-16) and Bacillus sp (DBS-19). These two stains will help us to further study in future.

Reduction in water conservation in Tissue paper manufacturing process by implementation of innovative scientific approach

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This study aims to explore the maximum horizon of how to reduce water consumption while manufacturing tissue paper by implementation of diverse innovative scientific approach. Manufacturing of tissue paper would be impossible in absence of water. Water usage in the paper industry is needed in almost each and every process, starting from preparation of wood logs, conversion of chips, digestion of wood chips, making fiber slurries, or washing the machinery and rollers. Despite there being great progress over the years, increasing stress on fresh-water availability and greater calls to reduce water usage further, **paper mills have been under more and more pressure to adapt their processes** and ensure they're efficient enough to reduce their waste. An added pressure is attempting to achieve all these while also being conservative on cost, which can make the paper mill's water-reduction strategy all the more challenging. Drawing fresh water from and disposing wastewater to local sources like lakes and rivers and public water bodies can be extremely expensive; resources are increasingly limited, and if we are able to utilize these sources, **chances are we will be paying exorbitant fees**. Mandated wastewater disposal regulations are increasingly stringent, too, and if the mill's facility isn't able to treat the wastewater to federal and local standards, it will incur more fees and possibly even lose its ability to utilize that source. Because of all these reasons and more, tissue paper industries are adjusting their goals to be more environmentally conscious, to be better stewards of the available natural resources that are often shared with their local communities, and ensure their businesses are able to adapt to an ever changing landscape. The various fronts in which water savings can be done while manufacturing tissue paper have been analyzed here. The greatest contribution towards water saving initiative comes from 5-R concept (Reduce, Reuse, Recycle, Recover and Respect) of back water. Tissue

paper making involves a closed loop system in which water can be recycled easily, but one of the most important constraints is biomass formation. Biomass acts as the culprit for slime formation which further leads to smell, discoloration and irregularities in the paper formation and web breaks. To overcome this issue, biocide program was run through the manufacturing process. The quality parameters of back water an, Effluent load were investigated before and after the biocide program and data analyzed. A significant reduction in biofilm formation/ bacterial growth was observed after biological treatment thus making it re-usable in several points of paper making process. This further reduced the overall water consumption in tissue paper making process from 20 m^3/ ton to 14 m^3/ ton. This has given us a big leap in our efforts for water conservation wherein we could save fresh water to the tune of 6 m^3/ton and putting us in the category of water positive industries.

Keywords: Tissue paper, Water-reduction strategy, 5-R concept, Biomass, Biofilm formation, Biocide program

Poster

Sustainable development Goals

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Introduction

- Education for sustainable development allows every human being to acquire the knowledge , skill , attitude and values necessary to shape a sustainable future.
- Education for sustainable development means including key sustainable development issues into teaching and learning for example: climate change , disaster risk reduction , biodiversity , poverty reduction and sustainable consumption.
- It also require participatory teaching and learning method that motivate and empower learners to change their behaviour and take action for sustainable development.

Concept of Sustainable development

Conclusion

- Development is a changing Phenomenon with the change of human numbers. There is a sea change in the use of both non-renewable and renewable resources. Sustainable development depends on the scientific and efficient use of resources (Natural and manufactured) future is on the hands of the people . More researches are needed for finding policy and tools of sustainable development
- A holistic understanding of peace is needed for the youth to be educated on the different facets of peace . It is in human nature to "strive" fro harmony and peace .
- Education for sustainable development plays a key role in promoting values for peace and commitment to engage in responsible individual and cooperative actions .
- In this new age of limited resources we need to nurture the boundless energy and creativity of young women and men to tackle complex new challenges.

Poster on:

ROLE OF ARTIFICIAL INTELLIGENCE IN AGRICULTURE

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Agriculture plays a significant role in the economic sector. Agriculture in India is an industry employing a large swathe of its population. It even has a huge impact the country's economy, as seen during the time of the pandemic. But the challenges being faced by today's farmers are different than what used to be e xperienced before. Although we have managed to solve the problems of irrigation, pests, fungi etc to very large extent, the rise of population and industrialization have started affecting the climate in a huge way. The rain cycles have altered, too much of pesticid es have changed the nature and pH of the soil. This has created too many variables for the farmer to consider. This is where the AI will come in handy. AI can further be used to automatically detect when the crops are ready to be harvested and can employ robots to do the tasks, thereby reducing the need for human intervention. Nowadays Farmers generally using GPS, GIS, RMs, Sensors, Software in Agriculture for increasing their production and convert agriculture practices into Smart Agriculture/Farm ing.

Poster Presentation on:

IMPORTANCE AND USES OF NATURAL FARMING

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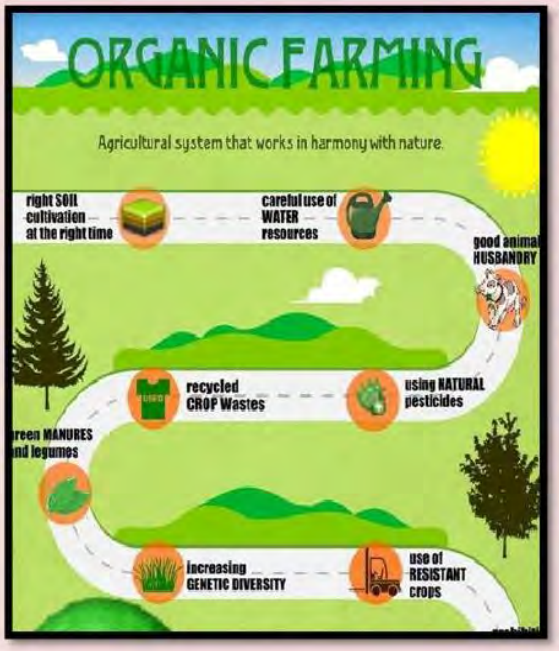
Natural farming is a type of organic farming that is based on the elimination of chemical inputs and promotes the use of locally available resources to reduce farmers' input costs and in making agriculture remunerative. These are residuals of dead plants, animals, and microbial tissues. Examples of organic manures are farmyard manure, compost, and green manure. The need to adopt the Natural Farming are Farmer distress, suicides, and mass protests are increasing due to the high production costs, un remunerative prices, depleting natural resources and increasingly unpredictable weather, Over half the aquifers in India have seen depleting water levels and around 90% of groundwater is used for irrigation, 30% of land area and topsoil has been degraded, India is ranked as the most vulnerable country in the world to extreme weather events induced by climate change. It will help in conserving the natural resources, in reducing greenhouse gas emissions; potentially reduce the cost of production and climate-related risks for farmer, to reduce the use of chemical fertilizers and pesticides.



POSTER

IMPACT OF PESTICIDES APPLICATION ON ENVIRONMENT

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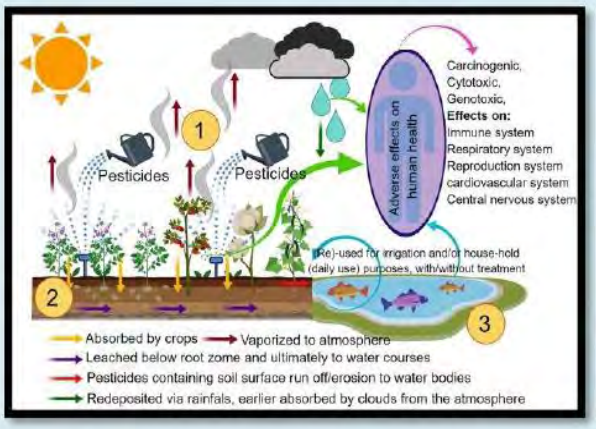
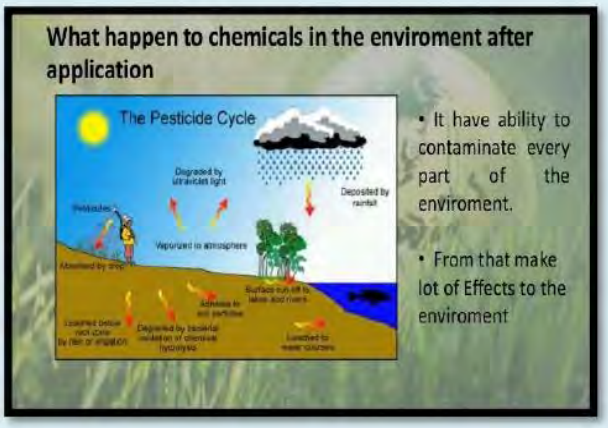
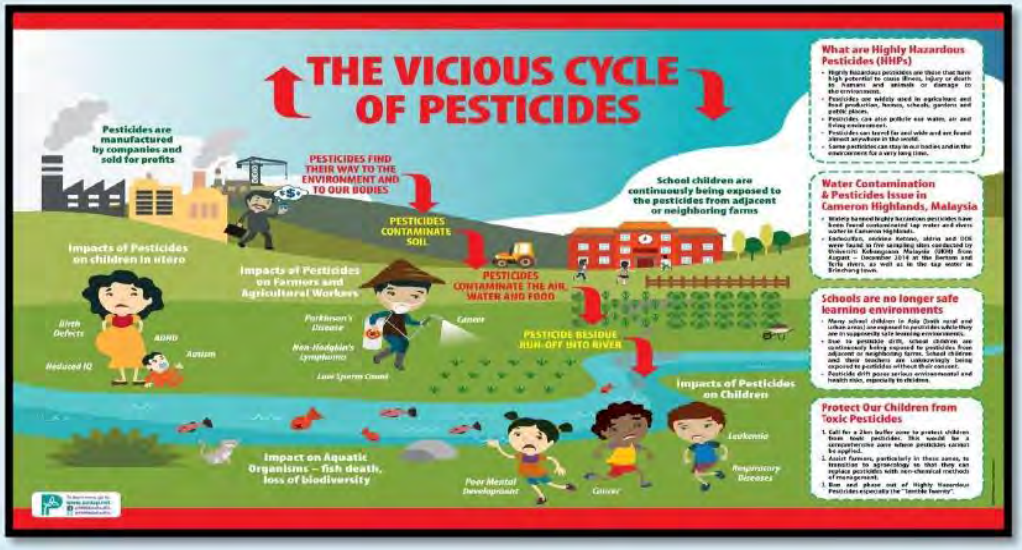
The term pesticide covers a wide range of chemical compounds including insecticides, fungicides, nematicides, and others. Pesticides are used to kill the pests and insects which attack on crops and harm them. A pesticide is a toxic chemical substance or a mixture of substances or biological agents that are intentionally released into the environment in order to avert, deter, control and/or kill and destroy populations of insects, weeds, rodents, fungi or other harmful pests. The use of pesticides has increased many folds over the past few decades. Different kinds of pesticides have been used for crop protection for centuries. Pesticides benefit the crops; however, they also impose a serious negative impact on the environment. Excessive use of pesticides may lead to the destruction of biodiversity. Many birds, aquatic organisms and animals are under the threat of harmful pesticides for their survival. Pesticides are a concern for sustainability of environment and global stability. Many kinds of animals are harmed by pesticides, leading many countries to regulate pesticide usage through Biodiversity Action Plans. Animals including humans may be poisoned by pesticide residues that remain on food, for example when wild animals enter sprayed fields or nearby areas shortly after spraying.







THE GLOBAL GOALS FOR SUSTAINABLE DEVELOPMENT : DIALOGUES AND DECARBONISING THE ENERGY SYSTEM

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ABSTRACT :- The Sustainable Development Goals are a collection of 17 interlinked global goals designed to be a "blueprint to achieve a better and more sustainable future for all". The SDGs were set up in 2015 by the United Nations General Assembly and are intended to be achieved by the year 2030.

We can inspire and channelize the future generations through SDG Activate Talk Series (SDG4 -Quality education)where we can collaborate with ideologies of dignified lecturers and other dignitaries along with the boosting ideas of working researchers to inculcate their ideas and suggestions to achieve SDGs. Through this we would like to motivate people for plantation drive (SDG15- life on land) and decarbonise the energy system through energy efficiency and electrification by Hybrid heating and waste heat recovery(SDG -7,12&13).

Keywords: SDG Activate Talk Series , Decarbonization

Introduction

The Sustainable Development Goals (SDGs) or Global Goals are a collection of 17 interlinked global goals designed to be a "blueprint to achieve a better and more sustainable future for all".[1] The SDGs were set up in 2015 by the United Nations General Assembly and are intended to be achieved by the year 2030.

Purpose

How can we achieve the Sustainable Development Goals for and with children?

"Awareness, action and accountability"

SDG Activate Talk Series

Can bring young change-makers to the stage to showcase for decision makers the ways they are supporting the goals, and to inspire others to take action.

The idea is to reach a young public that may or may not (necessarily) be interested in the inner-workings of the United Nations but are interested in hearing from "unexpected" community leaders, that knowingly or not are working on issues that are also a key focus of the UN or other development actors.

Hybrid heating and Waste heat recovery- Decarbonisation is the reduction of carbon dioxide emissions through the use of low carbon power sources, achieving a lower output of green house gasses into the atmosphere.

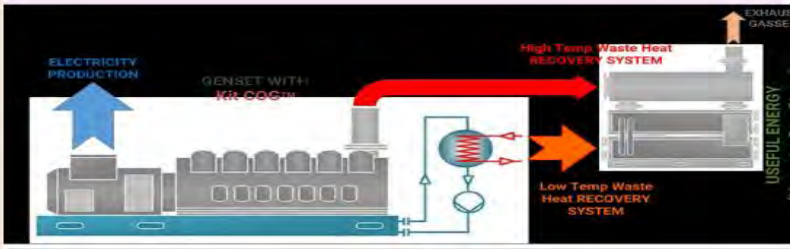
SDG Activate Talk Series

It can be an open house that includes a panel of local dynamic change-makers – some, if not all, preferably children, adolescents or youth. The idea is to reach a young public that may or may not (necessarily) be interested in the inner-workings of the United Nations but are interested in hearing from "unexpected" community leaders, that knowingly or not are working on issues that are also a key focus of the UN or other development actors.

Depending on the topic chosen, the panel could include innovators, inventors, campaigners, entrepreneurs, activists, designers and other change makers. These panelists would ideally present their work in hopes of activating others.

Waste Heat Recovery

"Waste heat recovery" is the process of "heat integration", that is, reusing heat energy that would otherwise be disposed of or simply released into the atmosphere. By recovering waste heat, plants can reduce energy costs and CO2 emissions, while simultaneously increasing energy efficiency.

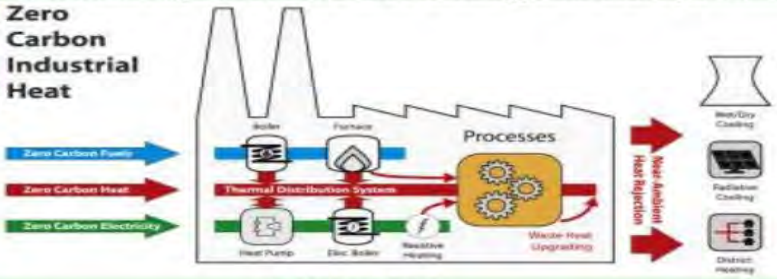


Hybrid heating

A hybrid (or dual fuel) heating system combines a traditional gas or oil boiler with a renewable heating system such as a heat pump.

Here's how it works…

An air source or ground source heat pump extracts heat from the air outside your home and uses it to heat your home and produce hot water. While it can be used all year as it can extract heat at even very low temperatures, it works most efficiently during the summer. A boiler is at its cheapest to run and most effective in cold winter months. A hybrid heating system will monitor the temperature outside and automatically choose the most energy efficient option.



OUTCOMES

Focussing on SDG- 4,7,12,13 and 15 Ensuring inclusive and equitable quality education and promote lifelong learning opportunities for all.

Ensuring access to affordable, reliable and modern energy for all.

Promoting sustained, inclusive and sustainable economic growth and decent work for all.

Building resilient infrastructure, promoting inclusive and sustainable industrialization and foster innovation.

Combating climate changes and its impact.

CORROSION COMBATING WITH GREEN CORROSION INHIBITORS

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ABSTRACT

Corrosion is a constant and continuous problem, often challenging to eliminate, would be prevented more practical and achievable than complete elimination. Corrosion processes develop fast after disruption of the protective barrier and are accompanied by several reactions that change the composition and properties of both the metal surface and the local environment. Control of metals is of industrial, cost-effective, environmental, and aesthetical importance. The use of inhibitors is one of the best options for protecting metals and alloys against corrosion. Organic corrosion inhibitors have prompted the search for green corrosion inhibitors as they are biodegradable and do not contain heavy metals or other toxic compounds. Besides being environmentally friendly and ecologically acceptable, plant products are low-cost, readily available, and renewable. The development of computational modelling backed by wet experimental results would help understand the mechanism of inhibitor action, their adsorption patterns, the interface of inhibitor metal surface, and are responsible for developing designer inhibitors with an understanding of the time required for the release of self-healing inhibitors. The inhibitors like plant extracts presumably possess biocompatibility due to their biological origin.

Keywords: Metals, Corrosion inhibition, Natural products, Toxicity

INTRODUCTION

Corrosion is the deterioration of metal by chemical attack or reaction with its environment i.e., acidic, basic or neutral. It is a constant and continuous problem, often challenging to eliminate, would be prevented more practical and achievable than complete elimination. A huge amount of money is wasted each year as a result of metallic corrosion, an estimated loss of 276 USD or equivalent to 3.1 percent of the United States GDP. Corrosion processes develop fast after disruption of the protective barrier and are accompanied by several reactions that change the composition and properties of both the metal surface and the local environment, for example, the formation of oxides, diffusion of metal cations into the coating matrix, local pH changes, and electrochemical potential. In acidic media, nitrogen-base materials and their derivatives, sulphur-containing compounds, aldehydes, thioaldehydes, acetylenic compounds, and various alkaloids, for example, papaverine, strychnine, quinine, and nicotine are used as inhibitors. In neutral media, benzoate, nitrite, chromate, and phosphate act as good inhibitors. Inhibitors decrease or prevent the reaction of the metal with the media. They reduce the corrosion rate by

- adsorption of ions/molecules onto metal surface
- increasing or decreasing the anodic and/or cathodic reaction
- decreasing the diffusion rate for reactants to the surface of the metal
- decreasing the electrical resistance of the metal surface
- inhibitors that are often easy to apply and have in situ application advantage.

GREEN CORROSION INHIBITORS

Green inhibitors act when they are added in very low concentrations to treat the surface of metals or alloys in a corrosive environment. Green corrosion inhibitors are of interest because there has been an increase in environmental awareness and a change in regulations that restrict regular corrosion inhibitors due to their toxicity. The consequences of the toxic inhibitors may cause temporary or permanent damage like kidney or liver or disturbing biochemical or enzyme system in body. Natural products are a good source of green corrosion inhibitors, where most of their extracts containing the necessary elements such as O, C, N, and S. The existence of phytoconstituents such as piperine, starch, proteins and terpenoids (citral) may synergistically increase the strength of the barrier film on the metal surface and causes metal protection through adsorption. Inhibition performances of some herbs such as coriander, anis, hibiscus and cumin were proved as new type of green inhibitors for the protection of steel in acidic medium. The anticorrosion effect of Andrographis paniculata and tea wastes have been reported from many laboratories.

TECHNIQUES ADOPTED

Following techniques are used to determine corrosion inhibition, efficiency and other parameters:

- Weight loss measurements – This study have Effect of temperature i.e. kinetic and thermodynamic parameters and adsorption isotherm, Effect of concentration of inhibitor, Immersion time of sample in inhibitor solution.
- Electrochemical studies - It contains linear polarization methods, Potentiodynamic polarization curves and electrochemical impedance spectroscopy etc.
- Other techniques – These techniques have FTIR, UV-Visible, SEM, TEM, XRD, QCM, DFT, Contact angle measurements, QCM analysis, salt spray test, TGA, AFM, molecular dynamic simulation analysis, Quantum chemical calculation analysis etc.

MECHANISM

Corrosion inhibition of various metals in different acidic media by green inhibitors can be explained on the basis of molecular adsorption. Adsorption is the first step in forming a corrosion protective film or coat in the presence of aggressive media that occurs on metallic surfaces on the active sites. There are different ways to adsorb the inhibitors molecules on the metal/solution interface: Interaction of the vacant orbital of hetero atoms with d-electrons of metal atom i.e. backdonation, Interactions between the aromatic rings (π-electrons) present in inhibitors and vacant d-orbitals of metal atoms, Interactions between the vacant d-orbitals of metal atoms with unshared electron pairs of hetero-atoms (O and N atoms) of inhibitor. There are two types of absorption namely physical adsorption and chemical adsorption. The inhibitors adsorb on the cathodic sites of the metal and decrease the evolution of hydrogen gas, they can both inhibit the partial reactions by decreasing the anodic metal dissolution and the cathodic hydrogen evolution reactions.

CONCLUSION

Green corrosion inhibitors are found to be effective from an ecological and environmental perspective and can play a major role over toxic inhibitors. It is still amazing that the anticorrosion efficiency of green corrosion inhibitors are equal to or even more effective than synthetic inhibitors. It is certain that natural compounds and plants products emerge out as effective inhibitors of corrosion in the coming years due to their biodegradability, easy availability, inexpensive and non-toxic nature. Natural products as green corrosion inhibitors having the limitation of their production volume on larges industrial scales, therefore, their economic aspects must be evaluated for industrial usage. Weight loss, electrochemical impedance, and Potentiodynamic polarization techniques were mainly used to confirm corrosion inhibition mainly in corrosive media. The phytochemical investigation is carried out on the extract and efforts are seldom made to pinpoint the active ingredient present in the plant extract. A lot of potential is still untapped especially computational modelling of the major extract components on mild steel.

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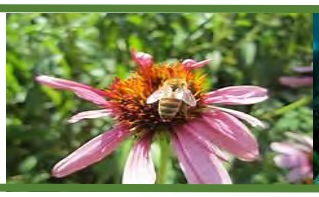

ECOLOGICAL RESTORATION FOR FUTURE SUSTANABILITY IN A CHANGING ENVIRONMENT

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ABSTRACT: –Our planet earth is blessed with a rich biodiversity. Most of the world's biodiversity happens to be in the developing countries which is now at a risk to rapid urbanization. A large amount of toxic waste is dumped from the industries in the nearby water bodies which pose a severe threat to the biodiversity. In this work, we are suggesting ecofriendly measures to get rid of this carcinogenic waste and protect our ecosystem.

Keywords- Carcenogenic,

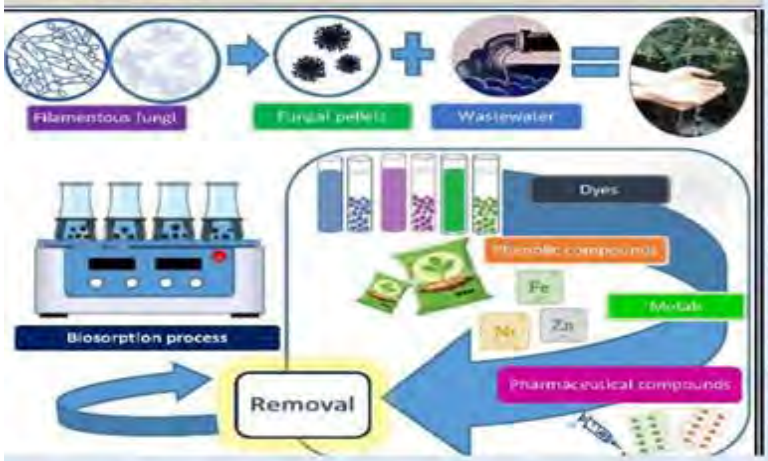
INTRODUCTION:–Our planet earth is blessed with a rich biodiversity. Millions of species of flora and fauna live symbiotically with each other creating a healthy ecosystem. Most of the world's diversity happens to be inside the developing countries that need support to make their conservation capacity. The rapid urbanisation and industrialisation is however a boon for the Human race but it is coming out as a bane for the biodiversity. The waste products generated in the industries are dumped into the nearby surroundings or aquatic bodies. This waste is highly toxic and carcinogenic in nature that may include various coloured dyes, heavy metals (such as Cr, Cu, Cd) etc that are non-biodegradable and affect both the flora and fauna. Thus, They need to be eliminated from our ecosystem to protect our biodiversity.

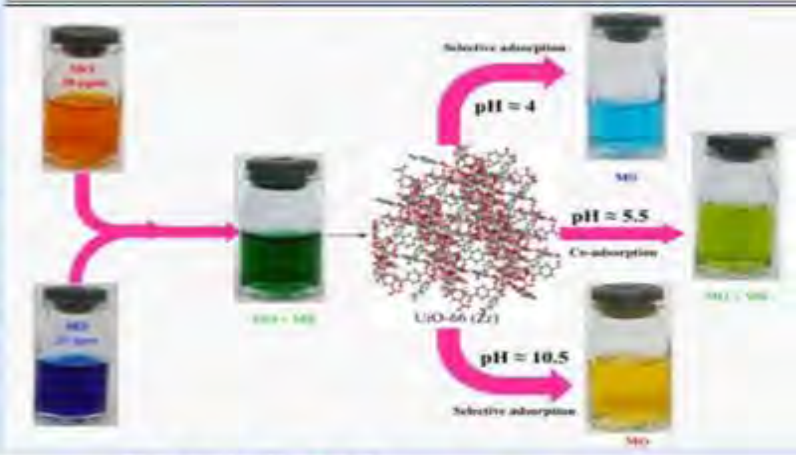
FOR THE REMOVAL OF HEAVY METALS

Various polymeric nanosystems may be developed such as graphene, carbon nanotubes etc for the efficient removal of heavy metals for the water systems. These work on the principle of adsorbtion where the heavy metal present in the waste water gets adsorbed over the surface the nanocomposite .

FOR ORGANIC DYE REMOVAL

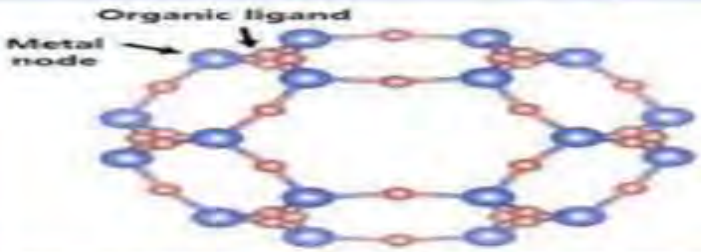
Metal organic frameworks are a class of adsorbents that may be used the efficient capture of the dye residues owing to their tunable porosity, ultralow density and large surface area. These work on the principle of host guest chemistry and form non-covalent interactions with the dye molecule thus capturing and eliminating it.





ADVANTAGES-

- These alternatives are eco friendly in nature
- Provide safe and effective result
- A long term treatment option.
- Economical option in comparison to others.



Conclusion -The environment and its compartments have been severely polluted by heavy metals. This has compromised the ability of the environment to foster life and render its intrinsic values. Heavy metals and the dyes are known to be naturally occurring compounds, but anthropogenic activities introduce them in large quantities in different environmental compartments. This leads to the environment's ability to foster life being reduced as human, animal, and plant health become threatened. This occurs due to bioaccumulation in the food chains as a result of the non biodegradable state of the heavy metals. Remediation of heavy metals requires special attention to protect soil quality, air quality, water quality, human health, animal health, and all spheres as a collection. Developed physical and chemical dyes and heavy metal remediation technologies are demanding costs which are not feasible, time-consuming, and release additional waste to the environment. The problems related to heavy metal and various dyes pollution can be controlled by adsorption using various nanomaterials as adsorbents.

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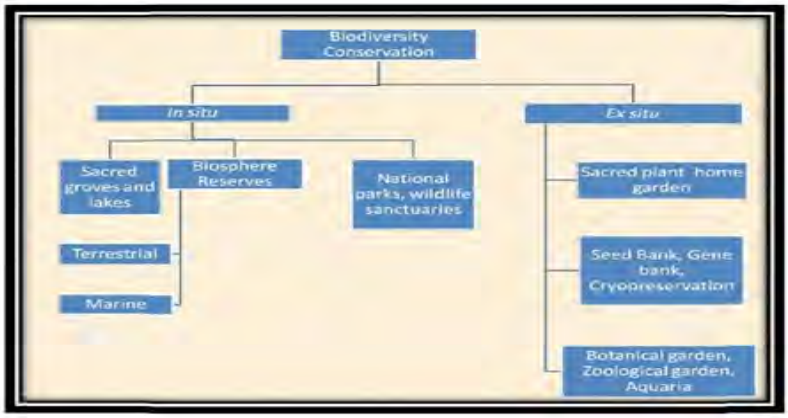
कोरोना वायरस महामारी का जैवविविधता पर प्रभाव एवं संरक्षण

शिवांशु तिवारी
गोविन्द बल्लभ पंत कृषि एवं प्रौद्योगिक विश्वविद्यालय, पंतनगर, उत्तराखण्ड

सारांश – हमारे ग्रह की पारिस्थितिक प्रणाली को बनाये रखने के लिए जैव विविधता अति आवश्यक है। समृद्ध जैव विविधता स्वस्थ पर्यावरण की निशानी है। पृथ्वी पर अन्य जीवों के साथ–साथ मानव जाति के अस्तित्व के लिए जैव विविधता का संरक्षण अति आवश्यक है। जैव विविधता पृथ्वी पर एक पूरे क्षेत्र में वनस्पतियों और जीवों की विविधता को संदर्भित करती है। जीवों एवं वनस्पतियों की विविधता जितनी अधिक होगी, उतनी ही विभिन्न प्रजातियों के लिए बेहतर है। ऐसा इसलिए है। क्योंकि यह खाद्य श्रृंखला की प्रकिया में मदद करता है। यदि किसी कारण से एक प्रजाति विलुप्त हो जाती है, तो भोजन के लिए उन पर निर्भर लोग भी मौत की ओर चले जाएंगे और हम विभिन्न प्रजातियों को खोते रहेंगे। प्रौद्योगिकी एवं अन्य विभिन्न गतिविधियों जैसे औद्योगिकीकरण, वनों की कटाई, बढ़ते प्रदूषण, ग्लोबल वार्मिंग और बढ़ती मानव जनसंख्या आदि के कारक उन्नति कम जैव विविधता के कारण है। हम प्रतिवर्ष पौधों, जानवरों, समुद्री–जीवों, कीट–पतंगों और अन्य जीवों की प्रजातियों को खो रहे है।

विश्व में कोरोना महामारी के कारण जन जीवन अस्त–व्यस्त हो गया है, सभी शैक्षणिक संस्थान और अनुसंधान संस्थान बंद हो गये है। शिक्षण एवं अन्य औद्योगिक एवं तकनीकि कार्य ऑनलाइन चल रहे है। कोरोना काल में वैश्विक बंदी (लॉकडाउन) के चलते मानव जीवन पर सकारात्मक एवं नकारात्मक दोनों ही प्रभाव पड़े हैं सकारात्मकता की द्रष्टि से देखे तो पर्यावरण साफ हुआ है। मानव जन को जैव विविधता की कितनी आवश्यकता है इस बात का भी बोध हुआ है। नकारात्मक द्रष्टिकोंण से देखें तो मानव जाति में जन हानि एवं बहुत अधिक आर्थिक हानि हुई है। राष्ट्रीय स्तर पर देखें तो अनेकों औद्योगिक इमारतों के बंद होने से रोजगार कम होने एवं राष्ट्रीय जी.डी.पी. में भी गिरावट आयी है।

उच्च स्तर की जैव विविधता को बनाये रखना अतिआवश्यक है। जैव विविधता में गिरावट लाने वाली गतिविधियों पर नजर रख कर सुधार की आवश्यकता है।



पोस्टर:

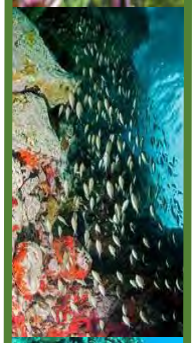
कृषि उत्पादन में जैव उर्वरकों की महत्ता एवं उपयोग

शुभम आर्य

कृषि विभाग, शोभित विश्वविद्यालय मेरठ

पिछले दशकों में आत्मनिर्भरता की स्थिति तक कृषि की वृद्धि में उन्नत किस्म के बीजों, उर्वरकों, सिंचाई जल एवं पौध संरक्षण का उल्लेखनीय योगदान है। वर्तमान उर्जा संकट ओर निरंतर कमी की और अग्रसर उर्जा स्रोतों के कारण रासायनिक उर्वरकों की कीमतें आसमान को छूने लगी हैं। फसलों द्वारा भूमि से लिए जाने वाले प्राथमिक मुख्य पोषक तत्वों-नत्रजन, सुपर फास्फेट एवं पोटाश में से नत्रजन का सर्वाधिक अवशोषण होता है क्योंकि इस तत्व की सबसे अधिक आवश्यकता होती है। इतना ही नहीं भूमि में डाले गये नत्रजन का 40-50 प्रतिशत ही फसल उपयोग कर पाते हैं, और शेष 55-60 प्रतिशत भाग या तो पानी के साथ बह जाता है या वायु मण्डल में डेनाइट्रीफिकेशन से मिल जाता है या जमीन में ही अस्थायी बन्धक हो जाते हैं। अन्य पोषक तत्वों की तुलना में भूमि में उपलब्ध नत्रजन की मात्रा सबसे न्यून स्तर की होती है। यदि प्रति किलो पोषक तत्व की कीमत की ओर ध्यान दें तो नत्रजन ही सबसे अधिक कीमती है। अतः नत्रजनधारी उर्वरक 2.0 के एक एक दाने का उपयोग मितव्ययता एवं सावधानी से करना आज की अनिवार्य आवश्यकता हो गई है।

भारत जैसे विकासशील देश में नत्रजन की इस बड़ी मात्रा की आपूर्ति केवल रासायनिक उर्वरकों से कर पाना छोटे और मध्यम श्रेणी के किसानों की क्षमता से परे है। अतः फसलों की नत्रजन अति आवश्यकता की पूर्ति के लिए पूर्णरूप से रासायनिक उर्वरकों पर निर्भर रहना तर्क संगत नहीं है। वर्तमान परिस्थितियों में नत्रजनधारी उर्वरकों के साथ-साथ नत्रजन के वैकल्पिक स्रोतों का उपयोग न केवल आर्थिक दृष्टि से महत्वपूर्ण है बल्कि मृदा की उर्वराशक्ति को टिकाऊ अक्षुण रखने के लिए भी आवश्यक है। ऐसी स्थिति में जैव उर्वरकों एवं सान्द्रिय पदार्थों के एकीकृत उपयोग की नत्रजन उर्वरक के रूप में करने की अनुशंसा की गई है।

Non-occupational Exposure to Petroleum Extraction Issue is big problem for Environmental Health

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Introduction-

- Petroleum, also called crude oil or just oil, is a naturally occurring, yellowish-black liquid found in geological formations beneath the earth's surface.
- The petroleum extraction is shale gas and tight oil using horizontal drilling with high volume hydraulic fracturing and the energy –intensive extraction of hydrocarbons from oil sands.
- The PAH compound ratios, phenanthrene /anthracene and fluoranthene/ pyrene, suggested that predominant present of PAHs of progeny sources in surface soils is an indication that oil leakage and/ or gas flaring contributes to soil contaminated.

Objective-

- Collection of soil samples from various sites rich in petroleum extraction.
- To isolate and characterize various microbes from the petroleum extraction.

Methodology-

Collection of Sample & Isolation of petroleum extraction Microbes

↓

Slide preparation from bacterial colonies on nutrients agar

↓

Preparation ofspecimen for microbes

↓

Bacteriological strain & Gram's strain

↓

Determination of from petroleum extraction selected microbes

Fig: Fungus Growth Plate

Conclusions-

- The larger issue of climate change due to excess release of carbon into the atmosphere.
- The impact on the natural environment, human health, socio-economic environment and caused degradation of host communities.

References-

- Butt N, Beyer HL, Bennett JR, Biggs D, Maggini R, Mills M, et al. Biodiversity risk from fossil fuel extraction. Science [internet]. 2013[cited 2015 feb 9]; 342:425-6.

Author Index

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Shobhit University
EDUCATION EMPOWERS

Ph.D. ADMISSION BROCHURE July-August, 2021

Shobhit University
EDUCATION EMPOWERS

JOINT ADMISSION NOTICE FOR Ph.D. PROGRAM FOR THE SESSION COMMENCING FROM JULY 2021

The Research and Development is an important contributor to nations's economic growth. The National Education Policy 2020 also focuses on promotion of research and innovation across all disciplines, inter-disciplinary research and on making India a global hub of Research and Development. The range of research activities at Shobhit is broad and our scholars are conducting research in many socially relevant multi-disciplinary thrust areas. The University has academic and research collaborations with many universities, research institutes and industries in India and abroad.

BROAD AREAS OF RESEARCH

Ph.D.

FULL TIME / PART TIME MODE

- Agriculture
- Agri Informatics
- Biotechnology
- Biomedical Engineering
- Computer Engineering
- Electronics Engineering
- Mechanical Engineering
- Law - Legal Studies
- Pharmaceutical Sciences
- Food Technology
- Microbiology
- Mathematics
- Environmental Sciences
- Business Management
- Psychology
- Economics
- Physics
- Chemistry
- Education
- English

Eligibility: Master's Degree with at least 55% marks or equivalent grade point in relevant subject as per UGC norms.

Selection Procedure: Online Entrance Test & Personal Interaction as per UGC norms.

Research Scholarship: NET qualified candidates are exempted from Entrance Test. Selected candidates may be offered Research Scholarship of ₹15600/ per month based on their performance. This scholarship is applicable only for full time on campus candidates.

How to apply: Application Forms are available online with ₹2100/ (Admission Processing Charges).

Important Dates

Last Date for submission	Wednesday, 30th June, 2021
Online Entrance Test	Sunday, 11th July, 2021
Interaction	12th - 13th July, 2021
Results declaration	Wednesday, 14th July, 2021
Registration & Fee Submission	Wednesday, 21st July, 2021
Online Course to commence from	Saturday, 24th July, 2021

For more details and to apply online, please visit:
www.shobhituniversity.ac.in

Shobhit Institute of Engineering & Technology
[A NAAC Accredited Deemed-to-be University u/s 3 of UGC Act 1956]
NH-58, Modipuram, Meerut, Delhi NCR
Helpline: **9927676677, 7617505012**

Shobhit University Gangoh
[Notified by Govt. of Uttar Pradesh, u/s 2(f) of UGC Act 1956]
Babu Vijendra Marg, Gangoh, Saharanpur, UP
Helpline: **7830810052, 9719356005**

Shobhit University
Admission Notification (July, 2021)

Shobhit University offers the following Research programmes for the year 2021-22

1. Ph.D. (Full-time / Part-time)

Applications are invited for admission to the said programmes. Admission shall be through an Entrance Test "online" to be conducted for following subjects.

Doctor of Philosophy (Ph.D.) Degree Programs Offered			
M Shobhit Deemed University, Meerut G Shobhit University, Gangoh			
❖ Agri Informatics	M	❖ Agriculture	M G
❖ Electrical Engineering	G	❖ Education	M G
❖ Electronics Engineering	M G	❖ English	M G
❖ Biotechnology	M G	❖ Environmental Sciences	M G
❖ Biomedical Engineering	M	❖ Law	M G
❖ Civil Engineering	G	❖ Mathematics	M G
❖ Mechanical Engineering	G	❖ Microbiology	M G
❖ Computer Engineering	M G	❖ Pharmaceutical Sciences	G
❖ Food Technology	M	❖ Economics	M
❖ Business Management	M G	❖ Commerce	G
❖ Conflict Management	M	❖ Physics	M G
❖ Psychology	M	❖ Chemistry	M G

The syllabi for entrance tests are available on official website of Shobhit University website http://www.shobhituniversity.ac.in/phd-admission.php

A) Important Dates:

Schedule for Admission for Research Programmes for Academic Session 2021-22

Availability of Application Form Online	5th May, 2021
Last date for receipt of completed forms	Wednesday, 30th June, 2021
Date for Online Entrance Test	Sunday, 11th July, 2021
Interview (For Candidates, exempted from entrance test as well as shortlisted through Entrance Test)	12th - 13th July, 2021
Declaration of Result (on University website/by mail to selected candidates only)	Wednesday, 14th July, 2021
Confirmation of Admission/ Fee submission by	Wednesday, 21st July, 2021
Program Commencement (course work to start)	Saturday, 24th July, 2021

B) Minimum Eligibility Criteria

A candidate seeking admission for the Ph.D. program shall possess, normally, the following qualifications:

1) Any candidate who has passed the Master's examination in the concerned subject with a score of not less than 55% marks in aggregate, or have appeared in the final year examination of Master's degree in the subject concerned, shall also be eligible to appear for the M.Phil. & Ph.D. admission.

2) Bachelor's degree in Engineering with a minimum of 75% marks in aggregate in relevant field of Engineering / Technology of a University or its equivalent, with at least five years of experience in Public Sector Undertaking / Research and Development Organizations / Private Industries / Service Sectors / Educational Institutions / any other State and Central Government Organizations.

Important Note

1) Applicants who have valid score in any of the relevant eligibility tests like JRF/NET (UGC/CSIR), GATE, GPAT & SLET of the State, may be exempted from the Entrance Test, as per University norms.

2) Candidates who are Teacher Fellowship Holders/ direct awardees of fellowship by DST (INSPIRE), ICMR or any other National Agency are also exempted from the entrance test.

3) If M.Phil. student wants to take admission to Ph.D. program after passing M.Phil. examination in regular mode shall be exempted from course work but will have to appear in entrance test and interview.

C) How to Apply

To apply for the Ph.D. programme (July - 2021) of the University, eligible candidates may **apply online** using credit/debit card for payment or **download and print the application form available on our website** with Rs. 2,100/- non-refundable fee. (see: List of enclosures as per clause 'L')

- Incomplete applications or applications received without all required enclosures are liable to be rejected / may not be processed.

Important Note:

1) You may use one application form to apply for Ph.D. in ONLY one Department.

2) Please use separate application forms to apply for two or more Departments.

D) Date, Time and Venue for Ph.D. Entrance Test

The Ph.D. Entrance Test will be held on 11th July, 2021, 10.00 AM–1.00 PM online.

E) Scheme of Examination

The Ph.D. Entrance Test on 11th July, 2021 would consist of following parts;

Type of Test	Number of Questions	Marks
General Aptitude Test (60 minutes)	50 multiple choice questions	50 marks
Subject Specific Test (120 minutes)	50 multiple choice questions	50 marks

	01 short essay type question Related to your subject	100 marks

The syllabi of the General Aptitude Test and the Subject Specific Tests for each Department can be seen on the concerned web pages on the university website.

Important Note

a) General Aptitude Test common to all applicants, from 10:00 am to 11.00 am.

b) Subject Specific Tests to examine basic fundamental knowledge in the subject, from 11:00 a.m. to 01:00 pm for candidates

F) Date, Time and Personal Interview

The Personal Interview will be held online on 12th – 13th July, 2021 afternoon for all candidates who appeared in entrance test and for all those Candidates who are exempted from entrance test

G) Provisional selection list

Provisional selection List along with procedure for admissions will be notified on or before 14th July, 2021, on the University website / by mail to the selected candidates only. Provisionally selected candidates will be required to take admission by 21st July, 2021, failing which vacant seats may be allotted to waitlisted candidates. The list of waitlisted candidates will be displayed on the website and Notice Boards of the university.

Candidates provisionally admitted to the Ph.D. program will be required to fill an "Enrollment Form" with details of their proposed field of research, research topic within 03 days after their admission, and submit the same to the concerned department, through the Registrar Office. The Enrollment Form will be available on the University website.

H) Selection Procedures

Selection to the Ph.D. programs would be based on performance in the Written Test/ Other Qualifying Test, Previous academic record and an Interview. At the time of interview, doctoral candidates are expected to discuss their research interests/areas.

I) Fellowships

1) A limited number of Institute fellowships/ Teaching Assistantships are available in some Departments for full-time residential scholars as per University norms.
2) Candidates who have qualified in CSIR – NET / BRNS / NBHM / other selections may avail the fellowships directly from the respective organizations as per rules.

J) Documents required at the time of admission

If provisionally selected, candidates will be required to submit following documents at the time of admission, along with the requisite fees.

1) Pass certificate and marks sheet of Class 10
2) Marks sheet of Class 12 / Intermediate or equivalent
3) Certificate and marks sheets of Graduation
4) Certificate and marks sheets of Post-Graduation
5) Migration Certificate
6) JRF/NET(UGC/CSIR), GATE, GPAT, SLET / other test admit card and Score card (if applicable)
7) No objection certificate from Employer (for sponsored candidates only)
8) One recent colour passport size photograph, identical to that upload in the application form
9) Photo identification: (Driving license, Passport, PAN Card, Voter ID, Employee Identification Card are acceptable)
10) Write up (1-2 pages) on proposed area of research

K) Fee Structure

After selection the candidate is required to submit Rs. 60,000/- which include first semester fee + course work and registration fee, thereafter the fee is Rs. 50,000/- per semester till 6th Semester. The candidate is expected to submit his/her well within minimum period of 6 semesters and if he/she continues further 50% of the semester fee i.e. Rs. 25,000 per additional semester shall be charged till total 10 semesters and thereafter the registration shall be cancelled. Thesis evaluation fee is Rs. 25,000/- (once

at the time of submission of fee). There is an additional fee of Rs. 5,000/- per year as other Administrative charges. There are no other hidden charges / fee. For on campus research scholars, they are allowed for hostel facility on cost as per rules.

Please note

(i) The Admissions Office / concerned Departments may not undertake detailed scrutiny of applications before Test / Interviews, and all shortlisted applicants called for Test / Interviews, except those whose applications are summarily rejected, are allowed to appear at the Test / Interviews purely on provisional basis, subject to their eligibility being verified at the time of Admission or later physically. Merely being allowed to appear at the Test / Interviews will not be considered as a ground for being eligible for admission to Ph.D. program. Further, mere submission of application form does not entitle a candidate to appear for the Test / Interviews.

(ii) All candidates in their own interest should keep photocopies of their completed forms for their own reference.

(iii) The Department-wise list of eligible candidates will be displayed on the University website.

(iv) **No Admit Card will be issued.**

(v) Candidates whose names do not appear in the lists of eligible candidates, may contact the Admissions Office on +91 8791000756 / 9634712358

L) Part- Time Candidates:

1) Candidates who are employed in recognized Educational Institutes / Universities / Colleges OR in Government / Defence / Research Laboratories OR in Industry must submit their applications in prescribed form, along with

   a) Letter of Sponsorship and
   b) No Objection Certificate from their Organization
   c) Experience certificate.
   d) Facilities available to carry out his / her research work at their place of working

2) They must also appear for the Test and Interviews.

Candidates must visit our website http://www.shobhituniversity.ac.in periodically for updates / any other matters related to the admission procedures.

For any further queries, candidates may contact:

Central Coordinator (Ph.D. Admissions)
Shobhit Institute of Engineering & Technology, (A Deemed to-be University)
NH-58, Modipuram
Meerut - 250 110
Helpline: 9411068399, 8791000756
E-mail: research@shobhituniversity.ac.in

Central Coordinator (Ph.D. Admissions)
Shobhit University
Adarsh Institutional Area,
Babu Vijendra Marg, Gangoh,
Distt. Saharanpur - 247341
Helpline: 7830810052, 9719356005
E-mail: research@shobhituniversity.ac.in

Shobhit University

EDUCATION EMPOWERS

Shobhit University, Gangoh, Saharanpur, Uttar Pradesh has been established by the Government of Uttar Pradesh vide U.P. Act No.3 of 2012. The University is established under section 2(f) of the UGC Act, 1956. Our strong Alumni Network, of more than 10000 graduates, extends throughout the World. Our proud graduates are serving a wide spectrum of industries globally including Fortune 500 companies.

Agriculture

B.Sc. Agriculture (4 Yrs)
M.Sc. Agronomy
M.Sc. Horticulture

B.Sc. Honors

Biomedical, Biotech, Electronics,
Computer Science, Microbiology
B.Sc. PCM

M.Sc. Programs

Biomedical, Biotechnology, Food Tech
Computer Science, Mathematics
Microbiology, Environmental Science
Physics, Chemistry

Naturopathy & Yoga

B.N.Y.S. (5½ Yrs)
BA Yoga
MA Yoga
PG Diploma in Yoga

Computer Applications

MCA | **BCA**

Management

BBA

Education

MA Education
B.Ed.
D.El.Ed.

Liberal Arts & Languages

B.A.
Economics, Public Administration
Political Science, Sociology
History, Sanskrit, English
Hindi, Urdu

M.A.
English, Hindi
Political Science, Sociology

Skill Based Diplomas in
Physiotherapy | OT Technician
Ayurveda Nursing | Ayurveda Pharmacy

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7830810052 / 9719356005

For Admission Procedure, Eligibility, Alumni and to apply online, visit:

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[SIET- A NAAC Accredited Deemed University u/s 3 of UGC Act 1956]
NH-58, Modipuram, Meerut, Delhi NCR; **M. 8791000756**

Shobhit University Gangoh, Saharanpur
[Established u/s 2(f) of UGC Act 1956, Notified by Govt. of UP]
Babu Vijendra Marg, Gangoh, Saharanpur, UP; **M. 7830810052**

Corp. Office: Shobhit University Tower, Institutional Area, Pocket B, Mayur Vihar Phase II, New Delhi - 110091; T.: 011 - 43205500