PASSIFLORA

2020-21
THIRD EDITION

THE ANNUAL MAGAZINE OF DEPARTMENT OF BOTANY,
HANSRAJ COLLEGE, UNIVERSITY OF DELHI

About Passiflora

Passiflora, the annual magazine of the Botany Department of Hansraj College, is published at a time when the whole world is facing the severe threat of Covid-19. The third edition of the magazine is dedicated to preserving, promoting, and presenting the experience and exploration of students in the form of creative writing, articles, events, and achievements. This is of utmost importance to all of us in search of excellence here and abroad. PASSIFLORA publishes a profusion of primary and applied research articles, findings, reports of several online events, and some beautiful poetries. The concept of passiflora aims to focus on love for nature and to raise scientific understanding and awareness. The contributions made by students were edited, shared and finalized online to bring out an issue for our enthusiastic readers.

Passiflora is also known as 'passion flower' holds medical, ecological and mythological significance. It's said that Passionflower got its name because its corona resembles the crown of thorns worn by Jesus Christ during the crucifixion. It is also believed with reference to the Hindu epic 'Mahabharata' that there are a hundred petals one of each Kauravas, five yellow petals symbolising Pandavas, the green bulb in the centre symbolises Draupadi, the three filaments are for holy Trinity Brahma-Vishnu-Shiv. Passiflora is also called 'Krishna kamal' because the radial in the centre resembles the Sudarshan chakra of Lord Krishna. Its colour, fragrance, shape, vine the leaves; everything is simply unique and magically beautiful.

Image courtesy:
Front Cover: Soumya Anand
Back Cover: Asmita

Teacher-In-Charge's Message

Dr. Romilla Rawat Bisht

I feel privileged to write this note on the release of the third issue of Passiflora- the annual magazine of the Botanical Society of Hansraj college. Passiflora is more than just documentation of events. This magazine manifests and conveys what Botanical society stands for. It's about learning that supplements classroom knowledge. It's about showcasing activities that we do as a society throughout the year to reinforce the idea of experiential learning. For our Department, this magazine is an annual dossier of moments & experiences. We can relive the past year by flipping through the pages of this magazine and can feel proud for building one more valuable year in our success story. For our students, this magazine acts as a platform to express their emotions, to put across their opinion and to share their findings.

It is a special moment for me as I recall being the convener of the society back in 2018 when the first edition of this magazine was brought out. Since then this magazine has been able to set a new benchmark of quality content with each of its new editions. I feel proud and a sense of achievement while writing this note as the teacher-in-charge of the Department.

I wish all the best to the conveners, student office bearers of the Society. I congratulate them for the release of the current edition and hope to witness an evolving Passiflora in the coming years.

Convener's Message

Dr. Anand Sonkar
Convener

Dr. Shalini Kaushik Love
Co-convener

We have been passing through difficult times. The COVID 19 pandemic has impacted all spheres of human activity. Last year has been challenging with respect to the teaching and learning environment with curricular and co-curricular activities moving to online platforms. The academic and student community has shown resilience to adapt to this new scenario. Against this backdrop, with a sense of pride and satisfaction, we present 3rd edition (2020-2021) of the annual magazine of BOTANIQUE, the Botanical Society of Department of Botany, Hansraj College: Passiflora - The Passion for Flora. The students have worked relentlessly in this difficult period to bring out the third edition of our magazine. The activities of Botanique provides a platform for the overall development of the students of the Department. A series of webinars were organized by the society where eminent scientists and experts spoke on various topics ranging from wetland conservation, solid waste management to transgenic crops and vaccine development. The webinars were focused on providing students with contemporary knowledge on important topics and spur the spirit of inquisitiveness, enthusiasm and enterprise in them. The inaugural lecture was given by Prof. Pradeep Kumar Burma, Department of Genetics, University of Delhi, South Campus on "Journey in Science- Drosophila to Transgenic Crops". The society organized events to observe important occasions such as World Wetland Day, National Science Day. The Society also collaborated with Mahatma Gandhi National Council for Rural Education (MGNCRE) to organize webinars on important topics of environment and ecology.

The webinars focused on the use of science for on the ground implementation for the benefit of society. An interactive session on 'Career Prospects in Biological Sciences' was also organized for the students, to provide them guidance on opportunities available and the way forward for the future. Botanique collaborated with the Indian Institute of Science Education and Research (IISER), Pune on scientific skill development with better science communication, public engagement and analysis of scientific literature.

To promote environmental awareness among students a photography competition "Naturae Consequat" themed "Wetlands World" was also organized to mark the occasion of World Wetland Day. The event witnessed a large number of entries of wetlands from the students.

As part of the active social life of students, the Society organized Fresher's Party online for new students. A wide range of performances and events were organized to make the fresher's feel at ease with the college environment and to unleash their true aptitudes and potentials. Floristics, the annual festival of the Society, provided an opportunity to the students to showcase their talents. Various competitions, online games, Botanical quizzes, were organized in online mode. The festival observed huge participation from students from various colleges of the University of Delhi.

The magazine showcases the annual events of the society, invited articles, poems, short stories, and new findings of interest in biological sciences. We hope the magazine will be informative and resourceful. We congratulate the student's council along with all the editorial team members for their determined efforts for bringing out the annual magazine.

President's Message

Sonal Negi

"The mind is not a vessel to be filled, but a fire to be kindled." Said, Plutarch. Passiflora, our College Magazine kindles the imagination of our learners. Cradled in the lap of nature, from serious thinking to playful inventiveness, students of Hansraj College Botany Department are brimming with zeal, empowering themselves with skills and creativity.

I congratulate the staff and students of the Botany Department who used various mediums of expression to present their ideas. As long as our ideas are expressed and thoughts are invoked we can be sure of learning, as everything begins with an idea.

It could not have been possible without the extraordinary work done by the Editorial Board of the magazine and I henceforth congratulate them for their hard work and dedication for putting up this beautiful piece of art together.

I would also like to extend my heartiest gratitude to our Convener, Dr. Anand Sonkar and Co-convener Dr. Shalini Kaushik Love for their constant support and encouragement.

I appreciate every person who shared the joy of participation in co-curricular and extracurricular activities along with their commitment to the curriculum. That little extra we do is the icing on the cake. 'Do more than belong – participate. Do more than care – help. Do more than believing – practice. Do more than be fair – be kind. Do more than forgive – forget. Do more than dream – work.'

Without any further ado, I present you with the third edition of Passiflora.

Happy Reading!

Chief Editor's Message

Shivangi Kochhar

"Good leaders create a vision, articulate a vision and passionately owns a vision and turn it into a reality" - Jack Welch. I being the chief editor, make a promise to the Department of Botany, Hansraj College that through my determination, perseverance and hard work, would undertake the task entrusted to me by the department authorities and fulfil it in the best possible way. New ideas and sections in the magazine are always welcomed by the Editorial Board. The editorial board is looking forward to making this magazine a vehicle for students to express their innermost thoughts. Hebert Spencer said-

"The great aim of education is not knowledge, but action."

And this is what we preach.

Faculty Members

Dr. Vijay Rani Rajpal

Dr. Anand Sonkar

Dr. Monika Koul

Dr. Ishwar Singh

Dr. Mahaswetta Saikia

Dr. Romilla Rawat Bisht

Dr. Archana Singh

Dr. Satyakam Guha

Dr. Shalini K. Love

Dr. Lebin Thomas

Dr. Pratibha Pant

Dr. Sushil Munna Tiwari

Laboratory Staff


Mr. Kamleshwar


Mr.Vijay Kumar


Mr. Sharwan Verma


Mr. Satyapal Singh


Mr. Praveen Kumar


Mr. Ajay Sharma


Mr. Ajay Pandey


Mr. Kawar Singh


Mr. Tarun


Mr. Mohit Tyagi


Mr. Ashish Aggarwal


Mr. Pratap Singh

Botanique- Office Bearers
Session 2020-21

NAME OF THE POST	CLASS	NAME
President	B.Sc. (H) Botany III Year	Sonal Negi
Vice-President	B.Sc. (H) Botany III Year	Shrishti
General Secretary	B.Sc. (H) Botany II Year	Tanisha Chhabra
Joint Secretary	B.Sc. (H) Botany I Year	Ritika Rawat
Treasurer	B.Sc. (H) Botany II Year	Nitasha Chawla
	B.Sc. (H) Botany II Year	Saurav Suman
Cultural Secretary	B.Sc. (H) Botany III Year	Aditi Jha
	B.Sc. (H) Botany III Year	Mohammad Taufeeq
	B.Sc. (H) Botany II Year	Chetan Pahwa
	B.Sc. (H) Botany II Year	Ishika Sharma
	B.Sc. (H) Botany I Year	Manisha Pant
Wall Magazine Editor	B.Sc. (H) Botany III Year	Shivangi Kochhar
	B.Sc. (H) Botany II Year	Nandini Killa
	B.Sc. (H) Botany II Year	Saumya Agrawal

Botanique- Office Bearers
Session 2020-21

	B.Sc. (H) Botany I Year	Prerna
	B.Sc. (H) Botany I Year	Ritika Thakur
Class Representative	B.Sc. (H) Botany III Year	Chakit Verma
	B.Sc. (H) Botany II Year	Vipul Kumar Chaudhary
	B.Sc. (H) Botany I Year	Aditya Prakash
Council Members	B.Sc. (H) Botany III Year	Apeksha
	B.Sc. (H) Botany III Year	Preeti Rawat
	B.Sc. (H) Botany III Year	Shagun Chaudhary
	B.Sc. (H) Botany II Year	Gunjan Verma
	B.Sc. (H) Botany II Year	Josemon Biju
	B.Sc. (H) Botany II Year	Prashansa Sharma
	B.Sc. (H) Botany I Year	Kuldeep Jaysi
	B.Sc. (H) Botany I Year	Nikhil Verma
	B.Sc. (H) Botany I Year	Soumya Anand

Shivangi Kochhar
Chief Editor

Pooja Jangir
Technical head

Prerna Sharma
Technical head

Nandini Killa
Co-editor

Saumya Agrawal
Co-editor

Editors:

Preeti Rawat

Apeksha

Prashansa Sharma

Josemon Biju

Divyakshi Negi

Priya Jha

Ritika Thakur

Contents:

Annual Report – "Botanique": The Botanical Society

Department of Botany, Hansraj College

President: Sonal Negi

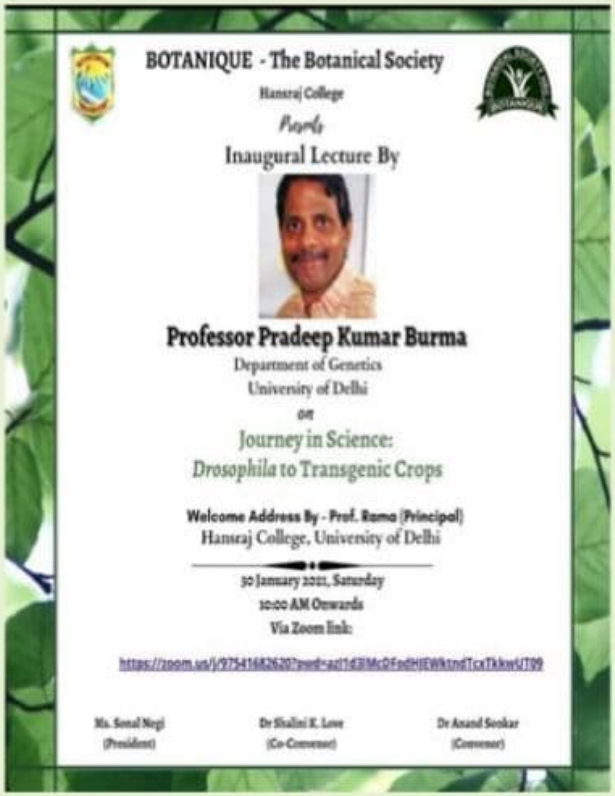
Convener: Dr. Anand Sonkar

Teacher-in-Charge: Dr. Romila Rawat

Co-Convener: Dr. Shalini K. Love

The Botanical Society focuses on the all-around holistic development of the students. Along with academics, equal importance is given to extra-curricular activities, thereby encouraging students to get involved, take up responsibilities, and participate in college events. It helps the students to showcase their talents and polish their skills. Various events were organized by "Botanique", The Botanical Society in the academic year 2020-21.

Inaugural Lecture and Fresher's 2021



BOTANIQUE, The Botanical Society of Hansraj College, organized its FIRST EVER ONLINE Fresher's Party on 30th January, where the "New Flowers" of the Botanical Department were welcomed! An inaugural lecture preceding the fresher's party was organized to make the event more inspiring and insightful. Prof. Pradeep Kumar Burma from the Department of Genetics, Delhi University was invited as our guest speaker who delivered a remarkable and an outstanding lecture on his " JOURNEY IN SCIENCE - *DROSOPHILA* TO TRANSGENIC CROPS", which nurtured the young minds with the taste of genetics, biotechnology and molecular biology.

Behind every future Arjun, there is a Dronacharya, and the same was felt after listening to Prof. Pradeep Sir, who inspired us not only with his knowledge and wisdom but also with his incredible journey. Genetically modified microbes are those microorganisms whose genetic makeup has been modified in a laboratory using genetic engineering or transgenic technology. This creates a blend of genes, a blend of qualities that do not occur in nature. Basically, the qualities of two organisms instilled in one, which can be used for the better of mankind. This is a sphere of science that requires patience, in depth knowledge, and a never ending will to try.

PERSEVERANCE IS THE KEY TO SUCCESS here and this is well depicted by our Prof. Pradeep Kumar Burma. Starting the career from BHU in zoology, which in itself is filled with all sorts of study of fascinating organism, still the Cinderella of Genetics "DROSOPHILA" always had his undivided attention, this was then he realized his real interest in genetics and molecular biology, fields in which he stands pioneer today!

Starting from genomic sequencing of yeast to understanding the usual DNA structure in regulating gene expression and finally arriving at Delhi University to start his astonishing journey on crop improvement, all these things add up to an unparalleled experience and unmatched wisdom. After arriving at Delhi University along with Prof. Deepak Pental and co-workers, they started working on producing a hybrid form of the mustard plant, which could cross-fertilize on its own! As mustards are self-pollinating plants, this cross is achieved through labour, making it expensive commercially and also making it an ineffective and inefficient way of producing cross breeds.

This was the place where Prof Pradeep got his breakthrough by incorporating Barnase- Barnstar gene from *Bacillus amyloliquefacians* in the genome of mustard plant and producing a transgenic mustard where male sterility was genetically stable and inheritable, ensuring cross fertilization only.

DMH11, which is tested and reliable and ready to use took around 15 years of development and has got almost all the clearances for commercial use!
This will not only revolutionize the mustard yield but also give rise to better variations!
"A person who asks questions" is a phrase that defines Prof. Pradeep Kumar Burma, a great geneticist, a great teacher and an inspiration to young minds! It was a delight and a blessing for our newest members of the Department!

Some Glimpses into Fresher's 2021

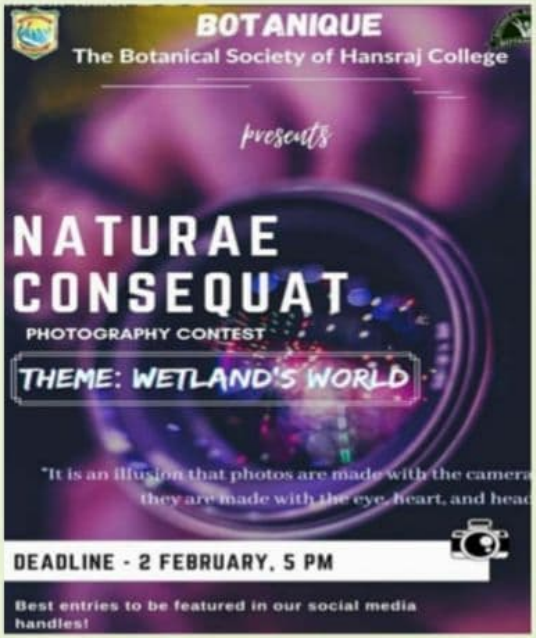
Online webinar on 'Role of wetlands in environmental clean-up'

BOTANIQUE, The Botanical Society of HANSRAJ COLLEGE, organized an online webinar on 'Role of wetlands in environmental clean-up' for its students on the 2nd of February on the occasion of 'World Wetlands Day'. The event was held in association with MAHATMA GANDHI NATIONAL COUNCIL OF RURAL EDUCATION, DEPARTMENT OF HIGHER EDUCATION, MHRD, GOVERNMENT OF INDIA. The chief guest for the event was Dr Pamposh who is an Assistant Professor at the University of Environmental Management, Guru Gobind Singh Indraprastha University and also an active face working towards wetlands conservation and awareness in India.

She addressed the students wholeheartedly and talked to them about the importance of wetlands and the various related threats and also about the ways for their conservation. The webinar started with an introduction of a wetland by telling the audience that a wetland can be defined as a complete ecosystem more or less dependent on water sources or more accurately it may be stated as a transition between terrestrial and aquatic ecosystem. Though on earth water is present everywhere but only 2.5 % is fresh water, less than 1% of water is usable and out of that 0.3% water is present in rivers and lakes and the freshwater consumption rates are fairly high. We use ten billion tons of water every day. Water use increased sixfold in 100 years and increases by 1% annually.

This is all the freshwater we have and most of it is provided by wetlands. This is one of the many reasons we need to conserve wetlands. Other than providing a supply of clean water, wetlands have many roles which include prevention of floods and erosion, a spot for many migratory birds and suitable habitat for a large species of birds and animals. It provides food and a home for certain fun activities.
With increased urbanization, a major threat is imposed on wetland's existence. The main reasons for wetland destruction are-:

- Water diversion through dams and canalization.
- Major changes in land use for agriculture and grazing.
- Air and water pollution and excess nutrients.



The mangrove cover in Mumbai decreased from 28 to 18%. Srinagar lost almost 50% of its water bodies. This is certainly alarming.
One of the steps taken for this problem is 'Ramsar Convention'. The Ramsar Convention on Wetlands is of international importance especially as a water flow habitat, is an international treaty for the conservation and sustainable use of wetlands. It is also known as the Convention of Wetlands. It is named after the city of Ramsar in Iran, where the convention was signed in 1971.

Every three years, representatives of the contracting parties meet as the Conference of the Contracting Parties (COP), the policy-making organ of the convention which adopts decisions (resolutions and recommendations) to administer the work of the convention and improve the way in which the parties are able to implement its objectives.

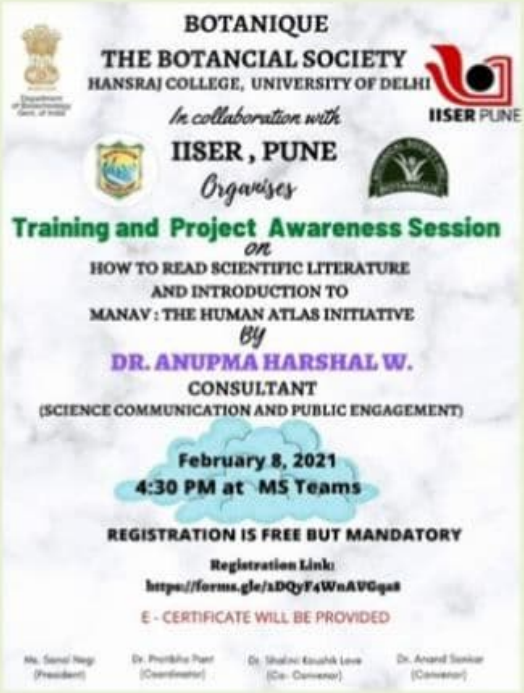
As of December 2020, there are 42 recognized Ramsar sites in India. Another method for wetlands conservation is constructed wetlands. A Constructed Wetland (CW) is an artificial wetland to treat municipal or industrial wastewater, greywater or stormwater runoff. It may also be designed for land reclamation after mining, or as a mitigation step for natural areas lost to land development.

Towards the end, Dr. Pamposh keenly answered all the questions asked by the students and provided all the information possible. The event was a success as the message of wetlands importance and conservation was perfectly delivered and it was interesting and engaging at the same time. Towards the end of the event the photographs of wetlands captured by the students were shared which surely was the icing on the cake. The interest the students took in the event and the enthusiasm with which everyone contributed was worth appreciating.

A sincere thanks to the organising committee which sure did a wonderful job:
Dr. Monika Koul (Convener)
Dr. Shalini Kaushik love (Co-Convener)
Dr. Anand Sonkar (Staff advisor)
Ms. Sonal Negi (President, Botanique)

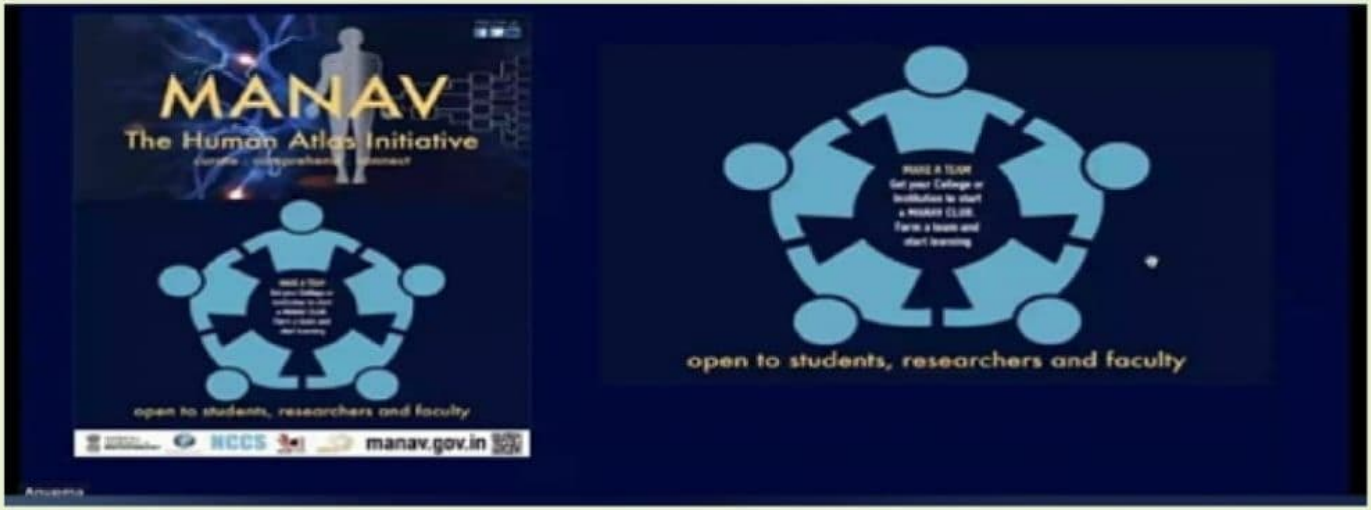
Some Beautiful Entries by Students of Botany Department

Online webinar on 'How to read scientific literature and introduction to Project Manav: The Human Atlas Initiative'



BOTANIQUE, The Botanical Society of Hansraj College in collaboration with Indian Institute of Science Education and Research (IISER) Pune, organized a Training and Awareness Session for the teachers and the students on how to read scientific literature and introduction to Project Manav: The Human Atlas Initiative, delivered by our guest speaker Dr. Anupama Harshal W. – Consultant (Science and public engagement). Our Guest Speaker was warmly greeted with a welcome address delivered by Dr. Romila Rawat Bisht (Teacher in Charge).

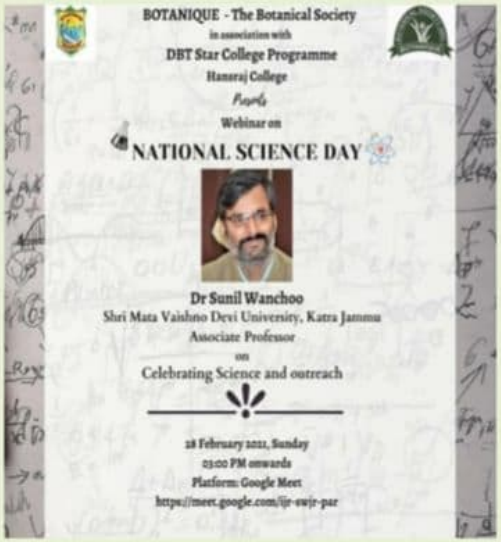
Information, in this modern digital world, has got no limits, an unlimited number of sources are at our disposal in just one click, but this ocean of data needs to be filtered. With new information pouring in every day, constant reviewing for establishing relevance and usefulness of the data has to be done, so that one has better access to the best possible and most accurate sources available. In the world of science, journals are the places where research papers of scientific breakthrough are published. These are the refined scientific literary works, comprising of research articles, review articles, commentaries and reports which are written in a unique format designed to keep the reader involved and are easily understandable.



Scientific works are more fascinating than the fictional world of tales and stories, where facts unravel the world around you, inside you and beyond you, but all this needs understanding and different approach of studying, where small things like note-making, time mapping, annotation and summarizing can become very handy in understanding and establishing virtual communication with the text itself and grasping the brilliance of science. It's no doubt that the best creation of nature is the HUMAN or 'MANAV' a true masterpiece of nature, a natural machine where everything is so beautifully linked, interconnected and coordinated to work as a single entity! With its astonishing beauty and perfection HUMAN BODY or 'MANAV SARIR', is also a mystery of its own! And it needs unravelling, it needs to be discovered from within, it needs to plot and map! And this initiative has been taken up in the PROJECT MANAV: THE HUMAN ATLAS INITIATIVE, where the different building blocks of the human body are being studied and analysed to create a comprehensive map of the organ system.

This will not only help in the better understanding of the human body and organ system but also make it much easier for tracking biological pathways more accurately in order to identify the sources of any ailment that may disturb the proper functioning of the body. This will lead to the development of drugs and medicine for even those diseases which are incurable now! Project MANAV also aims in building a scalable, robust platform for annotation and curation of scientific research and building a community with varied scientific skills. Conducting training programs in institutions and colleges and enhancing the knowledge base and interest in students and also providing them with exposure to diverse scientific and technological fields and trends, has been the main Vision of Project MANAV. This project aims in revolutionising our understanding of the Human Body and unravelling the mysterious of MANAV!

Online webinar celebrating science and outreach

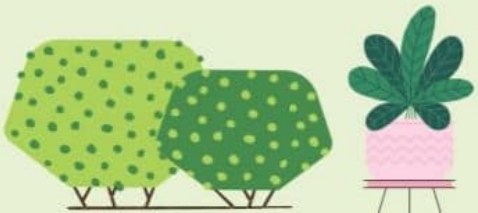


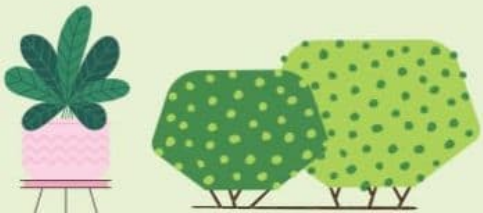
BOTANIQUE, the Botanical Society of Hansraj College, organized a webinar on the occasion of 'National Science Day', which is celebrated on February 28, to mark the discovery of the Raman Effect by the renowned physicist C.V Raman in 1928. The speaker of the event was Dr. Sunil Wanchoo, an associate Professor at Shri Mata Vaishno Devi University, Katra, Jammu who delivered an insightful talk on the theme 'Celebrating Science and Outreach' which helped the listeners in developing a scientific temperament.

Dr Sunil Wanchoo commenced the talk by recollecting his school days, he reflected upon the hardships that he faced being brought up in a small village in Kashmir. Late until his post-graduation, he remained curtailed from subjects like science communication and the scope of scientific research. In this regard, he highlighted the privilege that the listeners are endowed with. This did not come without a realization of potential that one possesses, given the current platform and exposure.

Since it was a Sunday afternoon, Dr Wanchoo kept the interests of the audience in mind and unfolded his talk through stories. These stories were small happenings around the world that translated lessons worth taking note of. Each hid in them, small actions which had the enormity to influence society for the better. A glimpse of the variety of stories he incorporated in his talk were-

- The Story of Nepal; owing to the culture of fragmenting land each time it is inherited, the buildings constructed kept on becoming narrower and increased in height, making them vulnerable to destruction by earthquakes. A small NGO named the National Society for Earthquake Technology resorted to retrofit about 250 schools before the 2014 earthquake. As a consequence, these buildings could survive the natural catastrophe.
- The Story of Leh; we have all relished the story of Sonam Wangchuk's life in '3 idiots'. Dr Wanchoo only elevated our enthusiasm by highlighting the creditworthy work of this scientist, which showed us yet again, the potential of small actions of relevance. During the stressed conditions between China and India, soldiers were posted on LAC who had to sustain the extremities of climate. Sonam Wangchuk constructed simple tents to moderate the temperatures and it then presented itself as alternatives to energy-intensive methods of heating tents. Thus, can be seen as a project that serves the sustainable development goal as well.
- ·The Story of Sirah; Tilakraj was an innovative farmer of the area, who grew lemongrass on his farm. He, along with a scientific R&D Laboratory (Indian Institute of Integrated Medicine) in Jammu and the district administration joined hands to initiate a project called 'National Aroma Mission' which facilitated the extraction of oil from the lemongrass. Thus, setting a perfect example of science and technology in action. The simple ideas helped the community and bridged the gap between the science practised in the lab and its real-world application.

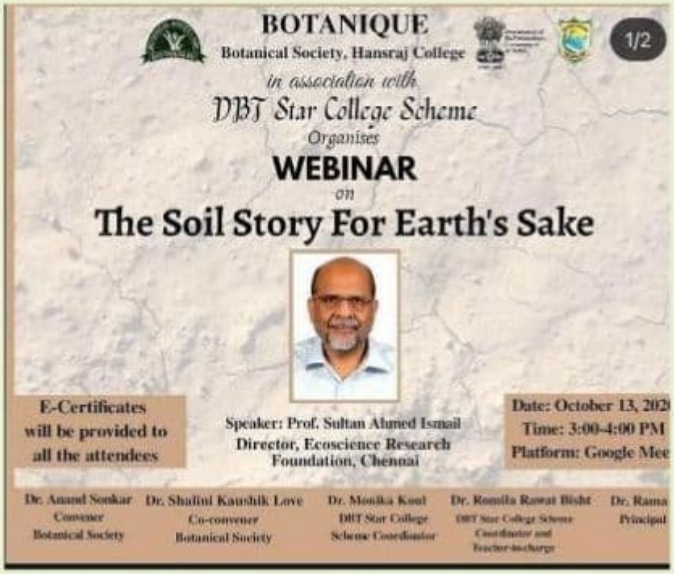




After giving a glimpse of different unnoticed stories, Dr. Wanchoo emphasized on the importance of 'Science in Practice' which transverses the barriers of laboratory and reaches out to the public to better the lives of people, provide them livelihood and most importantly, exploit the simple scientific know-how to solve common day problems.

The talk culminated with another inspiring anecdote from his life, where an event organised by him was attended by a girl from the village of Turtuk, which is the last village on the LOC of India with Pakistan. She came down to Leh to attend the camp and provided testimony to the fact that the speaker has fulfilled his purpose of communicating science far and wide, thus, providing students with the opportunities that he was restrained from, as a child. The last minutes of the talk took a rather philosophical turn and made everyone retrospect upon the change they can bring for an individual, if not for the society as a whole. The simple concepts of science, innovative approach and the right mindset would aid one to create inspirational stories, which would touch others and drive similar research and inventions. The inspiring talk was followed by a grinding Q/A session wherein the young learners put forth their thoughtful questions, which were answered well enough for them to see science in perspective and inculcate in themselves, a scientific temperament.

The Soil Story for Earth's Sake



The Botanical Society of Hansraj College under the aegis of DBT Star College Scheme organised a webinar on 'The Soil Story for Earth's Sake' on 13th Oct 2020 via Google meet. The soil story was narrated by renowned Prof. Sultan Ahmed Ismail, Director, Ecoscience Research Foundation, Chennai. He is well versed in the field of Indian soil ecology and also worked in the development of a module on vermicomposting as a sustainable ecological practice. Students and faculty members from all the disciplines across Delhi University graced the webinar with their active participation. The event started with a greeting by Dr. Shalini Kaushik Love (Co-convener, Department of Botany) followed by Dr. Anand Sonkar (Convener, Department of Botany) who introduced the attendees to the speaker. The speaker then mesmerized attendees with his eye-opening narration. He tried to connect attendees spiritually to the soil from where we are born and where we have to return. He explained unique and easy methods to determine the type of soil preparation of fertilizers and vermicomposting. He also encouraged students to work on small projects. He emphasized the research which is to be done for the social cause. After the professor's mesmerizing narration a formal thank you note was given by Dr Monika Koul (Co-ordinator DBT Star College). It was a great session and brought new insights to the current scenario and triggered new ideas that will benefit several generations for years to come.

Yakult factory visit

On 30 March, 2021 students of third year of Botany Department, Hansraj College, University of Delhi had virtually visited YAKULT DANONE INDIA PVT. LTD., SONEPAT accompanied by two faculty members, Dr. Lebin Thomas and Dr. Mahaswetta Saikia via MS Teams. The objective of this industrial visit was to familiarize the students with the production and processing aspects at Yakult Danone India (P) Limited. Yakult has received ISO 9001: 2008, HACCP and OHSAS accreditation for manufacturing a safe and quality product for its consumers. The students were welcomed by, Aadish PR Manager.

Thereafter they were given a brief presentation on the establishment of Yakult and its marketing strategies. They were informed that Yakult Danone India is a joint venture between the Japanese & French industry. The capacity of the plant is 10 lakhs bottles (units) per day and the milk produced is of excellent quality containing billions of useful bacteria which are essential for the proper functioning of digestive system.

The visit was divided into two phases:

An introductory presentation on Yakult by Plant operations Executive. Factory Tour Yakult Danone India Pvt. Ltd. is a 50:50 joint venture between Yakult Honsha of Japan and Group Danone of France. Yakult is a probiotic drink that contains more than 6.5 billion beneficial bacteria *Lactobacillus casei* strain Shirota. It was in 1930 that Dr Minoru Shirota, a Japanese scientist discovered a special strain of bacteria that was beneficial to human health. This friendly bacteria helps in improving digestion, building immunity and preventing infections. The two main marketing strategies here are:

Retails Shops: Home delivery by Yakult Ladies. Yakult ladies are also responsible for spreading awareness about Yakult probiotics drink among people. As a pioneer in probiotics, Yakult has formidable research capabilities and product technologies in the field of probiotic. Yakult central institute for microbiological research has researched the use of intestinal bacteria as a factor in health maintenance for years, conducting a wide range of studies on the benefits of microorganisms in Japan, and in India too. Yakult's benefits have been scientifically established through years of research and 30 million people in more than 30 countries drink yakult everyday.

During the tour students were taken for the visit inside the Processing Unit where different stages of processing namely mixing of raw ingredients, sterilization, fermentation, blending, injection moulding, scrambling, filling/sealing, shrinking and packaging, storage and their automatic control process were demonstrated.

The product is produced very hygienically. At no point does anyone touch it and the entire process is fully automated with only 30 workers working on it. The visit was a fruitful experience for the students as they learned the processing stages and the latest technology in producing processed products. It also provided them an opportunity to familiarize themselves with the industrial environment.

Career counselling

BOTANIQUE, The Botanical Society of Hansraj College organised a webinar for the second year students. In this event, Mr Anubhav Prakash, an alumnus of the Botany Department of Hansraj College, University of Delhi was invited to guide the budding scientists dedicated to pursuing research as a career in future. He has always been an ideal role model and a source of inspiration for his juniors by sharing the experiences throughout his journey from college to getting enrolled in one of the most prestigious and flagship research institution of the country, NCBS Bangalore. He cracked almost each and every entrance being conducted by various leading research Institutions particularly TIFR, NCBS, IISC, IISER NISER for pursuing Biological Sciences as a career in research. He is currently pursuing PhD from National Centre For Biological Sciences, Bangalore. He shared his preparation strategies with the juniors with respect to all the entrance examinations that are pre-requisite to get into the field of research in any of the top-notch Institutions. He also told us how important it is to attend our classes regularly, being attentive rather than being physically present.

He recommended a few must-read references/books for students pursuing Bachelors for building their concepts and developing innovative ideas about the topics we are focusing on. He also mentioned some of the under-grad internship programmes to enrich one's lab skills and understand the concepts in true perspective. He also shed light on the importance of consistent self-study with a definite goal under the guidance of our mentors for securing top ranks in entrances being conducted by some of the leading institutions of the country. He also cleared our doubts that we could pursue a career in any field of biological sciences as per one's interest, and need not be be restricted to the field of Botany. He also explained the exam pattern, eligibility criteria and interview process of a plethora of entrances for pioneer research institutions in the field of sciences.

Infectious Disease Biology and Vaccine Development

The Botanical Society and Life Sciences Society of Hansraj College organised a webinar on INFECTIOUS DISEASE BIOLOGY AND VACCINE DEVELOPMENT on 17th April 2021 via MS Teams. The guest for the event was Professor Deepak Gaur, FNA who is the Deputy Country Director at International AIDS Vaccine Initiative (IAVI) India, and also a Professor at School of Biotechnology, Jawaharlal Nehru University (JNU), New Delhi. The event started with the general introduction to vaccines and their functioning and types, and as the event proceeded all the major and important information related to vaccines and vaccination programmes were provided.

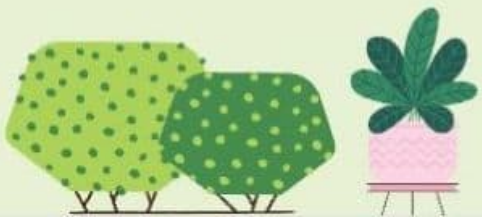
The main attraction of the lecture was to understand the role of vaccines in the eradication of viral diseases. The lecture centred around the present COVID situation and helped the attendees to understand the efficiency of the available vaccines and also all the precautionary measures one needs to adapt.

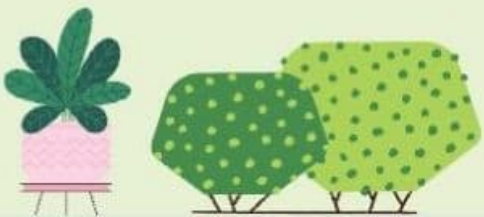
Amidst the pandemic, proper and factual information about vaccination is very important, and this webinar was an effort to provide knowledge about this subject.

The webinar was not only very informative but also very engaging and interesting. All the major and minor topics were included in the lecture and the doubts of all the students and teachers were well-addressed.

It was an absolute honour to listen to our esteemed guest. The event was very well arranged and coordinated by the team:

- Dr. Anand Sonkar
  (Convener, Botanical Society)
- Dr. Shalini Kaushik Love
  (Co-Convener, Botanical Society)
- Ms. Sonal Negi
  (President, Botanical Society)
- Dr. Archana Singh
  (Convener, Life Sciences Society)
- Dr. Pratibha Pant
  (Co-Convener, Life Sciences Society)
- Ms. Manika Bhatia
  (President, Life Sciences Society)





Floristics'21
Annual Botanical Fest

BOTANIQUE, the botanical society held its annual fest 'Floristics' on April 3, 2021(Saturday). Carrying on its legacy forward, Floristics once again provided a platform to the students of Botany and other related disciplines to showcase their talents and knowledge. A highly developed values system is like a compass. It serves as a guide to point in right direction. Likewise Dr. Anand Sonkar, convener and Dr. Shalini Kaushik Love, co-covener of Botanique guided us throughout the fest and made it a grand success. This year, it was held online owing to the prevailing situation. Nonetheless, the dedication of conveners and organizers as well as the enthusiastic participation added up to make the event a great success.

The event started at 10:00 am and culminated around 3:30 pm. It amalgamated a plethora of fun-filled activities and competitions embraced by the participation of students. The following is the chronology and a glimpse into the competitions held as a part of the fest:

Highlights

ACE THE CASE
The Botanical Case-Study Competition

CATCH ME IF YOU CAN
Samajhdar ko Ishara Kaafi

MAKE A MOMENT
The Botanical Photography Competition

SCINTILLATION
The Floral Dress/Accessory Competition

FUN-ARTISTIC
The Mascot and Tagline Competition

MEME-O-SPHERE
The Botanical Meme-making Competition

Q-FIESTA
The Quiz Competition

EMOJI-KON
Break the Emoji Code

ARTEM-REGNUM
The Academic Drawing Competition

Make A Moment

The Botanical Photography Competition

The photography competition was held on the theme- 'Blooming Grace'. The participants were required to capture the beauty of blooming flowers. A text was to be supplemented with the entries to embrace their beauty. The submissions were received via google forms well in advance and the results were announced on the day of the fest via Google meet at 10:00 am.

Fun Artistics

The Mascot and Tagline Competition

The participants were required to design a mascot and a tagline for the annual fest, Floristics. A huge number of creative mascots were received, making it difficult for the judges to choose the best. The entries were submitted via google forms and the winners were announced via Google meet at 10:40 am.

Meme - O - Sphere

The Botanical Meme-making Competition

The new age talent of creating humorous memes were put to test with 'Biological Interactions' as the theme. The participants were required to register in advance for the event and were provided a specific topic on the day of the fest in a Google meet. They were given a total of 30 minutes to make the submissions via Google forms. The received entries were assessed for their creativity and humour and the winners were announced shortly thereafter.

Arteum Regnum

The Academic Drawing Competition

A one of its kind competition wherein the art of academic drawing was finally honoured. It provided a platform to the students of biological disciplines to showcase the skill of penning scientific diagrams. Botanical topics were provided to the participants to choose from namely; (i) L.S of Casurina stem (ii) Prostrate thallus of Coleochaete (iii) Chara- Node bearing nucule and glocule (iv) Chara- L.S of globule (v) Chara- a nucule (the female sex organ). The entries were received via Google forms and the results were announced in a meeting at 12:00 pm.

Q - Fiesta

The Quiz Competition

·A two-tier quiz competition was conducted with 'Put your grey matter to test' as its tagline. The first round was held via Google forms. It was named 'Scrabbles- The Word Play', wherein hints were provided to the participants in a scrambled form to answer 20 questions based on biological know-how expected at the undergraduate level. The participants were assessed on their speed and correctness. It was an eliminatory round, the best 4 performing individuals proceeded to play on Q-Fiesta, round II which was held on Google meet. Each of the participant was required to answer a total of 5 questions whose rounds were:

1. The Starters- that consisted of easy questions.
2. The Picture Hunt- a picture-based question was put forth.
3. The Power of Precision- the questions demanded for the participants to be precise.
4. A little beyond Botany- The questions asked were beyond core Botany.
5. The Mixed Bag- The questions weren't from any particular topic.

The quiz lasted for about an hour starting from 12:35 pm and a tie-breaker was conducted to finally get the top-3 performers.

Apart from the academic competition, various games were also conducted from 1:30 onwards to make the fest enthralling:

Ace The Case

The Botanical Case Competition

A good presentation gives an insight into an intelligent brain.' The same principle was put to use to assess the participants. Each team was provided a case 20 minutes prior to the commencement of the game. They were required to present their cases via Google meet. Furthermore, some thought-triggering questions were put forth to the teams. Participants who delivered an enchanting presentation and came up with witty solutions were awarded the prizes. The event was conducted via google meet 3.30 pm onwards.

Catch Me If You Can

Samajhdar ko Ishara Kaafi

A lively game which tested the retention of botanical names, was held via Google meet from 1:30 pm-2.30 pm. A clip/ picture from some of the most renowned bollywood movies were shown to the participants but this time they had to see it in a different light and identify the plant to give their common and botanical names. The ones to answer first in the chatbox were awarded the points for each round. Subsequent adding up of the points gave us the top three performers.

Emoji Kon

Break the emoji code

The skill of expressing different situations through emojis never goes out of trend but were the participants prompt enough to decode the answer of the question when it was represented in form of a series of emoticons? The emoticon-freaks who also had a good sense of botanical and common names credited the top 3 positions to their name. The game lasted for about an hour starting from 2:30 pm and was successfully conducted via Google meet.

Scintillation

The Floral Dress/Accessory Competition

The floral Dress/Accessory competition was held and participants presented any dress/an accessory/DIY craft made by anything related to plants (like flowers, leaves, sticks, etc). We received a wholesome response from people and it was truly amazing to see their work. The result was declared on Google meet at 10:30 am.

All in all, the event turned out to be a grand success. The participants had put their best foot forward to capitalise the opportunity and the winners were filled with elation on conquering a position. The certificates were sent to the award-winners in the evening itself. Various teachers from the department joined in to enjoy the event and provide their valuable suggestions and feedbacks. A truly entertaining and enjoyable afternoon converged into its end. Short videos and clips were made thereafter to be posted on the social media handles and let everyone have a glimpse of happenings. Apart from this, small clips were made for winner revelation to celebrate the award-winning entries. Everyone from the 'Botanique' played their part to incorporate the best in Floristics'2021 making it the most appreciated and well-conducted event of the year.

NEW DISCOVERIES
In 2020

For many, 2020 was a terrible year. But if you ask a botanist, they would probably tell you it wasn't all that bad. In the domain of plant sciences, 2020 was rife with new discoveries. Scientists named more than 150 new plant and fungi species last year.

Eriocaulon karaavalense

Eriocaulon parvicephalum

Two new species of pipeworts in India

Scientists from the Agharkar Research Institute in Pune have recently discovered two new species of pipeworts in the Western Ghats of Maharashtra and Karnataka. The species reported from Sindhudurg district of Maharashtra has been named Eriocaulon parvicephalum (due to its minute inflorescence size), and the other reported from Kumta, Karnataka is called Eriocaulon karaavalense (named after Karaavali, Coastal Karnataka region)

The discovery was made in the Western Ghats while tracing the evolutionary history of the genus Eriocaulon.

Six new mushroom species unearthed in the UK

Image by Andy Overall

In 2020, six new species of webcap toadstool mushrooms have been named. Three were found in Scotland and three in England. All are in the genus *Cortinarius*, which supports the growth of trees such as oaks and pine. One of the species, *Cortinarius heatherae* (pictured), was found by a river on the boundary of London's Heathrow airport.

New plant or raw French fries ?

Image by Hawai'i DLNR

It doesn't exactly fit the description of a flowering plant, but that's what the *Cyanea heluensis* is. This rare new species was found in a West Maui rainforest by botanist Hank Oppenheimer and his colleague Jennifer Higas. Although scientists have not been able to find any other *Cyanea heluensis* plants, they have determined it is a relative of the native vegetation on an island known as hāhā. However, it differs in its appearance with curved, long white flowers that some might say look like raw fries or overgrown fingernails.

The wild ginger named after an Alabama teacher's mother

It doesn't always take a professional botanist to find a new plant species. Alabama high school teacher Brian Finzel discovered what is now known as one of the state's rarest vascular plant species while he was hiking along the Tennessee River. The new species, *Hexastylis finzelii* or Finzel's Wild Ginger, was named after Finzel's late mother, Ginger Finzel and published in the December 2020 issue of The Journal of the Botanical Research Institute of Texas. It is related to two other species of ginger found in Alabama, but its flower structure and habitat set it apart from others.

Image by Alan Cressler

The world's ugliest orchid

This is a discovery possessing serious 2020 energy. The *Gastrodia agnicellus*, a flower that was found in a Madagascar forest and named last year, has been dubbed the ugliest orchid in existence by staff at the Royal Botanic Gardens in Kew, London. The *Gastrodia agnicellus* has a withered flesh like appearance, with no leaves, a red inside and a brown outside. The plant grows from a wooly stem and has flowers only about 11 millimeters in size once it is pollinated.

Image by Rick Burian

Orchids galore described in New Guinea

A newly discovered orchid in New Guinea, *Bulbophyllum dologlossum*

An astounding 19 species of newly described tree-dwelling orchids were found on the biodiverse island of New Guinea by an orchid specialist from the Royal Botanical Gardens, Kew. Three of the new species are in the *Dendrobium* genus, known for its beautiful flowers. The other 16 species are in the *Bulbophyllum* genus, which are generally fly-pollinated and thus have flowers that appear to be hairy like a mammal. New Guinea has the highest number of plant species as compared to any other island, and researchers believe there are still many species here yet to be named.

This scaly shrub species became a whole new plant family

Tiganophyton karasense with its unique scaly leaves. Image by Wessel Swanepoel.

A new, unique, evergreen shrub, *Tiganophyton karasense,* was found in southern desert of Namibia. DNA analysis revealed that the dwarf shrub was distinct enough to be considered its own family, *Tiganophytaceae*, within the order Brassicales, the same as broccoli and cabbage. It has scaly leaves and thrives in the salt pans of the semi-desert, surviving in temperatures as high as 36° Celsius (96° Fahrenheit). Fewer than 1,000 individuals are known to exist.

Prerna Sharma
B. Sc. (H) Botany 1st year
Hansraj College

Harry's Musing's - A blog series for lives intoxicated on LIFE!

1. Ekagra Chitta

Recently I saw the movie "The Walk" which is the story of a French High Wire Artist who walks between the Twin Towers of the World Trade Centre on 7th August 1974. I was sitting on the edge of the sofa through the movie and couldn't imagine why someone would want to do such a crazy thing at the risk of one's own death. It reminded me of the famous reply by Mountaineer George Mallory when asked by a journalist "Why do you want to climb Mt. Everest?" which was "Because it's there". I am sure there are many more stories of adventurers, artists, scientists who have not given up despite repeated failures like Edison and his invention of the light bulb despite repeated failures he said - "I haven't failed -- I've just found 10,000 methods that won't work."

To expand the boundaries of human possibilities, it is these crazies who have done it and are still doing it. The crazies know that time is limited and that they need to do their bit quickly in order to raise the bar for the next generation to take it to the next level. What stuff are these men made of? The same stuff as you and me except that they choose to live with an attitude of enjoying challenges and surmounting them. Most people say you should take only what you can handle, the crazy attitude says to take up more than you can handle and increase the bar. Now more than ever we require an attitude of facing challenges

and enjoying the process. Do you think all crazies that lived years ago did not have crazy situations? No, they did what they did regardless of the craziness around them.

God has gifted humans with an indomitable spirit of resilience and all we need to do is choose one area of our liking and put our efforts to excel in that - whatever it may be - For Buddha it was enlightenment, For Michelangelo, it was painting, For Mother Teresa it was service, For Gandhi it was Freedom, For MS Dhoni it was Cricket, you get the point. Choose one area of focus and lose yourself in challenging the existing limits in that area - that would be a life certainly well-lived regardless of whether you achieve your goals...

In Yoga this is called an Ekagra Chitta: focused on one...It is possible for all of us. Why not try?

2. For-give, not for-get...

Life is simple but we complicate it. Nothing is "Expected" of us, it is our imagined expectations of ourselves and others that create problems in the first place. We are just a minuscule piece of energy experiencing life in this world which is itself insignificant as compared to the universe. Our intellect urges us to try to figure out the reason for all this creation but in the process we ignore the simplest principles of life & complicate things for ourselves & others.

Everything is temporary - including your time in this world, your body, mind, and everything that you see around. You are a visitor, at best who has been given a suit (body) and mind (cognitive & communication) abilities. You want to find out why instead of doing the work you were sent here to do in the first place - your karma. The intelligence that has created this wonderful creation knows what it's doing, it doesn't need our esteemed advice.

If you simply accept that you have a car - first learn to drive it without hurting others and enjoy the car & the sights around. Keep it simple - live by a simple code that helps you and all others experience their short time called life in as good a way as possible. You can't make others happy if you are not happy yourself. Being happy is living simply. Just switch the paradigm of your life from getting to giving. Takers may eat better but givers sleep better.

Life is for giving & forgiving and not for getting & forgetting...

3. Disso l(o)ve: find love within

Aasman ko zamin... ye zaroori nahi jaa mile (the sky doesn't have to meet earth), Ishq saccha vahi... jisko milti nahin manzilein...(only the love that doesn't seek/find a destination is true love). Lyrics from a song recently released that point in the direction of unconditional love. Loving a person, thing or an idea is an expression of our preferences that could change in the due course of time and owing to circumstances. Love is a state of being that was experienced by Radha / Meerabai / Kabir is completely different from love for people/ things/ ideas. Love as a state of being, that can be experienced only when you dissolve all identities that you have built around yourself - as in the words of Rumi - Your task is not to seek for love, but merely to seek and find all the barriers within yourself that you have built against it.

Dissolving identity is a path of Bhakti Yoga - it is recommended especially for people who are very emotional. There is no structured approach to dissolving identities since you are the one who has created them and holding on to them. Another method is that of Gnana Yoga for people who are inclined to experience life from an intellectual perspective. In the words of Sherlock Holmes, a character created to be a great logician, "when you have eliminated the impossible, whatever remains, however improbable, must be the truth...This is a method of using intellect called "Neti" (Not this) which involves observing yourself and letting go of who you are not and then what remains would be who you truly are - your state of being of which love/bliss is a quality experienced.

Harjinder Singh Kandra
B. Sc. (H) Botany
Hansraj College (1996)

Dam Construction Associated Floods: Impacts, Strategies and Future Perspectives

Introduction

Consider a situation wherein an ongoing dam construction, on the tributary of Brahmaputra River in the state of Assam, leading to floods and associated crises.
Several rampant earthquakes induced landslides, which ultimately led to the collapse of the dam. Due to damages to the unconstructed dam wall because of recent landslides and heavy rainfall, the dam collapsed releasing 75 GL of water downstream to the civilized areas. Other reasons speculated for the dam fiasco were - unfit site for erecting a large structure as that of a dam due to unsuitable soil properties and frequently changing course of the river.
Other problems which could've led to the dam failure can be figured out as improper grouting of the crevices in the foundation rocks and filling up the ground pits to ensure a fortified dam. Moreover, the area chosen for dam construction has undergone several mild and severe earthquakes in the past, which makes it further unsuitable for any large constructions. Soil erosion due to deforestation in the catchment area, resulting in frequent landslides. Due to downstream flowing of water into the town, destruction of property, loss of lives along huge detriment to environmental, social and economic sector occurred.
After the collapse that released around 75 GL of water perpetuated many harmful effects and other problems due to flooding like diseases, casualties, physical damages to people and homes, transportation losses, electrical losses, industrial losses, and even incurred losses to the economy of the country.
The whole geomorphology of the already very unstable site made it more prone to such disasters shortly. The River was said to show a change in its course for upto 30 km in 4 years but now, with the advancements of the flood and endorsing effects of the seismic activities in the year, the period is predicted to be reduced to a greater extent.
Assam is situated in such a geographical location where the rivers flowing through the Himalayan region flow down and get merged with the Brahmaputra. The tributary here rises from Bhutan and flows through Assam. So, any extra water released from the dams can lead to enormous inundation of the Brahmaputra valley. The track record of Assam is such that almost every year approximately 20 out of 35 districts are flood-prone and more than 50,00,00 people get affected. The releasing of water from dams from uphill has been the main cause behind the devastation of many districts of Upper Assam (northeastern part of Assam). Hydraulic modelling and GIS have a sufficient range of functionality to be able to produce the flood spatial area, flood depth, and vulnerability of the region based on available data.

The proposed hydroelectric project of the dam (under construction which has now broken) increases the severity of the flood impacts and covers large inundation areas around the river. Big stones/ boulders are used for dam construction, the sources of which are mainly from the rivers both at the hills and plains. Geophysicist believes that a huge stone /boulder contains silt or sand beneath it amounts to four times of its weight stop so, when boulders of stones removed, the Centre and sand being exposed are carried out by the water and resulted leveling the reverse at downstream higher than the banks and flood the adjoining areas. Increased rainfall (in the 3rd week of June) and release of dam water at the same time worsens the situation. The depth and the velocity of water along the inundation area due to the release of 75 GL of water from dam failure are expected to be huge.

Dam failure has both direct and indirect impacts. Direct impacts mainly include Dam benefits losses, Downstream property damages, and Dam repair/replacement costs. Dam benefits losses include the lost benefits from the undelivered supply of irrigation water i.e. lost in the agricultural field. Dams and reservoirs often provide Flood Damage Reduction benefits either through the reservation of a space or by act as a reservoir to meet other projects. Loss of water reserved due to dam failure will affect the Fish and Wildlife purposes. Downstream Property damage includes the replacement costs of residential, commercial, and industrial property as well as infrastructures such as roads, bridges, railroads, and utility lines. Dam replacement costs are determined based on their original construction costs. Indirect impacts refer to the country-level changes in business output and changes in employment from failure scenarios. Indirect impacts mainly include labor and capital reduction due to flooding, water shortage due to reduced agricultural deliveries, loss of tourism, etc. The capital reduction includes the percentage of productive capital loss due to dam failure. Labor cost is determined by the number of displaced and unemployed individuals. Capital and Labor reduction have also taken the loss of physical infrastructure into account. Dam failure also results in a decrease in the Gross Domestic Product(GDP), as the economy is directly affected due to dam failure i.e. changes in employment, farming effect, changes to inter-regional trade (imports and exports to domestic and international partners).

Diseases associated with Dam failure and subsequent Flooding

The dam failure leads to the accumulation of contaminated floodwater due to improper drainage and water outlet facilities. Thus, a major detriment caused here to the general public due to dam failure-induced floods is public health emergency. Discharge of fecal matter and presence of other pollutants render untreated flood water to be the source of various fatal water-borne, vector-borne, and other skin diseases, allergies, and fever. Here, we illustrate to you the spread of few common diseases pernicious for the population of flood-hit Assamese state.

Water-borne: Diseases spread from polluted water are most common in flood-affected areas due to the accruement of it in the lanes and residential regions. The most common and fatal ones are Diarrhoea and Dysentery coupled with fever.

1. Diarrhea: Diarrhoea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual). It is usually a symptom of an infection in the intestinal tract, which can be caused by a variety of bacterial, viral, and parasitic organisms. Infection is spread through contaminated food or drinking-water, or from person to person as a result of poor hygiene, and its severity increases in flood-struck areas.

2. Dysentery: Dysentery is bloody diarrhoea, i.e. any diarrheal episode in which the loose or watery stools contain visible red blood. Dysentery is most often caused by *Shigella* species (bacillary dysentery) or *Entamoeba histolytica* (amoebic dysentery).

3. Vector-borne diseases: Floodwater is the breeding site of various disease vectors especially mosquitos which are known to spread a plethora of diseases to humans. The most common ones in Assam state are Japanese Encephalitis and Malaria.

4. Japanese Encephalitis: Japanese encephalitis virus JEV is the most important cause of viral encephalitis in Asia. It is a mosquito-borne flavivirus and belongs to the same genus as dengue, yellow fever, and West Nile viruses. Most JEV infections are mild (fever and headache) or without apparent symptoms, but approximately 1 in 250 infections results in severe clinical illness. The incubation period is between 4–14 days. In children, gastrointestinal pain and vomiting may be the dominant initial symptoms. Severe disease is characterized by rapid onset of high fever, headache, neck stiffness, disorientation, coma, seizures, spastic paralysis, and ultimately death. JEV is transmitted to humans through bites from infected mosquitoes of the Culex species (mainly Culextritaeniorhynchus). Humans, once infected, do not develop sufficient viremia to infect feeding mosquitoes. The virus exists in a transmission cycle between mosquitoes, pigs, and/or water birds (enzootic cycle).

5. Malaria: Malaria is caused by *Plasmodium* parasites. The parasites are spread to people through the bites of infected female *Anopheles* mosquitoes, called "malaria vectors." Malaria is an acute febrile illness. In a non-immune individual, symptoms usually appear 10–15 days after the infective mosquito bite. The first symptoms – fever, headache, and chills – may be mild and difficult to recognize as malaria. In most cases, malaria is transmitted through the bites of female *Anopheles* mosquitoes. In many places, transmission is seasonal, with the peak during and just after the rainy season. Chemicals released due to flooding affect people in the surrounding and within the nearby radius. Exposure to the floodwater occurs in many ways like ingestion of the contaminated water, swimming, and even via the diet.

Flood water leads to the mobilization of various harmful chemicals, which are otherwise present in the environment. Migrations of chemicals occur in various ways, like leakages from the underground fuel tanks, Pesticides in the soil, etc. These chemicals lead to a variety of diseases like Cancer, Cardiovascular diseases, Neurological diseases, Miscarriage, and Carbon-monoxide poisoning. Accumulation of heavy metals and other chemicals like dioxins can be seen in the soil, these chemicals cause bio-magnifications and are transmit through the food chains for years. Flooding poses damage to the electricity of the town, leading to an increased usage of oil lamps and other sources, which further lead to the accumulation of oil and gasoline, causing health hazards like Asthma, TB, Bronchitis, etc.

Proposed Strategies to combat the problems/challenges associated with water quality and public health

1. Immediate Strategies for Water Quality

Storing water from underground sources in dams can result in a rapid deterioration of water quality due to evaporation and the associated concentration of dissolved salts. Unfenced catchment dams can be easily fooled by stock wading and defecating in the water. Poorly vegetated catchment areas can result in significant quantities of organic matter, manure, fertilizer, and soil entering the water supplies. The following strategies can help to maintain good water quality:

1. Store saline water in tanks rather than in dams, as storing water in dams' results in deterioration of concentration of dissolved salts.
2. Fence off dams and reticulated water into troughs for stock
3. Protect dam catchments with good ground cover and maintain a grassed filter strip at the dam inlet
4. Clean troughs regularly to avoid any contamination.
5. Establish windbreaks adjacent to dams to reduce evaporation
6. Construct sediment traps to protect dams during high-risk periods.
7. Enhancing local water storage in ponds or lakes through small structures, connecting channels, and measures to encourage groundwater recharge, such as the traditional 'tank' system in Southern India.

2. Midterm Strategies for Water Quality

Water quality is adversely affected during situations like floods and other catastrophic events. The integration of sewage water in drinking water is the major problem, and adverse effects are seen on the groundwater table and the groundwater in general. Because of the degraded soil quality, chemicals and other harmful substances from the soil are also leached into the groundwater. All these reasons and many others create harmful effects on the quality of the water, extensive measures have to be then taken to tackle these problems even a varied amount of time has elapsed, some of these Midterm impacts can be tackled by the adaptation of following strategies -

1. Installation of water purification systems both at an industrial and domestic level can be achieved by either practising traditional water purification techniques or utilizing new adapted and innovative technologies, which not only are more environmentally friendly but less expensive also. Example- Using the silica obtained from the sugarcanes for the purification of water.
2. Installation of rainwater harvesting systems to replenish the lost groundwater and improving its quality utilizing chlorination and treatment with UV light.
3. Building Embankments, floodwalls, and sea walls to prevent floods, in the future.
4. Installation of proper sewage treatment plants that will provide immediate purification of water, techniques like electrolysis can be used to get pure water on a large scale.
5. Installation of sewage pipelines that are situated deep inside the ground surface of the earth, will ensure minimal invasion of such dirty and contaminated water with the fresh and natural water bodies.
6. The barrier can be created in the existing sewage plant treatment and rubber sewage pipes can be preferred that are unbreakable, made up of silicon, and can withstand the effects and breakage caused due to the high pressure of water during a flood.

3. Immediate Strategies for Public Health

In a given inundation area, a lot of steps have to be taken up by the Government, non-governmental organizations, and even the people around to protect themselves and the economy from a disaster which has occurred. All the forces are put into action immediately and start performing their part. While both the water quality and the architecture are severely affected, other areas are also of important concern, The Public Health of the community is at Stake and requires immediate actions, the following are a few strategies that can be implemented to tackle this problem-

1. Robust surveillance of the community regarding the immediate needs (food, water, and sanitation), the available resources, disease outbreaks, and effectiveness of the current efforts is to be conducted during and after the event.
2. Adoption of an Emergency action plan which outlines deployment and duties of public health department staffs.
3. Providing awareness, training to the general public regarding health care and empowering them with means to reach the responsible authorities in case of health emergencies.
4. Legislations and Acts concerned with disaster mitigation funds should be given impetus for immediate delivery of funds to the respective authorities.
5. An increase in the budgetary shares and other facilities like hospital cost waiving policies, health insurance, etc can be covered up in legislation and policies depending on the severity of the impact.
6. Provision of foods and medicines at a subsidized rate or free of cost.
7. Emergency Drinking water facilities like tanks, bottles, water purification plans, etc.

8. Vaccinations are required to prevent the further spread of the epidemic. The first round of vaccination is recommended for selected high-risk individuals such as public utility workers.
9. Safe location site for relief camps, frequent cleaning around the site, avoiding overcrowding, and commotion-free environment.
10. Supply of essential drugs, medicines, and other wares like gloves, disinfectants, etc.
11. Earth stabilized raised pit latrines, step latrines are recommended for use in sanitation purposes so that no flood water reaches up. Packet latrines, bucket latrines with lids are also favourable options.
12. Evacuation and Rescue operations for the vulnerable groups first.
13. Management of dead bodies of humans and animals quickly, safely with care.
14. Air ambulance, multipurpose health service centres, deployment of doctors and nurses at relief camps for providing immediate health service.
15. Redressed affected hospitals' infrastructure to resume operations.
16. Immediate Communication (walkie-talkies, sirens, and mass media) and transport options (bailey bridges, boats, and airways) should be provided for proper delivery of health care facilities.
17. Search for ways to drain the vast flood water quickly to prevent the spread of various water-borne diseases. The use of big sewage pipes, digging up new diversions and channels for flood water to reach seas and lakes sooner, and removing the debris, filth in local gutters for free flow of water are some ways.

4. Midterm Strategies for Public Health

Apart from the adverse effects seen on the quality of water, the overall public health of the inundation area is also affected, it not only accounts for the various diseases that are either waterborne or vector-borne but also other issues that pose health hazards like sanitation and hygiene that is affected. Extensive measures have to be then taken to tackle these health problems even after a varied amount of time has elapsed, as their effect may create a prolonged and continuous cycle of diseases in the environment. Some of these Midterm impacts can be tackled by the adaptation of the following strategies –
1. Provision of medical insurance for people of the flood-prone area covering flood as a natural calamity and benefiting them in need.
2. Vaccination facilities to be made available to the people of the affected area.
3. Setting up medical camps for a free checkup and easy and cheap availability of medicines.
4. Setting up of awareness programs and campaigns for enforcement of a 'Code of Conduct' in the situation of a flood, and how to prevent spreading of diseases (toiletries in compliment for the attendees) and regarding logging of water in households and how to maintain an efficient outlet and drainage system in households to battle water and vector-borne diseases domestically utilizing trending slogans.

5. Installation of modernized and advance flood forecast devices or instruments in that area, thus fortifying the procedure of flood forecasting and management in the area by being prepared for it beforehand.
6. Storage of safe food grains, water, medications, and other commodities on the onset of monsoon season in the area is sanitized and safe chambers in the region.
7. Insurance of proper safety and sanitation in the workplaces and factories and situated in the area especially food processing industries.
8. Regulation and raising awareness regarding conduct during the flood and rainy season in educational institutions.
9. Safe and quick burial and management of dead bodies of humans and animals.
10. Installation of Water Purification Systems and Ground Water Treatment Systems both at domestic and industrial level.
11. Fund collection for reimbursement of flood-struck families.
12. Availability of sanitation facilities like Packet latrine, bucket latrine (with a lid), etc. for easy and safe disposal of human waste.
13. Availability of medical facilities like Air Ambulances and multipurpose health service centers.

Conclusion and Next Steps

1. Decision on demolition or reconstruction of the dam

The site as already explained is quite unfit for the production of a dam and hence the dam should be demolished and to meet the electricity and irrigation need for the town, alternative methods must be used. For Electricity, the construction of small hydropower plants must be installed in the adjoining areas. Rivers themselves are known to act as a barrier to floods and such catastrophic disasters, provided they are given adequate space and efficiency to carry the rainwater, if the geomorphology of the area and the river flow is not changed, such disasters can be easily avoided, but with the current human involvement, such processes are tough to be administered. The development of small tunnels beneath the river basin for the collection of water must also be created, these ensure that the river does not overflow on the onset of rain and can sufficiently take the upcoming rainwater. The development of these concrete tunnels will also ensure the availability of water for irrigation in the adjoining areas.

2. Architecture and design of flood-prone cities and towns + Better sewage capacity and installation of devices enabling better water percolation in the soil

The architecture makes homes more flood-proof by providing ample space between the ground level and the building. To create that distance, stilts are commonly used. In terms of design, stilts pose is a difficult challenge. The architect should balance the functionality and quality of the supporting columns and beams and also take care that designs should look good. The most common solution for flood-resistant home design is to incorporate a retaining wall into the site's landscaping design, along with trees and plants which will reduce soil erosion.

The foundation of the walls will need to be a minimum of 1.2 meters below the surface and the height of the wall will need to exceed the typical flooding depth of the flood zone so that overflow from flood, water does not enter the space. Windows in flood zones should be smaller but thicker than a single pane. For larger windows, an architect must use windows with metal supports or frames and also ensures that the height is above the flood level or able to keep water out. Doors should be raised above the ground level requiring more stairs to access. They can be made from metal, or at least the things which are less susceptible to damage than wood.

3. Resilient agricultural practices to tackle the growing need and Ethnobotanical perspective

Flood may be forceful, unpredictable with varying intensity, so by improving the distribution of water, by putting in place the water control structures, we can avoid the risk of waterlogging, soil erosion, and many more. By avoiding steep water (water with greater speed), it will help steer water safely. We can also put 'Flood Bed Stabilizers', water spreading weirs. Making dikes and soil bunds will help in preventing the field from unexpected flood. Drainage ditches would be benefited to channel away excess floodwaters. To avoid overexploitation of groundwater, several strategies should be adopted such as rope pumps, treadle pumps, motor pumps, and solar-powered pumps. Farmers can also adopt Agronomic Strategies such as introducing crop varieties that are better suited for flood-based farming systems, such as very fast-growing floating rice varieties, which are grown in areas such as Mali and Myanmar. The creation of a green belt by planting mangrove trees is also considered to be an effective measure for flood protection.

4. Increasing awareness and education about disasters and mitigation plans

Widespread education and awareness bestow every section of people with central responsibilities to deal with natural disasters. The general public should be made capable to make the required preparations to minimize the loss of life and injuries during and aftermath of the flood event. Education and the required experience of these can be provided through different platforms like including in-school curriculum for the student; disaster-related health awareness programs in mass media like radio, television, and journals; observing disaster day exercises; Poster campaigns showing photo graphical evidence of ways adopted by different states and countries to solve health issues during and after the disaster, empowering the people with medical kits and training for first aid measures; forming links to correspondents of various health centres for emergency access.

5. Medical and public health care competency

Additional funding should be provided for flood preparedness. A medical facility should have a flood plan concerning capacity and human resource (doctors and nurses) surge. Routine flood preparedness training should be given to employees and staff. A plan to ensure continuity of hospital supply and delivery chain is a must. Connections with nearby hospitals and health centers are required for coordinated efforts.

Special units like surgical operation units should be positioned above the presumed flood water level. Health institutions should be provided access to data (which includes population and epidemiological data) for proper planning and management. There should be recognition and support of traditional and indigenous disease cure techniques.

The equal focus should be also on the prevention of the spread of epidemic through vaccination. Deployment of medical correspondents to far fling areas are required for easy and proper access to health services, equal emphasis must also be laid on mental health since, people are mostly affected mentally under such circumstances, and as we know that the complete wellbeing of a human is important, therefore, we must pay equal emphasis on the mental health of individuals as well.

6. Economic policies and employment schemes

Flood management policies are always employed by taking into consideration the public policy framework, Both EIA (Environment Impact Assessment) and SEA (Strategic Environmental Assessment, play an important role in regulating this framework. Flood management policies go hand in hand with the economic and employment policies laid by the government. Such policies take into consideration the impact factor of the disaster as well as they play an important role in accessing the risk associated with the given policies. Strict laws must be there for the implication of various existing flood employment laws, which include giving complete pay to the people during natural disasters, increased emphasis must also be laid on creating employment for people like farmers and other small businessmen whose work was destroyed due to the flood, furthermore, a business loss compensation must be introduced by the government, especially for the flood victims and more employment opportunities in the public sector must be generated for such people.

7. Community partnership

For effective execution of any plans and full development of various flood-related mitigation efforts, it is required to have the participation of the respective community of the particular area from the initial phase of the planning process. Community involvement in planning imparts a sense of satisfaction to the public and strong public support towards implementation.

The community can work for flood preparedness in many ways. Volunteer teams should be arranged for a 24-hour flood watch, stationed at major dams and rivers. They are responsible for providing information to the public about the location of safe heavens in case of floods and shorter routes to it.

Every member of community clubs should maintain a phone directory for the district, state, and national emergency health lines. First aids training can be given to the public to handle an emergency at first sight. They should be given the prime Authority for management of community health centres (as a result of the decentralization of power of local government) for proper redressal of any issues. Monthly/annual surveys should be conducted regarding the health status of different areas under its jurisdiction and consequently publishing the report for public awareness and Government recognition. Strict rules should be framed for enforcing the practice of hygienic habits among its people to prevent any spread of disease with punishment and penalty in case of violation. They should be engaged with routine and frequent cleaning of sewage and solid dumpsites of the area.
The community should be the middleman connecting the Government with various private organizations to bring out a coordinated effort regarding health security development. Creating a social amplification of raising Health awareness and concerns is what the community is responsible to take care of Community people should be made available for any rescue operations.

8. Management of low-level river bank human settlement

The management of low riverbank settlement proves to be of a great disadvantage and it is always preferred that the people should make their homes at some height with the ground and use proper flood-prone architecture, this ensures that even at the onset of the flood, the least damage is seen on the properties and other commercial buildings. More strict rules and regulations must be made by the administration regarding land reforms and land allotment for human settlement.

Figure 1: showing the course of Bharamaputra River in the north east side of ASSAM

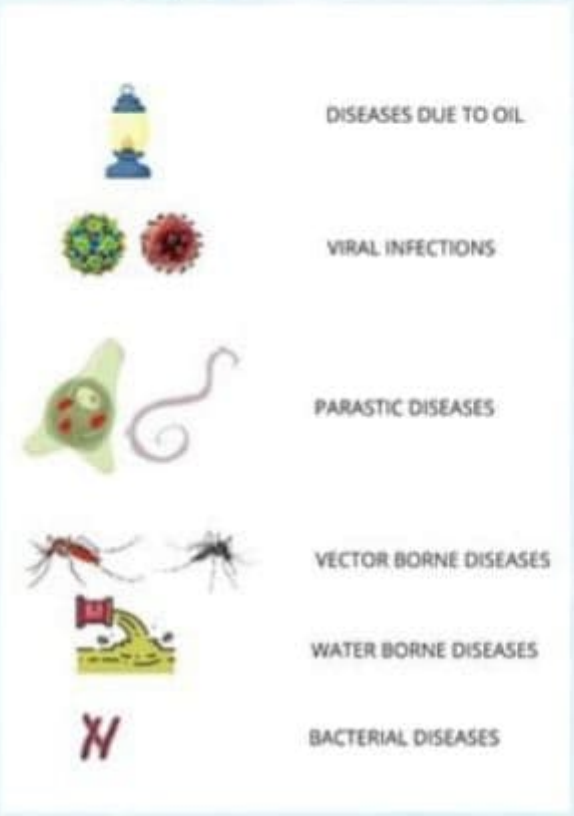


Figure 2: showing the types of diseases that may accumulate in an inundated area (Illustration)

STRATEGIES FOR MAINTAINING WATER QUALITY	
IMMEDIATE	MIDTERM
Storage of saline water in tanks and not in dams	Water purification systems at the industrial and domestic level
Fencing of Dam and it's protecting using good ground cover	Use of Silica for water purification
Cleaning of troughs to reduce evaporation effect	Installation of rainwater harvesting systems
Construction of sedimentary traps	Building Embankments and floodwalls
Promote reuse of water	Sewage treatment plants providing immediate or short term purification
Cleaning of possible water	Deep-rooted sewage pipelines
Enhancing local water storage in ponds and lakes	Use of rubber or silica-based sewage pipes, to ensure less wear and tear during flooding

Table 1: showing proposed strategies for maintaining water quality

STRATEGIES FOR MAINTAINING PUBLIC HEALTH	
IMMEDIATE	MIDTERM
Robust Surveillance	Medical Insurance
Emergency action plan adoption	Vaccination against diseases
Spreading awareness	Regular and free medical camps
Disaster mitigation steps	Awareness programs on code of conduct of flood
Food and other essentials at a subsidized rate	Installation of flood forecast devices
Evacuation and Rescue operations	Safe and flood-proof storage houses for groceries
Provision for proper sanitation facility	Proper sanitation facility in workplaces
Adoption of better drainage systems	Fund collection schemes
Provision for ensuring safe relief camps	Availability of advanced medical services
Provision for immediate and effective communication	Alternate, mobile, and effective sanitation facilities

References

- Akhtar, M 2020, 'A "Himalayan Challenge" for Assam', Northeast now.
- Amadeo, K 2020, 'Floods' Effect on the Economy and You', The Balance.
- Barrett, R 2014, 'Chemical Contaminants in Drinking Water: Where Do We Go from Here?' Environ Health Perspective, vol. 3, no. 122, pp. 80.
- Burton, H, Rabito, F, Danielson, L & Takaro, T 2016, 'Health effects of flooding in Canada: A 2015 review and description of gaps in research' Canadian water resources journal, vol.41, no. 1-2, pp. 238-249.
- Dasgupta, S 2010, 'Earthquake geology, geomorphology, and hazard situation in northeast India: An Appraisal', Research Gate, pp. 24-39.
- 'Dibang Project Cleared by Modi's Cabinet, Concern for Assam?'2019, News Click.
- Jha, P 2020, 'The most disregarded solutions to floods in India', The Times of India.
- Kalita, P 2016, 'Surprise water release from Bhutan dam floods 2 Assam districts', The times of India.
- 'Major disaster at Kopili Dam of NEEPCO in Assam'2019, Sandrp.
- Sulistyani, D, M, M & M, Si, 2016, 'Community Participation Helps Government in Flood Disaster Management', Scientific Research Journal, vol. 4, no.7, pp. 2201-2796.
- Villanueva, C, Kogevinas, M, Cordier, S, Templeton, M, Vermeulen, R, Nuckols, J, Nieuwenhuijsen, M & Levallois, P 2014, 'Assessing exposure and health consequences of chemicals in drinking water: current state of knowledge and research needs', Environ Health Perspective, vol. 2, no. 122, pp. 213-21.
- World health organization 2020, Japanese encephalitis.
- World health organization 2020, Malaria.

Manika Bhatia [B.Sc. Life Sciences, 3rd Year]
Ishita Singh, Shalini, Vineet Kumar [B.Sc.(H) Botany, 2020]

Maker of all

Everything bright,
Everything new,
A new day to you,
Baby birds are singing,
Grass shimmering in the light,
All creations he made,
No matter anyone's problem in life,
A new life,
A blessing to you,
Another day for all to keep on living,
Built from ground up,
The creator that is,
Without what was made,
You wouldn't be alive today,
Flower's blooming,
All colours as one,
In this blessing of a world we live in.....

Anshika
B. Sc. (H) Botany
Hansraj College

Sites in Spring

Merry blossoms all around
Mark and welcome onsetting spring
Oh, what a joy this brings!
When I hear the cuckoos sing

Young emergent tendrils coiling
Seeking as though hand in helping
Fresh leaves unfurling
Under shining sun rays
All in a bloom in a matter of days

Spring ushers cool fresh winds
Breezing with the utmost care
Fluttering flowers everywhere
Flowery showers when it brings

Majestic Gulmohar in all her Grace,
Standing tall and blooming red blaze
Casting her shadow on like a maze
Overlooking Junipers with a gaze

Youthful blooms are not in solitary
In fact, share a pleasant company
Of insects buzzing and wheezy
Pollinators like the humble bee
Decorated butterfly cheery
Glimmering beetles and lady bugs
Keep the roaring flora merry

Sugyan Preet
B. Sc.(H) Botany 3rd year
Hansraj College

Returning to nature

Nurturing all beings from start till the end
Mother Nature surely does tend
She is a constant source of inspiration
As she creates all walks of life with the same deliberation
Whether it be the evergreen forest; or the miniscule plankton
All are meant to coexist
With the same sense of zest

However to be fair
Ecological balance is rarely any one's care!

Instead of feeling rather inspired
We, humans give in to our numerous materialistic desires
There is a need to urgently conserve
Rather than encroach on Nature's bountiful reserves

To coexist in Nature requires all of us to act wisely
Loss of natural resources is pricey
Moreover Earth is an incredibly large biosphere
The only one sustaining life since yester-years.

Sugyan Preet
B. Sc. (H) Botany 3rd year
Hansraj College

A Reverie Odyssey

A tale roared inside
my, anatomical bricks.
I lurked upon glass window
and, stared the Sun.
Binary branches twig upon
grey fumes, rocketing clouds-
burning through concrete ashes,
That man, will eat it alive.
Is the Astronomer's umbilical cord,
still attached to greenish-blue globe?
Our primitive ancestors could,
again find the constellation guide?
First leap of faith of human kind
landed by a giant child,
These volcanic dreams
Now chasing alienated height.
Oh! Sunset mystic ocean,
I'm far away this twinkling sensation,
revolving into your Nebulae belly button,
After all I'm your star child,
longing to meet you soon!

Priti Yadav
Career Development Department
IMS Ghaziabad

Alternate Universe

I wish to explore an alternate universe,
Where being different is not a curse,
Where people don't forget our soldier's sacrifices,
Where we see a government free of vices,
Where colour and clothes are not genderized,
Where rape and assault are not normalized,
where partners still ask for consent,
where feminism is real and not just another internet content,
Where we realise climate change soon
Where there is no bane but only boon
I wish to explore an alternate universe

Ishita Banerjee
Department of Journalism
Kamla Nehru College

The War

The War began and we fought
Victory was our only thought
The War from nature completed
The nature got defeated
We won and we got civilized
But our nature got destroyed
Forests converted into deserts
Rivers into gutters
Air into gas chamber
Either we won or we lose
It is very difficult to choose
From this we gained a lot
But be ready to pay its cost
At the end I realised
We ourself got cheated
We are only one who got defeated!

Please conserve forests, wildlife, water bodies. Development is essential but it should be sustainable. Do not over use resources give it time to replenish otherwise in future the earth will be converted into Mars, there would not be a single place to live. THIS WILL BE THE BITTER END OF THE SUPERIOR, EXCELLENT, HIGHLY INTELLECTUAL HUMAN RACE!

Sarthak Agrawal
B. Sc. (H) Botany 1st year
Hansraj College

DEPARTMENT OF BOTANY
HANSRAJ COLLEGE
UNIVERSITY OF DELHI

Mahatma Hansraj Marg,
Malkaganj, Delhi-07

@hrcbotany

@hrcbotany