Anthesis
Volume 17 | 2021-2022

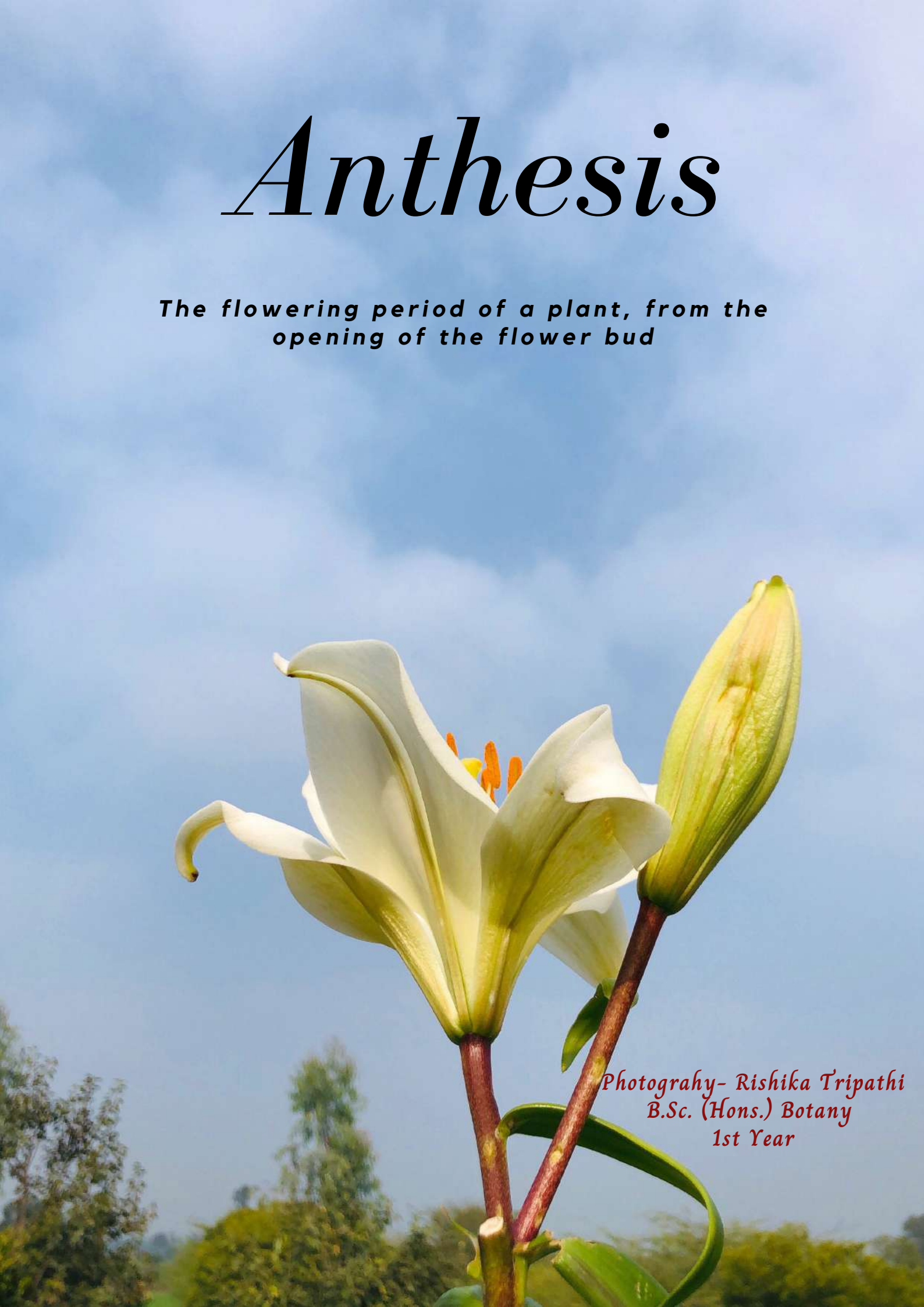
Altruistic Gaia

Still One Earth

Annual Publication
of
Gargi College Botanical Society (GCBS): TARU
Department of Botany
Gargi College, Siri Fort Road
New Delhi-110049

Anthesis

The flowering period of a plant, from the opening of the flower bud



Photograhy- Rishika Tripathi
B.Sc. (Hons.) Botany
1st Year

Anthesis

VOLUME 17|2021-2022

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STILL ONE EARTH: A KALEIDOSCOPIC VIEW INTO THE SUSTAINABLE FUTURE

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PRINCIPAL'S DESK

It is indeed a matter of pride to pen down the preamble for the 17th volume of the annual magazine “Anthesis” of the Botanical Society “TARU”. The human race to conquer everything possible including mother nature made us deaf about the signals that we were receiving in terms of polluted environment, unprecedented situations like the forest fire in Australia, flood in the desert of Saudi Arabia, uncontrollable air & water pollution in India to name a few. Climate change is an environmental challenge antagonizing all countries across the globe although the intensity may vary. Across continents, the adverse effects of climate change have been revealed over the years as ozone layer depletion, continental global warming, shower of acid rain, extended fires, melting ice, rise in sea level, and other extreme events which are alarming and need an urgent action at national and international levels.

This department is conscious about the environment. Its presence can be felt through plants, flowers, and scientific cataloging of the flora while walking down the corridors and lawns of the college. When the environment around you is clean, you experience a higher level of awareness and it helps you to see through things more evidently. This department is committed to provide an environment which enriches the intellectual and emotional development of students in an atmosphere that is vigorous, happy and nurturing.

The foremost goal of the college is to provide an education which explores and strengthens the potential which is innate in every individual but awaiting expression. Taping the vast potential of our students through such magazines and newsletters is one such endeavour in this direction. I congratulate the editorial team and contributors for this magazine and eagerly awaits the coming issue of “Anthesis”.

Prof. Promila Kumar
Principal, Gargi College
University of Delhi

TEACHER INCHARGE'S DESK

With all the exciting time whole year long, I am thrilled and humbled to see the success of departmental activities and events that are undertaken by GCBS- TARU team and Department of Botany and are presented so well under the one roof, ANTHESIS. It clearly represents the department's sound literary, educational, and other efforts. The well-composed magazine strongly reflects the well-organized structure and functioning of the team. It has provided new dimensions to the students to learn and to concentrate their thoughts and ideas as well as made them disciplined to be better leaders for tomorrow. It has the potential to educate, upgrade their skills and prepare students for the various roles in society that they will undoubtedly play in the near future. Throughout the journey, students from all the courses got fantastic opportunities to showcase their wonderful abilities. The whole year, the different inter and intra college activities have opened new avenues for the students to explore, participate in many competitions, and during which they came out with flying colours by winning many. Diverse responsibilities during organizing events, and compiling ANTHESIS has given new feathers to the students. Students must have got great exposure and greatly benefitted from the guidance of their mentors.

The magazine is a comprehensive booklet of recent and updated knowledge and information since it contains useful pieces written by our extraordinary students, most loved teachers, and adorable alumni. Thus, a magazine has a valuable role in the life of college students who have compiled ANTHESIS as well as for the readers. Among alumni, the magazine is cherished always as it revives their memories. Heartiest congratulations to the ANTHESIS team members and wish them "Good Luck" in their future endeavours and hope that the students of the Botany Department bring more laurels to the college as a whole.

Dr. Renu Soni
Teacher-in-Charge
Department of Botany

EDITOR'S DESK

The Gargi College Botanical Magazine- ANTHESIS, as an intellectual and creative forum has provided to the students expansive learning opportunities in scientific researching and writing. While working on ANTHESIS, the editorial team has received nonpareil training which has helped us to develop an aptitude of critical thinking and comprehensive refinement. Each and every challenge that we overcame along the way- from contemplating on the theme to the final compilation was filled with countless lessons for us and for this the team is laden with gratitude towards the faculty and all teachers of the department for their constant guidance and motivation. Their efforts have not only brought out one more best version of Anthesis, but has also shaped the minds of students on board.

This year's theme- 'Altruistic Gaia: still one earth' is both an ode to the selfless Earth and a rouse for this generation to step in and take charge of the future. We wanted to put the lime light on the innumerable ways plants in nature have provided more than enough for sustenance of life, plants indeed hold potential to also serve as damage control for the ill effects that anthropogenic actions have administered. While we go through the current climate crisis, The Gaia Hypothesis stands at the threshold of hindsight, highlighting the importance of species interconnectedness- that all life forms exist in numerous intricate relationships with each other. The collapse of one is bound to cause the dominos to fall, disrupting not one other but many webs of life.

There is none but one earth and it is silently weeping under the cascading anthropogenic demands. Anthesis wished to draw a bead on this urgency by elucidating how all species function as a single entity to maintain the continuum of life along with briefing some of the latest researches and technologies that will promote a more sustainable future.

Jayati Pandey
Editor
Anthesis 2021-2022

The Department of Botany

2021-2022

Gargi College

Pillars of Department of Botany

Beloved, late Superannuated Faculty

Dr. Chhaya Biswas (August 17, 1932 to February 3, 2012)
Dr. Lalita Sehgal (November 21, 1942 to August 12, 2016)
Dr. Bharti Bhattacharyya (December 26, 1942 to March 23, 2018)

Superannuated Faculty

Dr. Pushpa Markandan
Dr. Ahalya Chintamani
Dr. Krishna Kumar
Dr. Shashi Tyagi
Dr. Usha Prasad
Dr. Gita Mathur
Dr. Kiran Prabha
Dr. Geeta Mehta


Dr. Pushpa Markandan


Dr. Krishna Kumar

Teaching Faculty

Dr. Aparajita Mohanty
Dr. Priyanka Pandey
Dr. Leisan Judith
Dr. Geeta Prabhakar
Dr. Jasmeet Kaur Abat
Dr. Renu Soni
Dr. Reema Mishra
Dr. Vera Yurngamla Kapai
Ms. Ruchitra Gupta
Dr. Anjana Rustagi
Dr. Garvita Singh
Dr. Samira Chugh
Dr. Gladys Muivah
Dr. Preeti Agarwal
Dr. Neha Singh
Dr. Akanksha Madan
Dr. Sumit Raj
Dr. Pritam Kaur
Dr. Amrita Singh

Non-Teaching Faculty

Mrs. Munni Sharma (Retd.)

Mrs. Shashi Bala

Mr. Ashok Rana

Mrs. Rajni

Mr. Arun Kumar

Mr. Panchan Singh

Mr. Vijay Kumar Pandey

Mr. Hansraj

Mr. Amit Kumar

Mr. Gopal Kumar

Faculty Advisors

Dr.Garvita Singh

Dr.Preeti Agarwal

Dr.Pritam Kaur

Dr. Akanksha Madan

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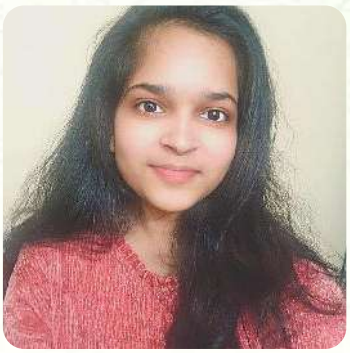
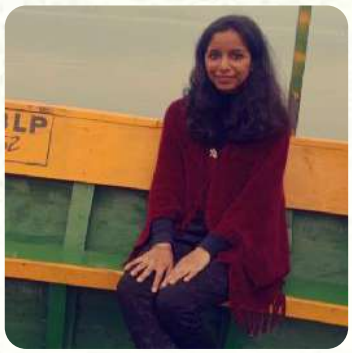


EDITOR
Tanya Dogra



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Ananya Chamola

EDITOR
Janvi

EDITOR
Anshita Bhatnagar

EDITOR
Ananya Tomer

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Mahira Zabeen

CREATIVE MEMBER

Rukhsar Bano

CREATIVE MEMBER

Khushi Bansal

CREATIVE MEMBER

Sucheta Barman

Batch 2022

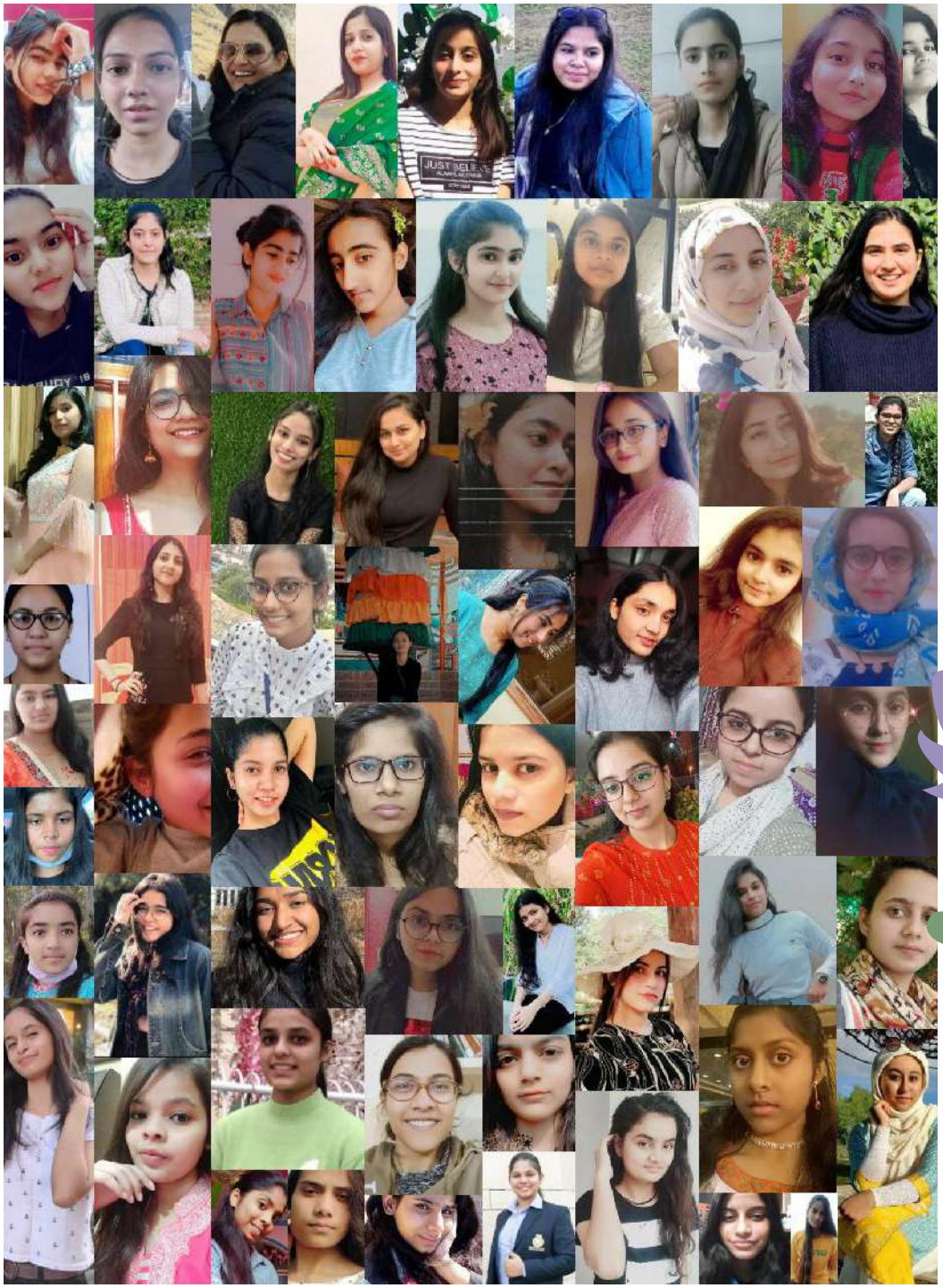
Akshita, Prachi, Raidhani, Monika, Akanksha, Nasra, Kunchuk, Sapna, Sakshi Sharma, Kavita, Shephali, Niva, Sneha, Sakshi Pandey, Riyanshi, Bhoomika, Priyanka, Bhawana Himanshi, Rakhi, Manisha, Rashmi , Anjali, Divya Goel, Rupal, Jayati, Nisha, Bisma, Elone, Khushi, Astha, Pallavi, Nima, Shikha, Tanya, Ritika, Ayushi, Divya Mangla, Shrishty, Lyangmith, Shreya, Muskaan, Kanishka, Sakshi Nain, Shruti, Varsha, Nidhi.

Batch 2023

Adithi, Akshita, Ananya, Anjali, Ankita, Asfiya, Deepanshi, Disha, Devyani, Geetanjali, Hansa, Kalpana, Kesang, Khwahish, Kirti, Komal, Maitreyee, Mallika, Mausam, Moumi, Nandita, Nidhi, Nisha, Nishu, Padma, Prachi, Pragati, Pragya, Pratima, R Bhargavi, Rakhi, Riddhi, Rishita, Riddhima, Riya, Samisksha, Shagun, Shalu, Shefali, Shikha, Siya, Shruti, Simran, Shubhi, Sonal, Soniya, Surbhi, Swati, Tamanna, Tejsevi, Vanshita, Vishakha, Yashasvi, Yogita.

Third year &
Second year class

Batch 2024



Saloni, Isha, Srishti, Manisha Singh, Kusum, Mahira, Neha Kaswan, Ananya Tomer, Harsita, Bhoomika, Lalita, Meenu, Pinki, Ankita, Radha, Bazila, Aditi, Sanika, Neha Kumari, Kashish, Vanshika, Sucheta, Komal, Isha Vishnoi, Anshita, Drishti, Pearl,Sudeepa, Neha Negi, Ananya Smriti, Sakshi, Muskan, Saniya, Niti, Vandana, Swathi K, Janvi, Rukhsar, Suhani, Urooj, Nancy, Chayanika, Pallavi, Rishika, Prajna, Akshra, Riya, Alsa, Jaya, Yashee, Shivani, Manisha Ahirwar, Aadhya, Rolly, Krishna, Devashi, Nishu, Leena, Prerna, Khushi, Suhasini, Ananya Dahanwal, Anushka, Fatima Sugra Razvi.

Scholastic Achievements

2019-2020

Name of Student	Class	Award
Apoorva Vardhan	3rd year	Dr. Lalita Sehgal Memorial Award
Minora Priya	3rd year	Dr. Lalita Sehgal Memorial Award
Sakshi Dawer	2nd year	Sh F.C. Sehgal Memorial Award
Bisma Butool	1st year	Smt. Pratibha mukherjee memorial award

2020-2021

Name of Student	Class	Award
Sanchita	3rd year	Dr. Lalita Sehgal Memorial Award
Akshita Sharma	2nd year	Sh. F. C. Sehgal Memorial Award
Jayati Pandey	2nd year	Sh. F. C. Sehgal Memorial Award
Bisma Butool	1st year + 2nd year	Sh. Shiv Bhagwan Mundhara Memorial Scholarship
Surbhi Mendiratta	1st year	Pratibha Mukherjee Memorial Award

Academic Toppers

2020-2021

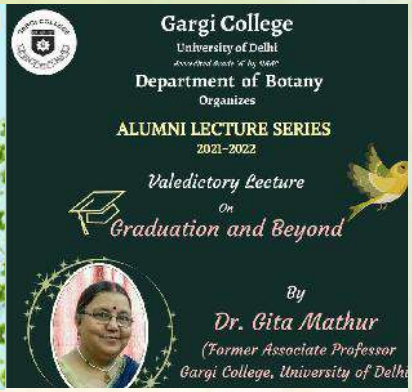
Name of Student	Class	CGPA
Akshita	2nd year	9.75
Jayati	2nd year	9.75
Rupal	2nd year	9.68
Bisma	2nd year	9.64
Himanshi	2nd year	9.64
Name of Student	Class	CGPA
Surbhi Mendiratta	1st year	9.77
Ridhima Sharma	1st year	9.68
Shruti Jha	1st year	9.64

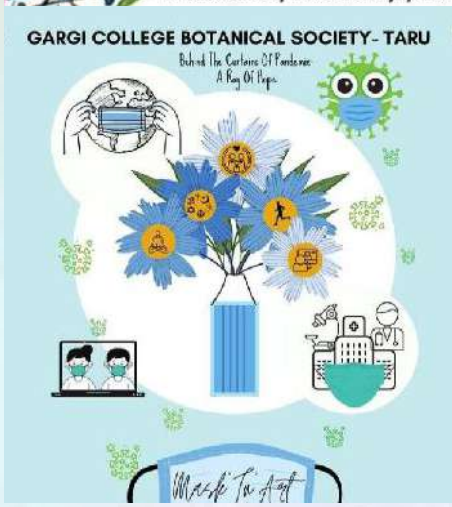
Co-Scholastic Achievements

2021-2022

Name of Participant	Class	Competition	Position Awarded
Nasra	3rd year	Photography competition	1st position
Shephali gupta	3rd year	Specimen sketching	2nd position
Riyanshi joshi	3rd year	Poster making, Topic-Save ozone save life	1st position
Pallavi Sahu	3rd year	National Level Wildlife Photography Competition	2nd position
Jayati Pandey	3rd year	Poetry comptetion	1st position
		Essay Writing	1st position
		Collage Making	3rd position
Shreya Singh	3rd year	Poetry competition	2nd position
Divya Mangla	3rd year	Quiz Competition	3rd position
		Quiz Competition	2nd position
Shubhi Srivastava	2nd year	Poster Making Competition in Gargi Olympiad	3rd position
		Wildlife Quiz Competition	1st position
Tamanna Sharma	2nd year	Photography competition	2nd position
		E-Poster making competition	2nd position
		Paper Presentation Competition	4th position
		Wildlife Quiz Competition	2nd position
		Ozone Day Poster Making Competition	1st position
Ananya Chamola	2nd year	Info graph poster making competition	3rd position
		IntellectStormer	1st position
		Mismatched	2nd position
		Kalakriti- Poetry composition Competition	2nd position
Ankita Kumari Gupta	2nd year	Poster making competition	3rd position
Yashasvi Saini	2nd year	Zenith Poster/Logo Making Competition	1st position
		Kalakriti Inter College Poster Making Competiton	1st position

Departmental Events 2021-2022





Inaugural Lecture Report

Yashasvi Saini, Co-Editor

"**Everything is difficult in starting but it is the effort and determination that matters to achieve one's desired goals**"

- Professor Dinabandhu Sahoo

Gargi College Botanical Society- TARU organized the inaugural lecture to mark the beginning of the new session 2021-2022 on 28th August 2021, on an online platform. Professor Dinabandhu Sahoo- a proficient Scientist, an eminent environmentalist, and botanist, graced the event with his presence and delivered the lecture on the topic 'Biodiversity for Everyone's life'.
The lecture was attended with great zeal and enthusiasm by over one hundred and thirty participants, including students and faculty from various departments.

The event started with Dr. Garvita Singh expressing her gratitude on behalf of the Botany Department to Prof. Sahoo, superannuated teachers, faculty members, and students for their venerable presence. The auspicious ritual of paying respect to Goddess Saraswati by performing Saraswati Vandana was done by Pallavi Sahu (Secretary- GCBS TARU) followed by a brief introduction to the Botany Department by Bisma Butool (President-GCBS TARU). The event proceeded with a welcoming gesture towards Prof. Sahoo by Shubhi Srivastava (vice-president GCBS TARU).

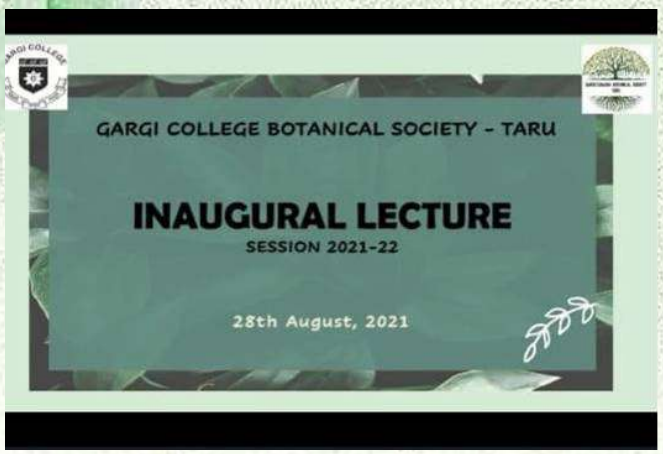
Prof. Sahoo's Lecture was a detailed and enthralling insight into the immense extent of biodiversity that continuously mingles with daily lives. He began by sharing his picturesque experience of his journey through all the seven continents and five oceans that he traversed in a course of two years. He shared his exhilarating experiences of being the first Indian Student to visit Antarctica and having the pleasure of hoisting the Delhi University flag on the grounds of India's second permanent research station, Maitri in Antarctica.

The attendees were keen to know more about his projects in the North East and so he continued to elaborate about the valleys of North East where he single-handedly established the headquarters of IBSD, Manipur, a floating laboratory on LokTak Lake, and an Orchidarium in Chirakungi, Shillong, Meghalaya. He also gave an insight into how he managed to incorporate the local biodiversity of the North East into a flourishing business opportunity, along with connecting the biodiversity with people and their culture. He initiated the use of bamboo in making furniture to save the costs of import, promoted commercial production of Orchid, and started the first-ever "Cherry Blossom Festival" of India. He spent most of his time venturing the forests of North East which he described as 'a near Jurassic Park experience'. During his adventure, he came across a never seen species of ginger that was named after him- *Caulokaempferia dinabandhuensis*.

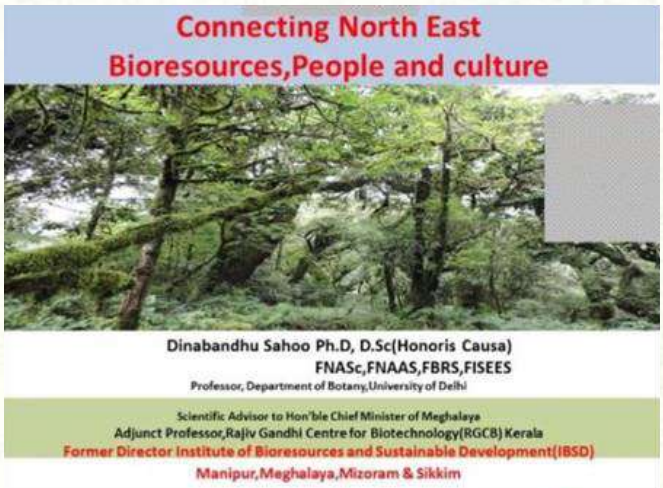
Apart from sharing his experiences on biodiversity, he also highlighted the culture of the North East. His visits to Ima market- a 500 hundred-year-old all-women market in Imphal, where more than hundreds of vegetables, edible frogs, and insects are sold shows how well women are respected and empowered in the North East. He discussed the delicacies of Nagaland and Meghalaya, the aromatic black rice- of which he contributed in compiling germplasm of 28 species and bitter *Parkia* tree beans. He also established an institution- Technology Business Incubation Center in Manipur, and organized a Bio-resource Fashion Show where dresses were designed out of pineapple, garlic and other plant remain eventually concluding the lecture by encouraging everyone to plant at least one tree and to nourish it and watch it grow for a better future.

The lecture had left the audience awestruck and everybody was filled with passion to know more from Prof. Sahoo so he enthusiastically answered all the questions and was happy to get an active response throughout the lecture.

The event progressed and Prof. Sahoo graciously unveiled the theme for Anthesis 2021-2022, Altruistic Gaia- Still One Earth. Jayati Pandey (Editor, Anthesis) gave an insight into the importance of the theme followed by a small introduction to team GCBS and the department's achievements so far this year. The Vote of thanks by Pallavi Sahu followed a brief photo session commemorated the Event.


GARGI COLLEGE BOTANICAL SOCIETY - TARU
INAUGURAL LECTURE
SESSION 2021-22
28th August, 2021


Viewing dinabandhu sahoo's...


Connecting North East
Bioresources,People and culture
Dinabandhu Sahoo Ph.D, D.Sc(Honoris Causa)
FNASc,FNAAS,FBRS,FISEES
Professor, Department of Botany,University of Delhi
Scientific Advisor to Hon'ble Chief Minister of Meghalaya
Adjunct Professor,Rajiv Gandhi Centre for Biotechnology(RGCB) Kerala
Former Director Institute of Bioresources and Sustainable Development(IBSD)
Manipur,Meghalaya,Mizoram & Sikkim


Dr. Gita Mathur
dinabandhu sahoo


Commercial Orchid Production Unit at IBSD.
Training imparted to farmers


Business up by 200-

Farewell Message from Dr. Mehta

I desired to be a teacher and was fortunate to start my career as a lecturer against a leave vacancy in 1982 at Gargi College. I had to take a break for personal reasons and got back into teaching in July 1989, starting from Maitreyi College. I re-joined Gargi in January 1990 and retired on 30th June 2021. These 31 years at Gargi were really fulfilling and satisfying. I enjoyed interacting with enthusiastic, creative and imaginative young girls in class. Apart from routine classwork, I had the opportunity to guide and interact with girls on some research projects which were very encouraging. The inter and intra-departmental extra-curricular activities were very interesting and highlighted the creative side of students.

The excursions undertaken by the Botany department were not only fun-filled but also great learning experiences. These activities resulted in formation of strong bonds with my students.

During the tenure spent at Gargi, I got opportunities to learn several things that have helped both in my professional as well as personal life. I met and made many friends who supported me throughout. I learned various key skills such as management ability, teamwork and time management by being a part of several committees.

I remember that shortage of funds and resources caused massive challenge for us in the initial years and through the dedication of students, staff and lab staff and unconditional support from the head of the institution we overcame the situation and are huge success now. I am confident that the Department of Botany will be successful in all its future endeavour.

I would like to express my special thanks to all my colleagues in the department and the lab staff for their help and cooperation at all times. I will always remember the bond shared with my colleagues in the staff room and enjoying the chit-chat over a cup of tea. I am a bit sad that I am going to miss you all, but will be happy to extend my support and always be available for Gargi. My best wishes to all in the Department.

ADIEU DR. GEETA MEHTA

For all that knowledge and kindness
for all the patience and power
for all the stories and seriousness
beholden we're for the love you shower.

If only we shall try to embody
half of the selflessness you hath
for all the guidance, grateful is
everybody
Dear Geeta Mehta ma'am,
for excellence you've paved a path.

- Shreya Singh, Batch 2022

For countless years and an immeasurable amount of time, Geeta Ma'am has been one of the strongest pillars of our department. A guiding light to her students and a serene companion to the faculty. Her presence had become a home at college, her little anecdotes during classes always anticipated but most of all, her serene nature had inspired and still motivates us all. Geeta ma'am, your love, inspiration and knowledge is still a source of constant guidance for the entire department. As you continue to support us through our journey even after we bid Adieu, we continue to long for your everyday presence.
The immense amount of gratitude the department beholds for Geeta Ma'am can in no ways be put into good enough words, but the faculty and her students tried to express their admiration for ma'am through a small honorary event that brought back nostalgia to all.

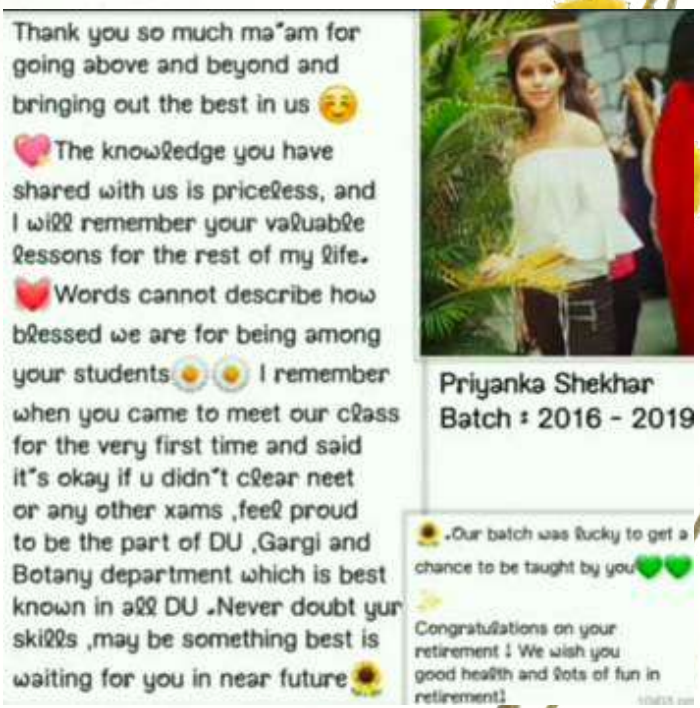
MESSAGES FROM STUDENTS TO MEHTA MA'AM

Thank you for watering the roots of our foundation, leaves of our future and flowers of our success. A teacher like you has an abiding mark in everyone's life. (Mallika Ghosh)

Your knowledge is as deep as an ocean and no matter how much we take from you, there is still more to know and more to learn. Thank you for introducing us to the world of botany. Wish we had more time to learn and grow with you. A teacher like you is hard to find. (Rishita Chhikara)

We got to spend very little time with you and yet were mesmerized and fascinated by your knowledge, your way of teaching and your calmness. Thank you for introducing to us the beautiful world of Algae. (Kalpana Ja)

I remember you took our first class when our college started and made us realise that college will be filled with amazing teachers and interesting lessons. Thank you for teaching us and guiding us (Shruti Apurva)



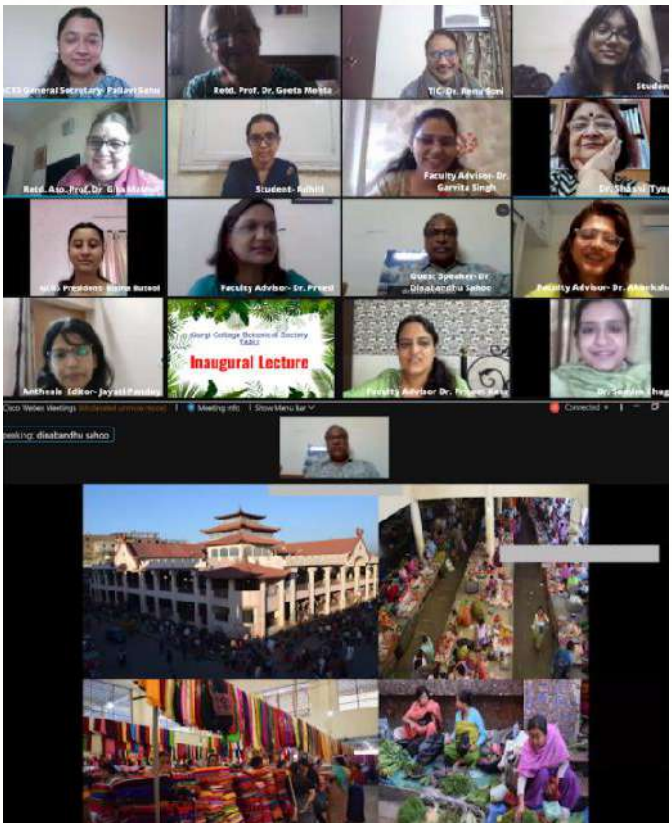
Gargi College Botanical Society- TARU (GCBS-TARU) Annual Report

Bisma Butool, President

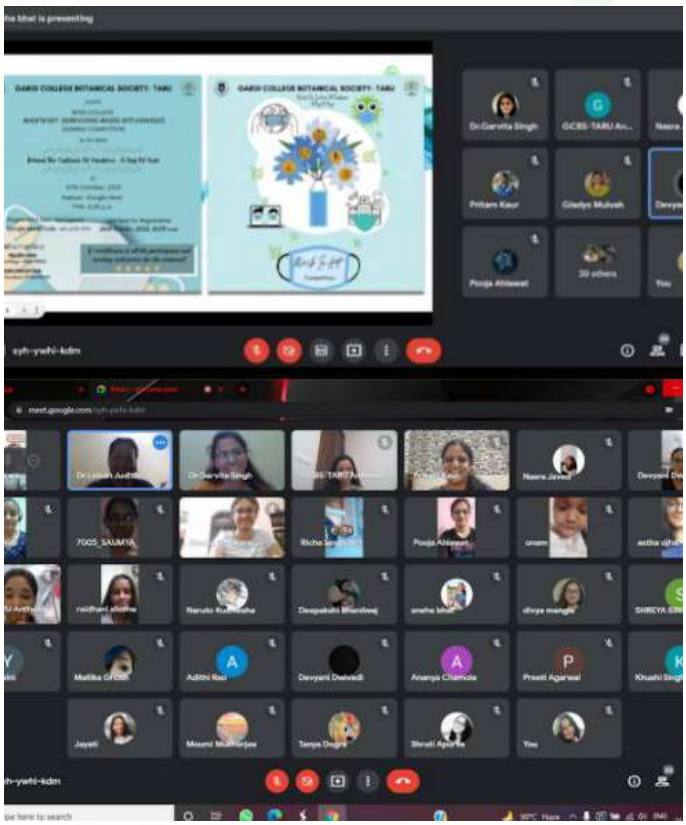
TIC: Dr. Renu Soni

Faculty Advisors: Dr. Garvita Singh Dr. Pritam Kaur Dr. Preeti Agarwal Dr. Akanksha Madan

The Department of Botany, Gargi College, the verdant ground for the plethora of talent and growth, where the elegance of nature and dedication of the faculty and students unite to form its foundation, since 1967, has been an embodiment of excellence nurturing young women to strive hard in achieving their dreams, encouraging them to look beyond their peripheries not only academically but through extracurricular activities as well. In 1994, the Gargi College Botanical Society was formed and christened as TARU on September 2012, which has been an evolving ground of leadership, team strength, learning and opportunities by organizing various guest lectures seminar, various co-curricular activities of creative fervor. Besides these, the annual magazine ANTHESIS has always served to generate awareness with it's unique theme, improving the aspect and perspective of scientific writing and publishing various articles written by the students, giving them a platform to voice their opinions.



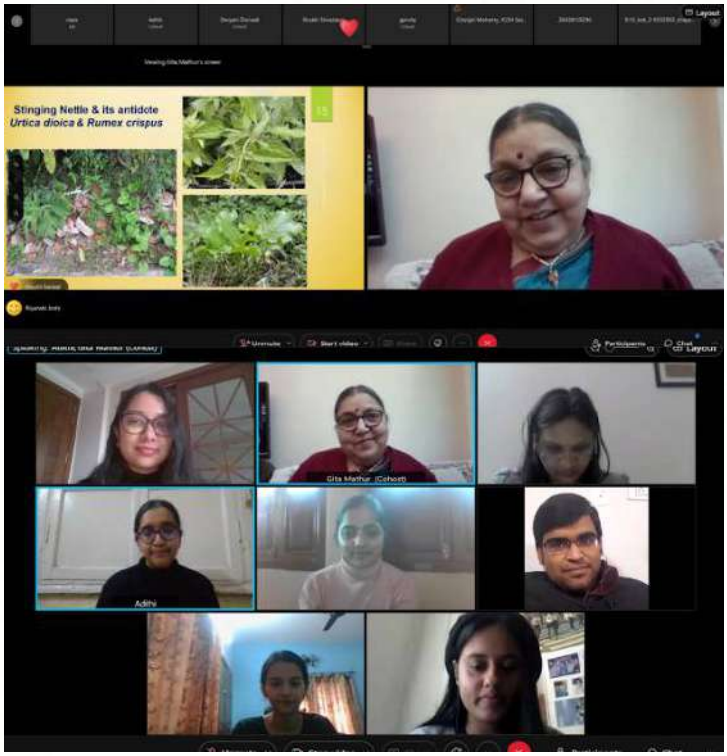
Inaugural Lecture by Dr. Dinabandhu Sahoo



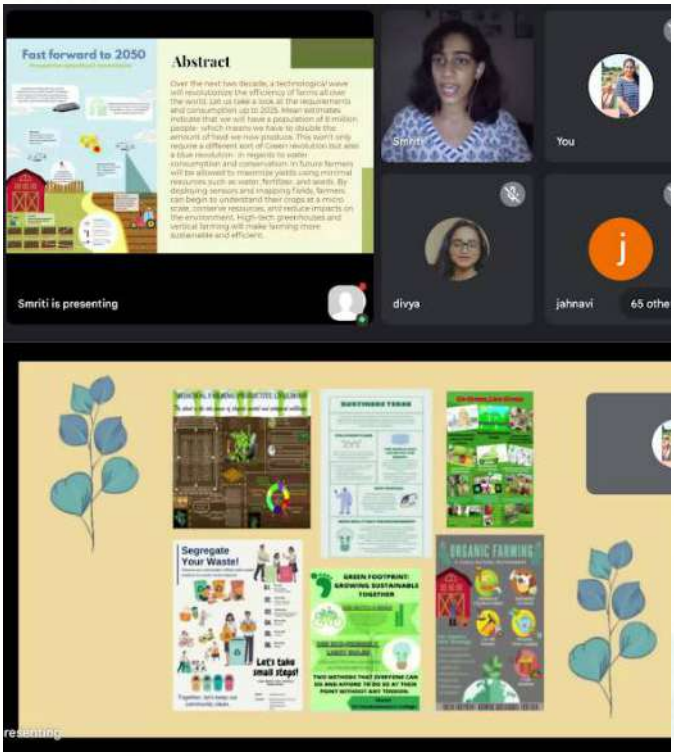
Mask'in'Art Crafting Competition

For the academic year 2021-22, the inaugural guest lecture was presented by Dr. Dinabandhu Sahoo, a prominent scientist, botanist and environmentalist on 28th August, 2021 where he provided an insight on the topic "BIODIVERSITY FOR EVERYONE'S LIFE" giving a great learning opportunity to all the science enthusiasts while diving deeper into the significant aspects of biodiversity. Dr. Sahoo delivered an extremely informative lecture followed by the theme reveal of the department's annual magazine ANTHESIS (Volume 17) - "ALTRUISTIC GAIA: STILL ONE EARTH."

On January 8, 2022 a lecture witnessing participation from across departments resonating with the beautiful idea of a Virtual Botanical Excursion was organized with the speaker gracing the event being none other than the esteemed retired associate professor of the department- DR. GITA MATHUR giving us all a lifetime experience of knowledge and excitement. Known for holding various extracurricular activities along with academic events, TARU organized a total of 4 events namely intercollege infographic poster making competition themed "Conserving Gaia's Elixir Vitae", an interdepartmental Mask'in'art crafting competition themed "Remolding Masks into Canvases", an interdepartmental Mountain Day photography event, followed by the Best Out of Waste Competition for the 1st year students.



Virtual Botanical Excursion event by Dr. Gita Mathur



Infographics Poster Making Competition

The events were a success witnessing massive participation from students across the college and the University, providing a platform to the students for the expression of their ideas and to exhibit their creativity. In the history of organizing events, the Botany department for the first time collaborated with the other science departments of the college to organize Revel on 28th February, 2022, commemorating National science day and celebrating the spirit of science.

The society, on behalf of the department, prepared and circulated informational videos on various social media platforms to spread awareness and mark the significance of World River Day, World Science Day, World Habitat Day, World Food Day, World Mountain Day, World Forestry Day and Taxonomists Appreciation Aay.

The academic session has truly experienced a heartwarming growth and witnessed remarkable participation by the students of the Botany department in various competitions and bringing laurels to the department. This session witnessed a grand total of 20 awards won by the students of the department, celebrating science and nature.

Our department stands for the values of unity, connecting us all to the same roots. During these difficult times of uncertainty amidst the pandemic, the Department of Botany did not let anything dampen its spirit and moved forward celebrating education and creativity, paving way for excellence and always being there for its student in every possible way.

Infographic Poster Making Competition

Shreya Singh,Co-Editor

"They wanted people to wake up to a city that had been transformed into a gallery, bursts of colour amid the pigeon-coloured buildings. They wanted their posters to be the only thing people talked about that day."

— Magdalena McGuire

On October 4th, 2021 with an alluring theme - " Conserving Gaia's Elixir Vitae", an Inter-College Infographic Poster Making Competition was organized by the Gargi College Botanical Society (GCBS) TARU. With much enthusiasm, this event marked the beginning of session 2021-22. The event was full of knowledge and creativity, took place at an online platform, and received participation across the Delhi University with great vision and originality.

The theme for the Inter-college Infographic Poster Making Competition, 'Conserving Gaia's Elixir Vitae' was introduced by Kalpana Jha, executive member of (GCBS) TARU, and she also highlighted the foundation of the Botany department of Gargi College.

Jimmy carter rightly said "Habitat allows us which is very difficult to find: to reach out and work side by side with those who never have had a decent home-but work with them on a completely equal basis. It's not a big-shot, little-shot relationship. It's a sense of equality." Agreeing with the same feeling, that today we all need to respect our habitat and practice sustainable development, Divya Mangla on World Habitat Day, which was on October 4th, 2021, the same day as the competition, introduced the theme of the World Habitat Day for the year 2021 which was "Accelerating Urban Action" for a carbon-free world.

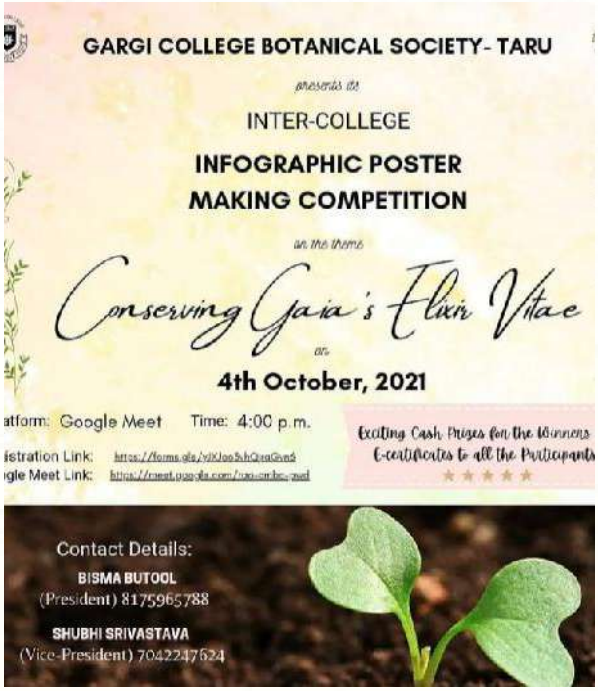
The participants presented stunning digital posters alongside a PowerPoint presentation, showcasing the underlying idea of their project on given subtopics. The informative and insightful posters and presentations made the event a huge success. Though every entry was a winner in itself, the judges had to come up with some positions,

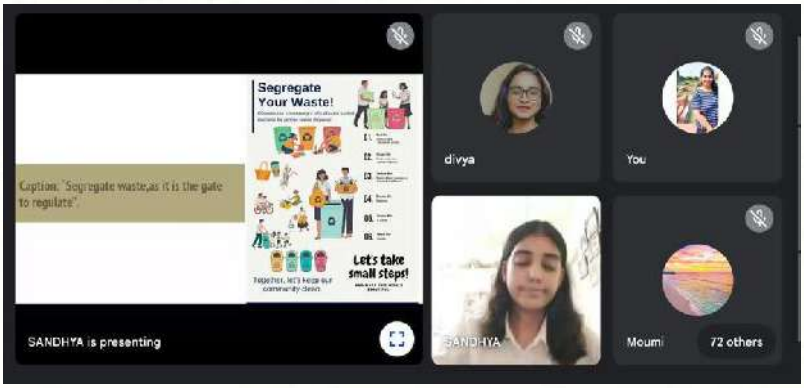
The first position was backed by Surbhi Mendiratta.

The second position was shared by Hibu Paku.

The third position was backed by Ananya Chamola.

E-certificates along were awarded to the winners to encourage them for more creative work in the future and all the other participants were also awarded certificates of participation for their enthusiasm.





WINNING ENTRIES

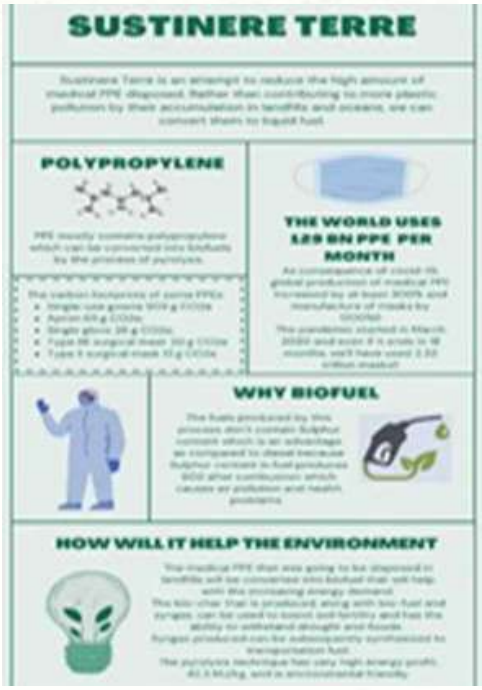
1st

Surbhi Mendiratta
B.Sc.(Hons.) Botany, 2nd year
Gargi college

2nd

Hibu Paku
B.Sc.(Hons.) Botany, 2nd year
Gargi college

3rd



Ananya Chamola
B.Sc.(Hons.) Botany, 2nd year
Gargi college

Mask'in' Art: Remoulding Masks into Canvases

Khushi Singh, Editorial Team

"Art Is The Highest Expression Of The Human Spirit"

The pandemic has been difficult for all. Every person around the globe has either been infected or affected by the COVID-19 disease. During these tough times of unprecedented changes, there still were moments in each one of our lives that inspired and motivated us to carry on and instilled our beliefs back in life and humanity. To highlight such moments of incredible kindness, interconnectedness, courage, and hope, GCBS - TARU organized an inter-college art competition, MASK 'IN' ART, on the theme 'Behind The Curtains Of Pandemic: A Ray Of Hope' on 27th October 2021. The on-the-spot drawing competition aimed at depicting the positive side of the pandemic through an art piece with the unique concept of having a 'face mask' as a central piece of the creation.

Since the event fell on the same day as Sustainability Day, to celebrate the same the event took off with some limelight drawn to the sustainable development goals of the United Nations and the importance of sustainable living for a better life and a sustainable future. The celebration was followed by a one-of-a-kind and the much-awaited drawing competition which commenced with great zeal and enthusiasm. The event received the active participation of art enthusiasts from different colleges and universities across the country. The competition was held online on Google Meet with all the participants switching on their cameras and were given a duration of an hour to produce their piece of art. Every participant made their artwork with great gusto and truly spoke their hearts out through their work of art. Each piece of art created by the participants was a masterpiece of its own and presented their interpretation of the theme beautifully.

Towards the end of the event, participants gave wonderful presentations of their artwork supported by a caption describing their creation and expressed their thoughts behind the art piece they created in their own words. The canvases displayed various messages from our interconnectedness, not just as humans but also with our natural environment, to showcasing immense gratitude for the frontline workers for their selfless services during the pandemic while others portrayed the hope of togetherness during the social distancing times, resilience, and the importance of vaccines. The art pieces created were truly awe-inspiring, thought-provoking, and absolutely magnificent.

The judges applauded all the participants for their efforts and impressive art pieces. A vote of thanks to all the attendees was proposed by the treasurer of GCBS-TARU, Nasra. The event culminated with a photo session of the judges with teachers and the entire team of the botanical society. The competition proved to be very successful and ended on a hopeful and positive note.

The final results of the competition were declared on 28th October 2021 and three winners were announced.

·The 1st position was secured by Tannu Vashist, BSc. (Hons.) Zoology, Second Year

·The 2nd position was held by Payal Kushwaha, Computer Science, Second Year

·Finally, the 3rd position was backed by Deepakshi Bhardwaj, B.A. (Hons.) Hindi, Second Year

E-certificates along with cash prizes were awarded to the winners. Besides this, all participants received a certificate of appreciation.

WINNING ENTRIES

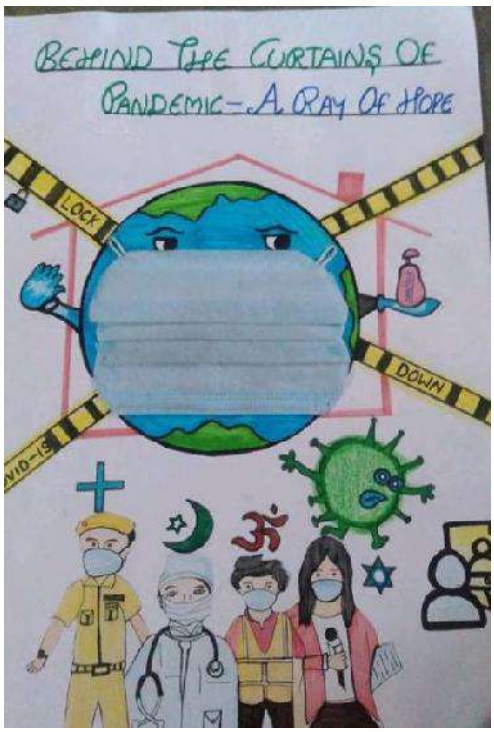
1st

Tannu Vashist
BSc. (Hons.)Zoology, 2ndYear
Gargi College

2nd

Payal Kushwaha
Computer Science, 2nd Year
B.K. Birla College

3rd



Deepakshi Bhardwaj
BA (Hons.) Hindi, 2nd Year
Maharaja Agrasen College

Departmental Orientation

Janvi, Editorial Team

The Department of Botany organised an Orientation Event for the Freshers of Batch 2021-2024 on November 22, 2021. The event commenced with great zest at 12:30 p.m. and on a virtual platform, google meet. Though being virtual the event seemed no less than real. The department's Teacher in Charge Dr. Renu Soni with other teachers warmly welcomed the Freshers to the department and introduced the students to the incredible life of an academician that students pursue as a part of the Department. The teachers gave an insight into the department's building, equipped labs, research opportunities, the Gargi College Botanical Society and the annual publication- Anthesis. Freshers were also given a keen outlook into the amazing learning process through practicals, classes, virtual excursions The students were glad to have attended the orientation, and the event ended with all freshers feeling privileged to be a part of the botanical family at Gargi College.

Mountain Day Photography Event

Ananya Tomer, Editorial Team

Photography: Alsa Mohsin, B.Sc.(Hons.) Botany, First year

If you adore the sky-kissing beauty of mountains from afar or up close, you can't repudiate how enthralling their beauty is. There's so many ways that these stupendous mountains can influence you as a person with their capricious wilderness, their draconian weather and their bewitching panorama.

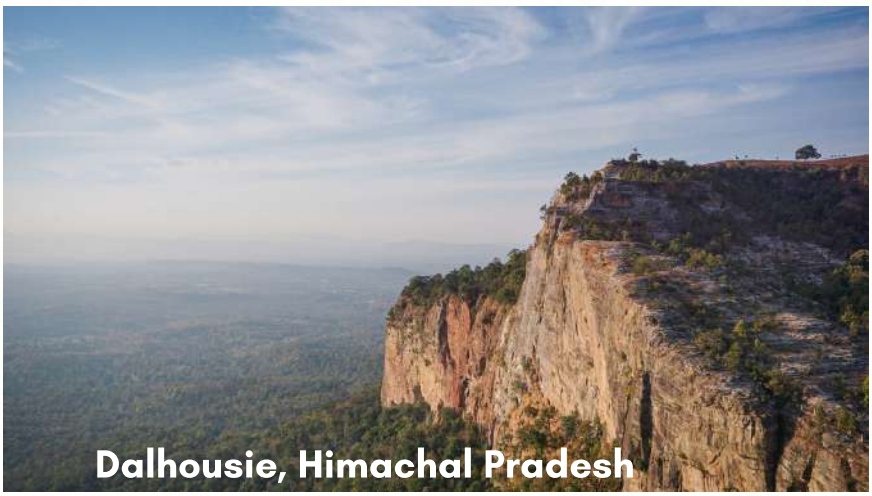
To engender cognizance regarding the significance of mountains to life, to accentuate the opportunities and impediment in development of mountains and to build entente that will lead to inducement of sanguine changes in the surroundings and lives of the people living in mountains, Mountain day is celebrated internationally on 11th December since 2003.

To honour this alluring "*tour de force*" of Mother nature, and to celebrate our fantasies concerning these beautiful mountains, Mountain Day was celebrated by the students and teachers of Gargi College on 11th December, 2021.

Self-clicked photographs reminiscing the memorable moments and depicting the beauty and biodiversity of mountains along with captions were shared by the students and faculty members. The captivating pictures showing the beauty of mountains made us all recall the quote by John Muir," The mountains are calling, and I must go."

Photography&Caption:
Bazila Jan
B.Sc.(Hons.) Botany
First year

Sunshine covering the mountains giving breathtaking look from the top of other mountains



Photography&Caption:
Tashu Singh
B.A. (Hons.) History
First year

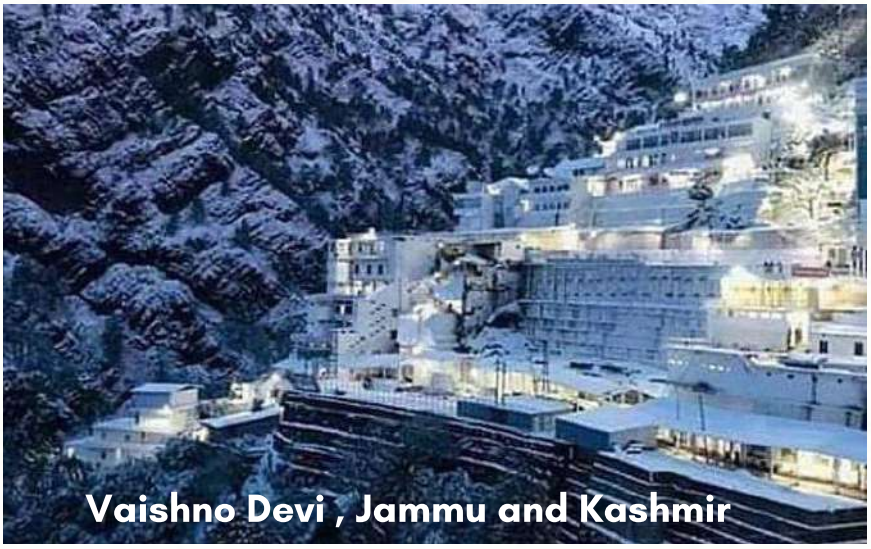
A scenic roadside view of the layering mountains seen from Dalhousie. A never ending row of mountains.

Photography&Caption:
Shubham Priya
B.Sc.(Hons.)Microbiology
Second year

We sat in silence that day. That's all. Not really speaking, but breathing in the cold, sweet air, listening to what the mountains had to tell us.

Photography&Caption:
Shreya Lunial
B.A. Program
Third Year

Hidden Treasures

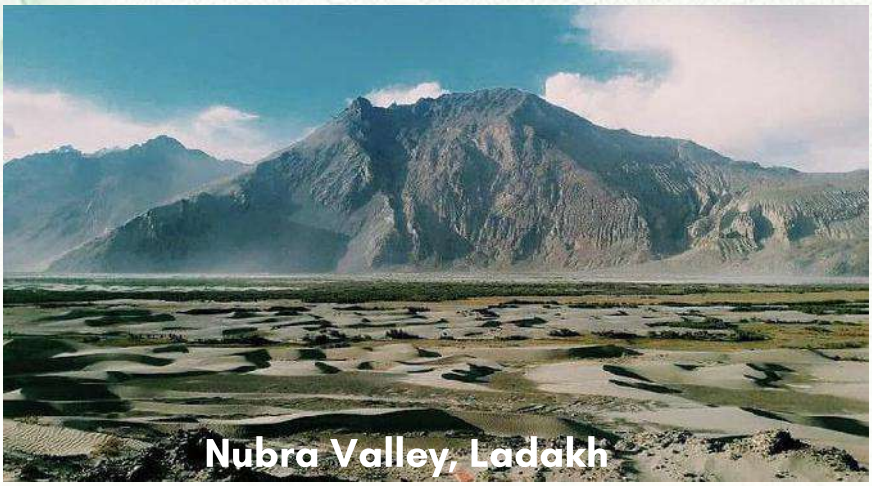


Photography&Caption:
Sejal
B.El.Ed.
First year

The Vaishno Devi Temple is an important Hindu temple at the Trikuta Mountains within the Indian state of Jammu and Kashmir.

Photography&Caption:
Ananya Singh
B.A.(Hons.) Political Science
First Year

Take the journey to enjoy the view



Photography&Caption:
Anoushka Dey
BA (Hons.) Political Science
First Year

And there, as I stood before the mightiness of the mountains and vastness of the desert, was I reminded of how we are merely a fleeting moment on this planet

Photography&Caption:
Sayantani Ghosh
BA (Hons.) Political Science
First year

A moment in the mist of the night, the moon peeping through the sky

Best Out of Waste Competition

Anshita Bhatnagar, Editorial Team

The whole world is cognizant of the adverse consequences of global warming, but nobody is ready to take any considerable action towards it. To bring this to light and invigorate students all over the college to perform their part in tackling global warming, The Gargi College Botanical Society "Taru" 2021-22 organized a 'best out of waste' competition. The competition was held on the auspicious day of 28th December 2021. It was an inter-departmental competition and attracted the attention of many art aficionados across the entire college.

"*Imagination is the beginning of creation*," by George Shaw. This quote was brought to life as young artists enthusiastically displayed their glamorous work. Due to the widespread of coronavirus, this competition was held online. The chief motive of the competition was to educate people on the significance of one's actions towards the greater good. This competition enlightened many young scholars to take specific measures towards confronting this tremendous problem standing at our feet.

The reception of the competition was positive and jubilant. Every presentation brought out a sense of wonder and hope in both the participants and the audience. The decision-making was a complex process, but our excellent judges announced the results. Five winners were selected, and each was given a cash prize according to their secured positions.

·The first position was backed by Sushri Suhasini, B.Sc. Hons. Botany, 1st year with a cash prize of Rs. 1000/-.

·The second position was shared by Gunjan Mishra, B.A. Hons. History, 1st year and Manogya Handa, B.Sc. Life sciences, 1st year with a cash prize of Rs. 700/- each.

·The third position was shared by Sucheta Barman, B.Sc. Hons. Botany, 1st year and Khushboo Sharma, B.Sc. Hons. Zoology, 1st year with a cash prize of Rs. 500/- each.

Some appreciable mentions:

·Krishna, B.Sc. Hons. Botany, 1st year

·Prachi Gola, B.Sc. Hons. Chemistry, 1st year

·Tanisha Champia, B.Sc. Hons. Botany, 1st year

·Neha Kaswan, B.Sc. Hons. Botany, 1st year

·Mahira Zabeen, B.Sc. Hons. Botany, 1st year

Some other appreciable students who took part in this is awe-inspiring competition:

·Alsa Mohsin, B.Sc. Hons. Botany, 1st year

·Anupriya Bhatnagar, B.A. Hons. Political Science, 1st year

·Gunjan Sharma, B.Sc. Life sciences, 1st year

·Nalanda Pratap Singh, B.Sc. (Prog.) Life sciences, 1st year

·Kirti Bhadana, B.A. Hons. Political Sciences, 1st year

·Niketa Rajput, B.Sc. Life sciences, 1st year

·Priya Khatri, B.Sc. Life sciences, 1st year

·Rolly Gaur, B.Sc. Hons. Botany, 1st year

·Rukhsar Bano, B.Sc. Hons Botany, 1st year

·Shivani Rathore, B.A. Hons. History, 1st year

The position holders were awarded certificates along with cash prizes. The competition was able to serve its purpose i.e., to inspire students to work towards sustainable development and help in the making of a better world.

1st:

Sushri Suhasini
B.Sc. Hons. Botany, 1st year

2nd:

Gunjan Mishra
B.A. Hons. History, 1st year

2nd:

Manogaya handa
B.Sc. Life sciences,1st year

3rd:

Sucheta Barman
B.Sc. Hons. Botany, 1st year

3rd:

Khushboo Sharma
B.Sc. Hons. Zoology, 1st year

Appreciation

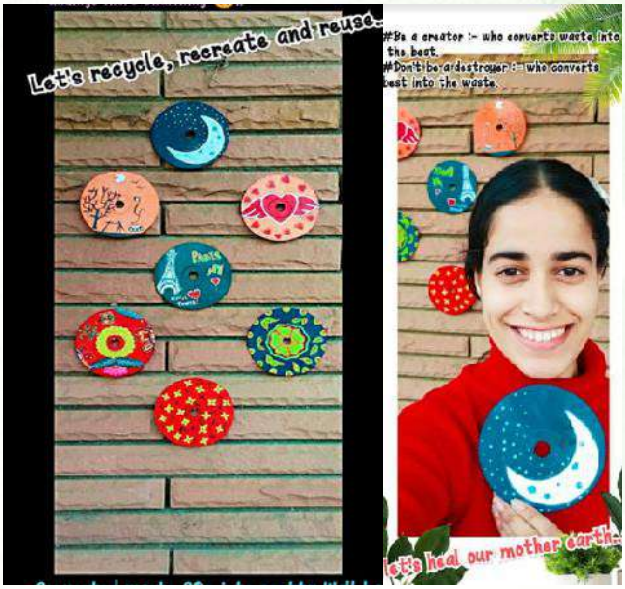
Alsa Mohsin
B.Sc. Hons. Botany, 1st year

Appreciation

Priya Khatri
B.Sc. Life sciences, 1st year

Anupriya Bhatnagar
B.A. Hons. Political Science, 1st year

Gunjan Sharma
B.Sc. Life sciences, 1st year



Nalanda Pratap Singh
B.Sc. (Prog.) Life sciences, 1st year

Kirti Bhadana,
B.A. Hons. Political Sciences, 1st year

Niketa Rajput
B.Sc. Life sciences, 1st year

Appreciation

Shivani Rathore
B.A. Hons. History, 1st year

Rukhsar Bano
B.Sc. Hons Botany, 1st year

Rolly Gaur
B.Sc. Hons. Botany, 1st year

Botanical Excursion with Dr. Gita Mathur

Jayati Pandey, Editor

"**Observing small things is the key to understanding greater technical aspects**"

- Dr. Gita Mathur

The most a book can give to a student are words, knowledge comes from the teacher, observation, and analysis. To realize this notion, On January 8, 2022 GCBS-TARU, The Botanical Society of Gargi College began the new year with an enthralling trip to the fascinating homes of plants that the department students had only read about! The society commenced the first event of the year- 'The Botanical Wanderlust' with our esteemed superannuated Professor Dr. Gita Mathur being the tour guide for this Virtual Botanical Excursion.

The event began with the Principal Dr. (Prof.) Promila Kumar expressed her immense enthusiasm for the event, followed by Dr. Garvita extending a heartfelt welcome to the audience and expressing gratitude on behalf of the department towards superannuated teachers who continue to be the backbone of students and faculty of the department. The Vice President of GCBS-TARU- Shubhi Srivastava introduced the Chief Guest and Speaker- Dr. Gita Mathur to the audience followed by Sarasvati Vandana performed by GCBS General Secretary Pallavi Sahu. A congratulatory mention of the newly selected GCBS-TARU Creative, Executive, and Editorial Board members was brought up by an existing Creative Team member- Devyani Dwivedi who then proceeded to give the freshers a brief about Annual Departmental Activities, Cultures and functioning of labs and faculty.

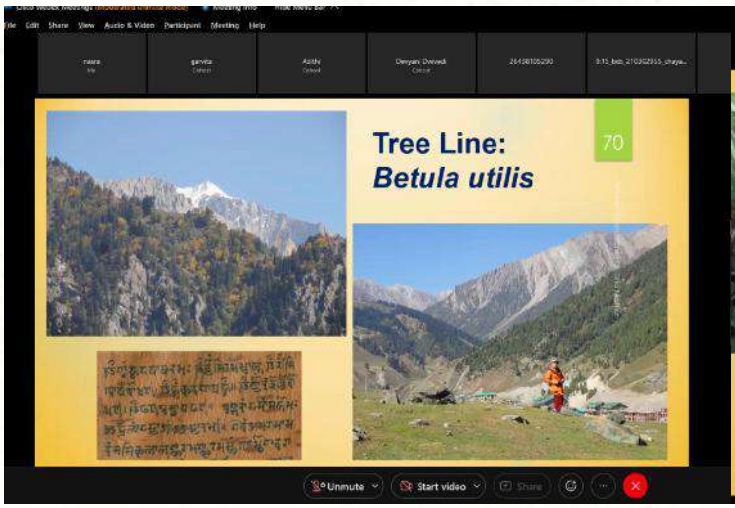
The Most Awaited Trip of the year could not be held back by the pandemic as Gita Mathur ma'am upon request of the students took us all on a Virtual Botanical Excursion! She began by expressing her gratitude to the faculty and Team GCBS, along with extending a special thanks to the lab staff without whom excursions would have been a meagre possibility.

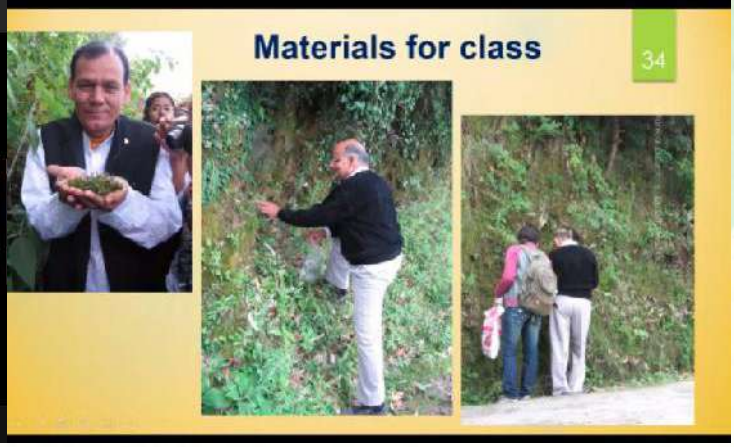
The entire department as well as the audience from other faculties set foot on the bus thinking it will be a long while until the excursion place is reached. Mathur ma'am however made us all analyze the journey "Excursion begins the moment you set foot on the bus". On the way, through her excelling storytelling Mathur ma'am quite literally brought to life, the Solar Panels and Vertical Gardens planted alongside the Yamuna Expressway. Sugarcane plantations and their unique characteristic of being grown tied together did not go unnoticed either. Ma'am also explained to the audience the importance of frivolous observation and analysis. She brought to our notice the shady side and the sunny side of a mountain and how intriguingly their vegetation differs. Through her picturesque lecture which was not much less than an actual excursion, the audience realized how simple things often go unnoticed. Reminiscing about the past excursions Mathur ma'am narrated short memoirs of Department trips, enriched by her melodious poems about plants that left the audience in awe.

Interestingly, Gita ma'am had discovered a *Pellia* spot between Nanital and Bhimtal! This led ma'am to highlight the evolutionary importance of pteridophytes in studying vasculature and organ development of higher plants. Ma'am took us to various places including Bhimtal, Nanital, McLeod Ganj, Kahjjar in Dalhousie, jute fields in Siliguri, and potato research center in Shimla. She also took us to an exotic fruit market, giving us a virtual taste of exotic fruits like Fig and Cashew Apple. Going full circle, we came back to Delhi, however the excursion was not over yet! Mathur ma'am continued to tell us about the Sanjay Van in Delhi which has recently been restored through Bioremediation by plants belonging to Ranunculales.

The excursion was an extremely unique and enriching experience to have for the students! The GCBS Team is immensely grateful for Dr. Gita Mathur for always being an integral role model and mentor of the Department, to the TIC- Dr. Renu Soni for always supporting GCBS and students in, and for the faculty advisors who have guided us through out!

Glimpses of the Event





Farewell to Mrs. Munni

Yashasvi Saini, Co-Editor

"***Assistance is salient and building blocks of the success.***"

The efficient functioning of any department is a combined effort of both the teaching staff and the non-teaching staff. The Department of Botany of Gargi College has friendly, cooperative and hardworking lab staff from which the end of the tenure for one lab staff came to an end. Munni Ji is a dedicated and sincere lab staff who worked with the Botany department for thirty-five years and six months. She joined the department in August 1986 and remained selfless and devoted to her fellow lab staff members, teaching staff and the students. The Department of Botany gave Munni Ji a formal retirement ceremony on 28th February 2022. It was followed by the planting of a plant by Munni Ji. A formal farewell was also given by the department members to Munni Ji to thank her for her work and service.

It is the end of an old chapter and the start of a new one. The members at the Botany Department Gargi College wish Munni Ji the best of health, happiness, and success on her new journey in life.

A Visit to Festival of Science and Technology – Vigyan Sarvatra Pujyate

Tanya Dogra, Editorial Team

24 Feb 2022: To commemorate the countrywide programme of Azadi ka Amrit Mahotsav and to motivate students for research from various arenas, a science festival was inaugurated in Jawahar Lal Nehru Stadium, New Delhi. Students from our college were also invited to visit the science book fair and explore ongoing researches in the different fields of STEM. From our Botany Department, Dr. Neha and Dr. Gladys leaded the student crew. The event was jointly organized by Department of Science & Technology (DST), Department of Biotechnology (DBT), Indian Council of Medical Research (ICMR), Council of Scientific and Industrial Research (CSIR), Ministry of Earth Sciences (MoES), Department of Atomic Energy (DAE), Defense Research and Development Organization (DRDO), Department of Space (DOS) and Council for Technical Education (AICTE).

The major objective of this fest was to spread awareness and highlight the work done by various research and development organizations across the country. It was exhilarating to see their creative innovations which were further even planned down to 2047, the 100th anniversary of independence. The programme was organized among 75 locations all over India.

The Nehru Stadium was beautifully decorated depicting the magic of science and technology. Also, there were pictures of the great Indian Scientists and their quotes were displayed below. The total area was divided into four big halls, two of them were for book stalls and the other two for science and tech section.

The book stall covered kids' science section, spiritual and holy writeups, space and tech, biology and experiments, physics and phenomenon, chemistry and magic etc. In addition to that, numerous experiments were being shown to ignite curiosity and it excited our inner scientist. Each one of them was awe-stucking and made us think "why"?

Moreover, a lecture on the theme genome editing was conducted by Dr. Debjyoti Chakraborty who is currently the head of RNA Biology group at CSIR Institute of genomics and Integrative Biology.

He discussed about recent development on genome editing and the CRISPER technology which played a key role in exploring the COVID Virus and development of vaccine for the same. Emmanuelle Charpentier and Jenifer Dounda are the first women scientists to share the Nobel prize on their work on Crisper – Cas 9 which recently brought a revolutionary change in the sector of gene editing. He also gave a brief idea on gene insertion and manipulation and how it can cure various genetic diseases, for example, (sickle cell anemia). At last, there was a Question and Answer session in which he cleared the doubts of the students. After the event, students were given tasty refreshments. To conclude, the experience was quite wonderful and knowledgeable. It was our first trip after the pandemic and will stay in our happy memories for ever.


3D CAR


GSLV MK-III
ISRO
INDIA


White-throated kingfisher
Halcyon smyrnensis
Python Skin
Python reticulates
Leopard Nails
Panthera pardus
Red Jungle Fowl (Neck feather)
Gallus gallus
Elephant Ivory
Elephas maximus
Leopard Canines
Panthera pardus
Tibetan Antelope Shawl
Pantholops hodgsonii
Monitor Lizard (hatha jodi)
Varanus bengalensis

National Science Day

Khushi Singh, Editorial Team

"The essence of the scientific spirit is to realize what a wonderful world it is that we live in"

CV Raman

The National Science Day is observed every year on 28 February to commemorate the eminent scientist CV Raman's historic discovery, 'Raman Effect'. For his work, Raman was awarded the prestigious Nobel Prize in physics, in 1930. The theme for this year was "Integrated Approach in Science and Technology for a Sustainable Future".

To highlight the importance of science in our day-to-day lives and recognize its contributions to the development of the Nation, the Science and Mathematics Departments of Gargi College celebrated National Science Day on 28 February 2022 by organizing various events like the Inter-College Paper Presentation Event - REVEL, Slogan Writing competition, and Parody Writing competition. All the events were conducted in an online mode and saw enthusiastic participation by students.

The students shared their innovative ideas by way of presenting their papers during REVEL. The topic for the paper presentation competition was based on the following themes-

- Integrated Approaches in Science and Technology for a Sustainable Future, Ministry of Science and Technology, Government of India
- International Year of Basic Sciences for Sustainable Development by United Nations

The three best papers were declared the winners. The Paper Presentation competition was followed by the Slogan Writing and Parody Writing competition, themes for which were given on the spot during the Paper Presentation competition itself. After REVEL was concluded, the participants were called one by one to present the slogans and parodies which they prepared.

The students showcased their writing talent through catchy slogans and expressed their thoughts on the topic. The event was a grand success and all the participants were appreciated for their efforts. The winners were selected based on the effectiveness of the slogan and the presentation of the theme. Through these competitions, students got the chance to explore their creative skills and scientific mindset. The winners of various events were awarded certificates and prizes.

The following students were declared the winners of the Paper Presentation Competition:

First Position-Drishtant Sen, B.Sc.(H)Zoology, First Year, Deshbandhu College, Delhi University

Topic- Any implementable innovative idea. Using Science and technology for sustainable development.

Second Position-Shraddha R. Bhat, B.Sc.(H) Chemistry, third year, Gargi College, Delhi University

Topic- How science and technology can be a boon for sustainable development.

Third Position- Smriti Verma and Bisma Khan, B.Sc. (H) Zoology, Second Year, Gargi College, Delhi University

Topic- *How science and technology can be a boon for sustainable development.*

Winners of the Slogan Writing competition were as follows:

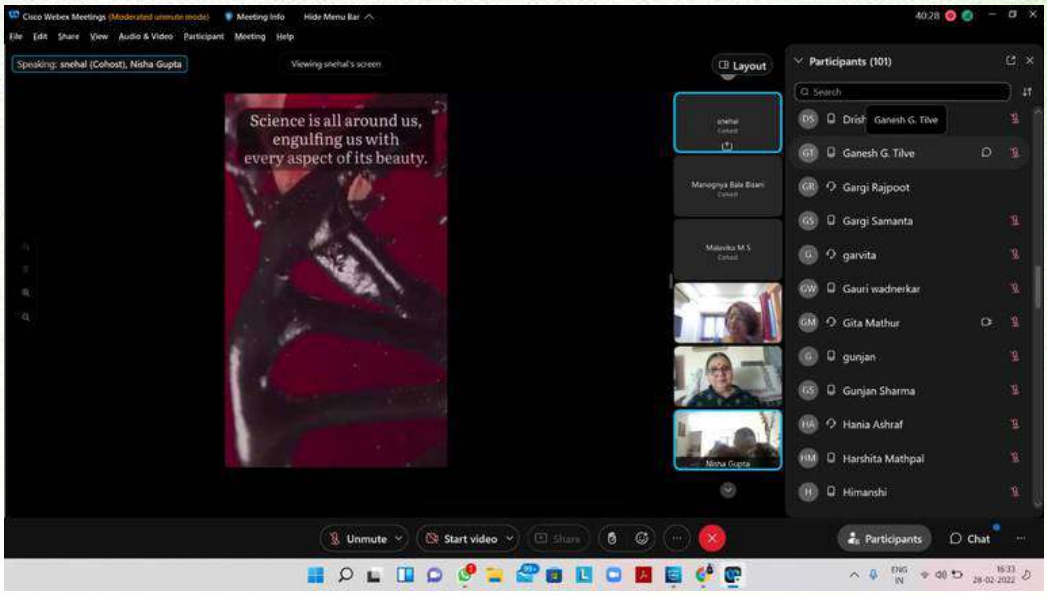
First Position- Rajasvi, B.Sc.(Prog)Life Science, 2nd Year, Gargi College, Delhi University

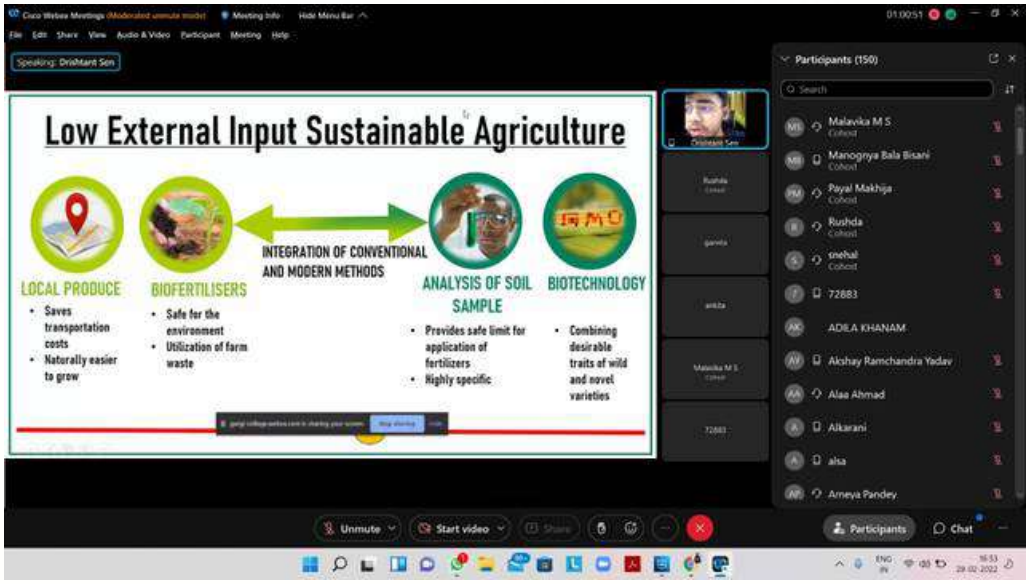
Slogan-*Let's put wastage to an end And make recycling a trend Let's consider environment a friend And make the necessary amends.*

Second Position-Payal Makhija, B.Sc.(H)Mathematics, Gargi College, Delhi University

Slogan- घर, जूते, कपड़ा, गाड़ी, इन सबकी है बड़ी भमारी । प्रयोग करो पर तुम करो हिसाब, भविष्य की सोचो, थोड़ा करो लिहाज़ ।

Glimpses of the Event





Interactive Session at National Institute of Immunology organized under *Science Setu Program*

Jayati Pandey, Editor

Gargi College is a part of Science Setu program, in collaboration with National Institute of Immunology (NII) which is an initiative by Department of Biotechnology, Ministry of Science and Technology, Government of India. The objective of this collaboration is to expose the students to research in national institutes of India and motivate them to take up careers in research. As a part of this program, NII invited students of the Department of Botany, Gargi College for an interactive session with young researchers and scientists, on the occasion of National Science Day celebrations (28th February 2022). Poster presentations of research work of various laboratories were put up which helped to update the students about the frontier areas of biological research in India. Six students accompanied along with the Nodal officer (Dr Aparajita Mohanty) of the Science setu program visited the NII campus. Young PhD and Post Doctorate researchers enthusiastically presented their recent researches through infographics. The presenters elaborately explained the aim, the methodology, interpretations and conclusions of their research projects in an extremely comprehensible manner. Grounds were open for the visiting students to interact with scientists as well. This helped the students to gain insight into various internship and summer workshop programs that are organized by NII for students pursuing graduation in biological sciences. Overall, the interactive session was an extremely enriching experience for the students. We gained deeper insights into the life of an academician and a researcher through the session along with learning about several upcoming research arenas and new technologies of research.

REVERIE - '*Embracing Change*'

Tanya Dogra, Editorial Team

REVERIE is the annual fest of Gargi College which lasts for two to three days. It is a podium through which various cultural and non-cultural societies put forth their creativity and skills in different arenas like dance, music, drama etc. through concerts and competitions. This year it was held on 4th March 2022, exhibiting the theme – Embracing Change. Although it was inaugurated in offline mode, students were invited via an online platform (Cisco Webex) in accordance with corona pandemic guidelines.

The programme was initiated by the convenor- Dr. Sheela Dubey. The esteemed chief guest of the event was Mr. Rabbi Shergil who is a prominent singer and musician. The auspicious event began with a lamp lightening ceremony by our respected chairperson and principal. The event was leadoff by a melodious Saraswati Vandana performed by the Classical Music Society – Samrajini.

Then the chief guest was called upon the stage for conveying some words of wisdom. He passionately put forward his ideologies about our education system and what is true meaning. He talked on numerous aspects such as film industry and its effects on youth, innovation and research and developments sector, employment sector, sustainable development, science and technology, spirituality etc. His kind and inspiring words motivated all the students and gave them a reality check about life. He also sang some Bollywood pop songs like "Bulla ki jaana main kaun", "Jallah" etc. which elevated the adrenaline level in the audience. Afterwards, our honored chairperson, Mr. Amitav Virmani, gave an exhilarating speech in which he gave an insight about the importance of creativity and knowledge. His cool and cheerful nature took everyone's heart.

Following, various societies came upon the stage to showcase their talent. The drama society, 'Upstage' displayed their amazing acting skills on the theme -The Fisherman, the writer and the skeleton. It was a story about a writer who was busy coping up with grief rejections and challenges in his life. The entire play was marked by metaphors and symbolism displaying the enthralling journey of conception to abandonment. Another drama was performed by 'Kshitiz' on the theme of COVID-19 pandemic. The drama elegantly portrayed the difficulties faced by common people and the contribution of politicians in their lives.

Next came the classical dance society, 'Nazaakat' which performed three native dance forms – Odissi, Bharatnatyam and kathak. All of them were beautifully choreographed and filled with vivid and narrative face expressions. The audience was mesmerized by their captivating outfits and graceful hand-eye coordination. 'Euphony', the western music society, rocked the stage with their bold and energetic vocals. They performed a pop song 'We are young' which cheered the spirit of the audience.

Finally North-eastern society enlightened the overall mood by their vibrant dance performance. Each participant wore a dress indigenous to a state representing the culture and tradition of the same. The society symbolizes unity and integrity within the diverse cultures of India. The day was concluded by a vote of thanks given by Saungrya Rastogi to the honorable chief guest, chairperson, principal, faculty members, staff members and all the participants for making the event a great success.

On the next day, through online mode, the closing ceremony was held at 5:00 p.m. in the evening, imparting gratitude towards the college and administration for supporting the participants throughout the event. It was indeed a delight to participate and attend the event; the warm memories will definitely stay with everyone forever.

Flower Show 2022: Gargi Blooms

Ananya Chamola, Editorial Team

"The very best relationship has a gardener and a flower. The gardener nurtures and the flower blooms."– Carole Radziwill

On 11th March 2022, the Garden Committee in association with the Department of Botany, organised the flower show called *"Gargi Blooms"*.

The Teacher in Charge Dr. Renu Soni took the charge and made sure the floral glory of the Botany Department was presented beautifully before the arrival of the main guests. The flower show began with the felicitation of our Principal ma'am, Dr. Promila Kumar, by the Garden Committee members with a handmade bouquet.
This was followed by sapling distribution to teachers as well as students by Principal ma'am, the Garden Committee and the teachers of the Botany Department. Students enthusiastically participated in sapling distribution and promised that they would take care of them with utmost love.

There were 35 different species of flowers on the display. *Clarkia*, *Poppy*, *Dahlia*, *Sweet Alyssum*, *Snapdragon*, *Salvia*, *Petunia and Pansy* were just a few of them. The flower arrangement made an extremely picturesque scene.

Everyone had a good interactive session with the teachers and the gardeners who were explaining the various kinds of saplings that were up for take. All the visitors were mesmerised by the beautiful flowers and were enjoying themselves by taking pictures and getting to know about various kinds of flowers.


Clarkia


Gazania

Virtual Alumni Meet 2021

August 14, 2021
By Ritu Kumari, Batch 2020
Dr. Renu Soni, Dr. Reema Mishra,
Dr. Preeti Agarwal, Dr. Neha Singh

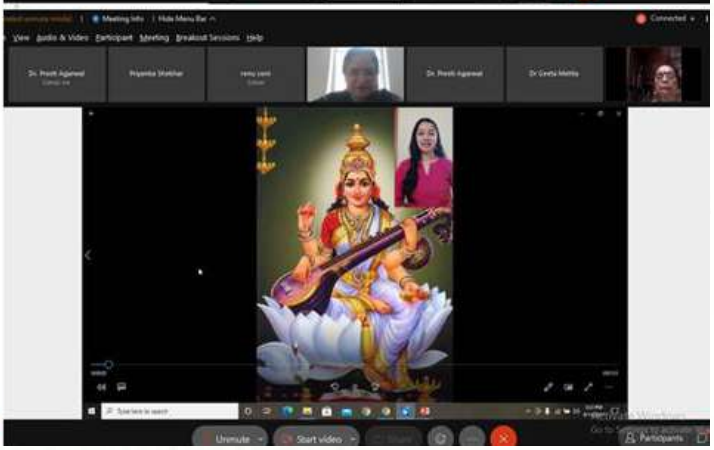
The Department of Botany, Gargi College, University of Delhi organized an immersive virtual Alumni Meet on August 14, 2021, on CisCo Webex Platform under the aegis of the principal, Dr. Promila Kumar, and honourable retired faculty members. The event was well put into order by the organizers, Dr. Renu Soni, Dr. Reema Mishra, Dr. Preeti Agarwal and Dr. Neha Singh. The occasion commenced with a welcome address for all the attendees, followed by a beautiful Saraswati Vandana.

A video compiling memorable parts of the connecting link, Gargi College, was played. This was followed by a heartfelt address from superannuated teachers, Dr. Ahalya Chintamani, Dr. Shashi Tyagi, Dr. Usha Prasad, Dr. Gita Mathur, Dr. Kiran Prabha, and Dr. Geeta Mehta. The event was dignified by the presence of distinguished alumni, Dr. Suman Govil, Batch 1973-1976. More than 70 alumnae from batch 1973-2020 had graced the affair.

It was made more interesting and enjoyable with skilfully put games like Early Bird, Pictionary and Treasure hunt. The platform allowed everyone to share their experiences of the college.

With an objective to strengthen, nourish and perpetuate the relations among the alumni and the students, to allow the enrolled students to receive guidance on career aspects, internship or training opportunities, counselling and much more, the department along with voluntarily participating alumni, introduced the Alumni Student Interaction Forum, Samavaya, while concluding the event. The department is keen on organizing Alumni Lecture Series in upcoming sessions in order to vitalize the students with knowledge and exposure. The meeting concluded with a formal vote of thanks. The virtual reunion was a success with the alumnae participating jovially and sharing cherished memories. It received humongous appreciation from each and every one.

Glimpses of Alumni Meet 2021




Dr. Preeti Agarwal
Sheela Kumari
Dr Geeta Mehta
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Dr. Preeti Agarwal
Sheela Kumari


Speaking: Reema Mishra
Dr. Preeti Agarwal
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Viewing Renu Soni's screen
GC Botany
Alumni Student
Interaction Forum
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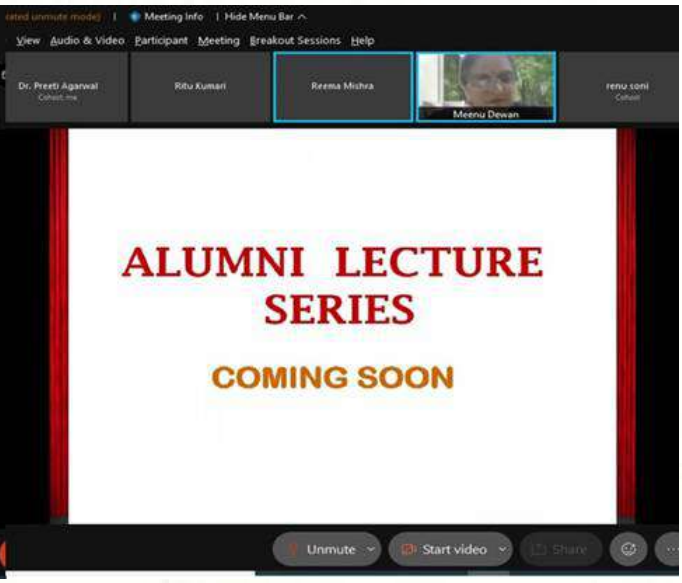
ALUMNI LECTURE
SERIES
COMING SOON
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Alumni Lecture Series (2021-2022)

Conveners: Dr. Renu Soni (TIC), Dr. Reema Mishra
Organizers: Dr. Preeti Agarwal, Dr. Neha Singh
Student Coordinator: Ms. Akshita Sharma

Alumni are crucial to any institution as they help in building and grow an institution's brand, continue to benefit the institution from their skills and experience and serve as a great role models for current students. They also offer practical support to their students as they begin their careers.

With all this in mind, Department of Botany Gargi College, University of Delhi organized an Alumni Lecture Series for its students so that they can be guided by prestigious alumni about the courses available, institutions, scope, how to go about a particular career and how to select what fascinates and interests one such that they become an inspiration for the upcoming generation.

The Inaugural lecture of the series was held on 18 September, 2021. The speaker for the lecture was Dr. Shashi Tyagi (Former Principal and Associate Professor of Gargi College, University of Delhi). Her topic of the talk was "Careers for Biological Science Graduates. Her talk included information about various scientific career options after graduation. She also discussed about different vocational course other than academics that student can pursue post-graduation She also provided details on several institutes in India and overseas where students can study a variety of courses. The logo for GC Botany Alumni-Student Interaction Forum (SAMAVAYA) was also released the same day.

The second lecture of the series was held on October 23, 2021. The speaker for the lecture was Dr. Suman Govil (Superannuated as Senior Advisor from Department of Biotechnology, Ministry of Science and Technology, Government of Delhi). Her topic of the talk was "Crafting your Career". She provided information about different funding opportunities, courses, essential skills for employability, job search, CV and interview preparation strategies.

Third lecture of the series was held on November 27, 2021. The speaker for the lecture was Dr. Saloni Mathur (Scientist IV, National Institute of Plant Genome Research, New Delhi). Her topic of talk was "Making Sense of Non-sense RNAs".

She talked about miRNA-mediated stress regulation in Arabidopsis and rice.

Fourth lecture of the series was held on January 22, 2022. The speaker for the lecture was Dr. Madhurima Kahali (Publishing Editor at CRC Press Taylor and Francis Group). Her topic of talk was "The World of Scientific Publishing". Her career from Botany Undergraduate to Publishing Editor II, Life Sciences at Taylor and Francis was detailed in her presentation. She also talked about different criteria (qualifications, interview preparation, eligibility etc.) required for getting into the editing field. She also provided information about different companies which recruit students in this field.

Fifth lecture of the series was held on February 12, 2022. The speaker for the lecture was Ms. Swati Chugh (Director, Producer, Editor and Writer). Her topic of talk was "Journey of an Award Winning Filmmaker". Her talk included her journey from the Corporate World to Filmmaking. She advised students to identify their passion and hone their skills and knowledge.

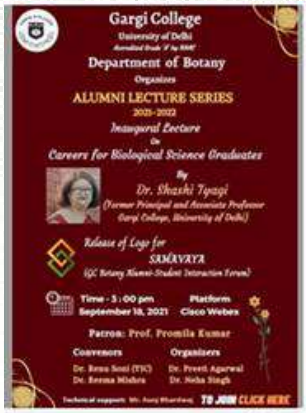
Sixth lecture of the series was held on February 26, 2022 on the topic "Teaching as Profession: All you need to Know". The first speaker for the lecture was Dr. Atika Chandra (Associate Professor, Maitreyi College, University of Delhi). She provided information about the qualifications needed to enter in the field of college teaching. Ms. Avi Mendiratta (Tutor (Biology) at Byjus) was the second speaker of the day. She went into great detail on how to get into the coaching field. Ms. Preeti Sharma was the third speaker (Teacher, Delhi Government School). Her talk covered information about qualifications and exams clearance required for government school teaching, the exams to be qualified for getting into government school teaching. She also discussed the many levels of education offered at the school level, which include pre-primary, primary, and higher education.

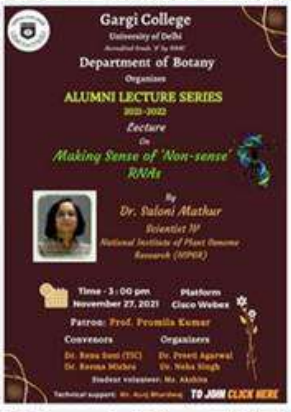
Seventh lecture of the series was held on March 12, 2020 on the topic "Scientific Research: Enrollment and Career Opportunities". The first speaker of the day was Dr. Nidhi Gupta (Social Scientist and Consultant, Imperial College London, UK). Her talk included information about the opportunities available for pursuing higher studies and research abroad. She also discussed how to use various social networking sites to learn about the job openings in the UK and how to apply for various courses and employment there. She also discussed the several exams that one must pass in order to travel abroad.

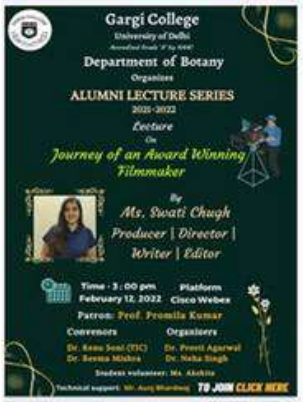
She also gave students motivational tips. The second speaker of the day was Dr. Pinky Agarwal (Scientist V, National Institute of Plant Genome Research, New Delhi). Her presentation covered information about various courses exams and fellowships available at post graduate level. She also talked about various funding agencies, internships opportunities available at both undergraduate and postgraduate level. Eighth lecture of the series on the same topic was continued on March 13, 2022. The first speaker for the day was Dr. Nidhi Sharma (Research Specialist, Stanford University, Stanford). She talked about criteria required for getting into PhD programs in US. She also stressed the importance of several examinations (TOEFL, GRE), recommendation letters, research statements, and research experience when it comes to pursuing research overseas. The second speaker of the day was Ms. Gayatri Tripathi (PhD student, Department of Plant Molecular Biology, South Campus, University of Delhi). She talked about various entrance examinations, fellowships, internships. She also provided a list of criteria for students who should and should not pursue a PhD, what they can do thereafter. More lectures on career prospects were organised with speakers being- Ms. Barkha Ravi (PhD student), Ms. Preetam (Sub Inspector), Ms. Sneh Kunwar (UPSC aspirant) and Ms. Vedika (IP expert). To conclude the Alumni Lecture Series 2021-2022, the Valedictory lecture entitled "Graduation and Beyond" was delivered by Dr. Gita Mathur (Former Associate Professor) Gargi College.

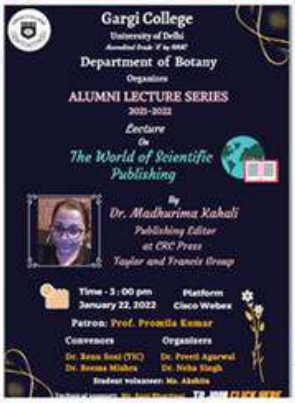
The event was a huge success in terms of connecting and networking alumnae and current students, which was the main goal.

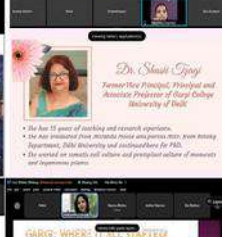
Glimpses of Alumni Lecture Series 2021-22

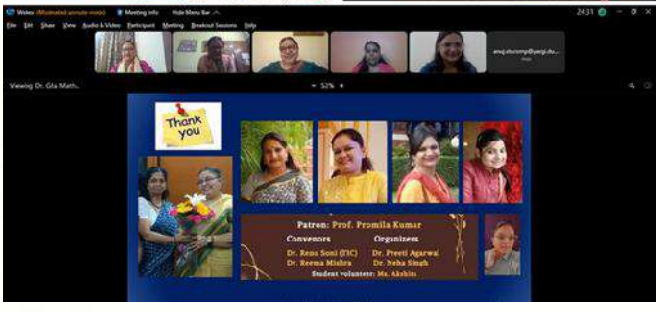


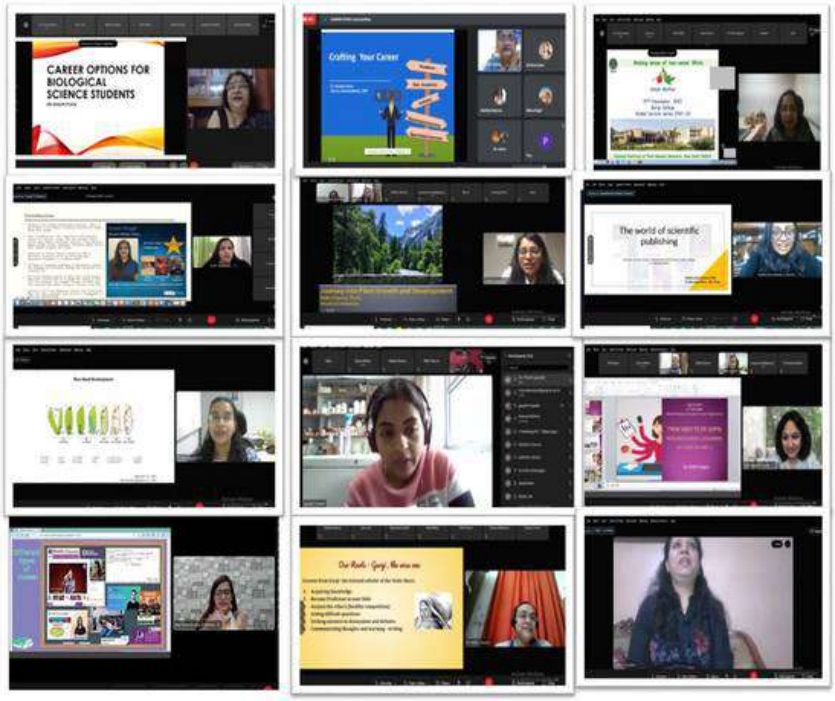


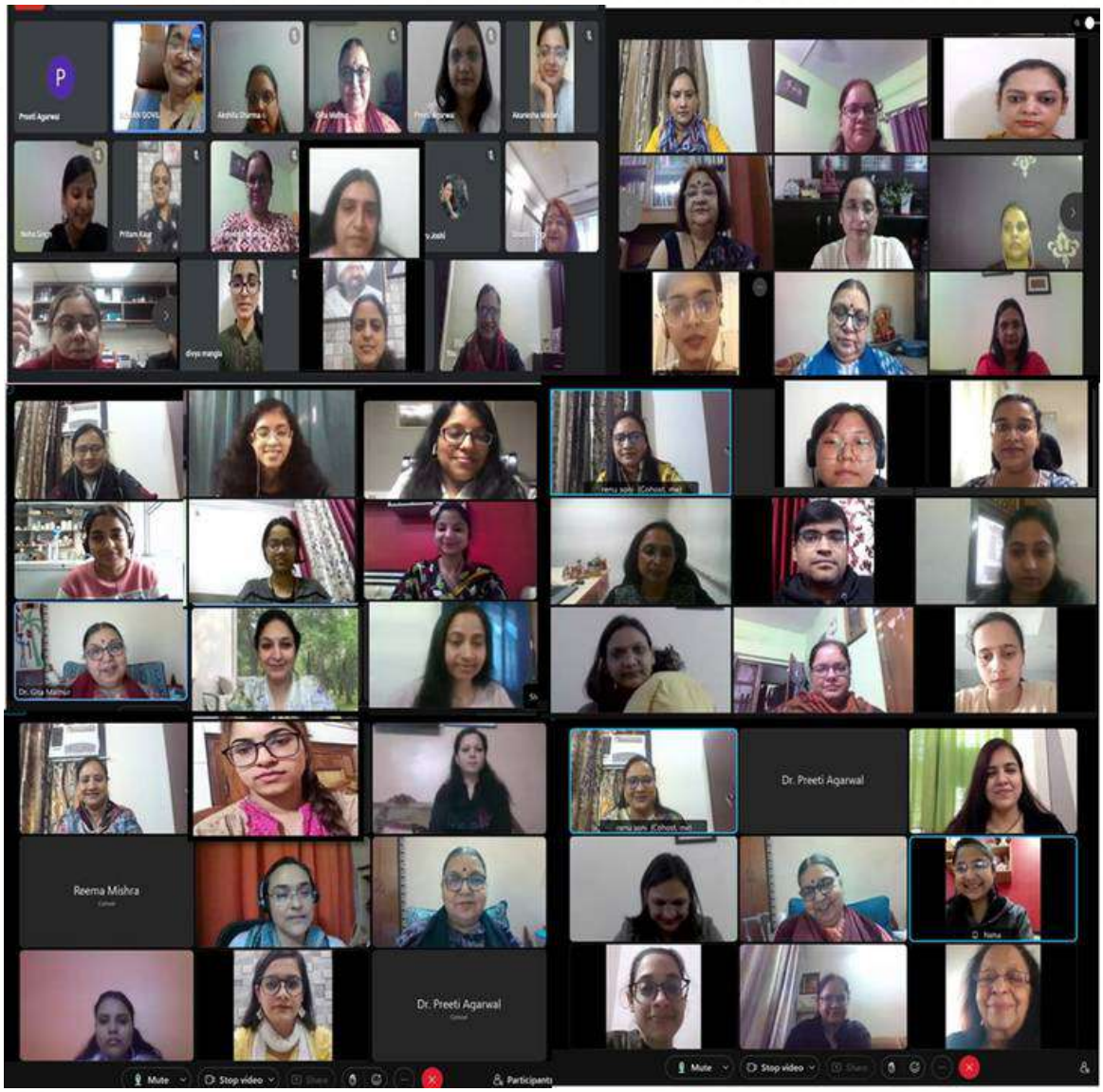









CAREER OPTIONS FOR BIOLOGICAL SCIENCE STUDENTS
Crafting Your Career
The world of scientific publishing


Dr. Preeti Agarwal
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Dr. Preeti Agarwal
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Add On Course on Eco-friendly Agriculture

Yashasvi Saini, Co-Editor

"The Key to Understanding and Enhancing the Future is just One Word: SUSTAINABILITY."

The Department of Botany organised an Online-Add On Course on Eco-friendly Agriculture for second and third-year students from diverse educational streams. The course is self-financed and, Dr Promila Kumar (Principal, Gargi College) is the Patron while Dr Priyanka Pandey and Dr Geeta are the Conveners. The course aims to make students aware of the organic practices carried out in the agricultural field. It is a curriculum-based course, and the lectures are taken by experts and eminent speakers dealing with various aspects of sustainable agricultural practices and scope in India.

The starting of the course was marked by the inaugural lecture on 26th October 2021. Dr Y.V Singh (Principal Scientist, Division of Agronomy, IARI Pusa), Dr Rupam Kapoor (Department of Botany, University of Delhi) and Dr Pranjal Hazarika (Joint secretary PWD, Agriculture, Animal Husbandry, Fisheries, Civil Aviation UT of Dadra Naga Haveli Daman and Diu) were the eminent speakers for the day. They discussed the trends of NPK fertilizers use in various states of India and the progression and acceptance of organic farming in the country. The subsequent lectures were taken by-:

- Dr Gita Mathur [Associate Professor (Retd.), Department of Botany, Gargi College, University of Delhi] on "Eco-Friendly Agriculture and Biofertilizers" (1st November 2021)

- Dr Reeta Khosla [Associate Professor (Retd.), Department of Botany, Zakir Husain Delhi College, University of Delhi] on "Biofertilizers: A new tool for Sustainable Development" (30th December 2021)

- Dr Dinesh Kumar (Principal Scientist, Division of Agronomy, ICAR New Delhi) on "Productivity, Quality and Safety of Organic Products" (26th February 2022)

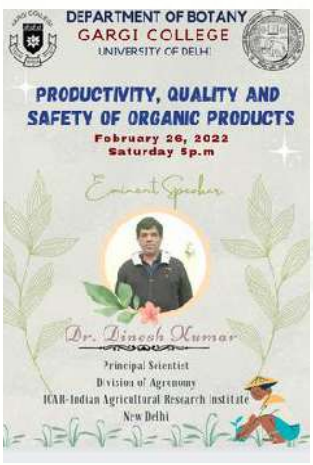
The faculty members of Botany Department, Gargi College namely, Dr Geeta and Dr Akanksha Madan, also took the online lectures pertaining to the course topics viz. Biofertilizers and Mycorrhiza respectively.

Visit to Pusa Krishi Vigyan Mela

The first offline visit of the add-on course was to Pusa Krishi Vigyan Mela at Mela Grounds, Pusa, New Delhi, on 10th March 2022. The field trip was organised to make students aware of the recent and upcoming sustainable practices in the agriculture world. There were many stalls like pest control, new hybrids, hydroponics, organic food etc., displaying products and technologies for newer and safer methods to be adopted for eco-friendly agriculture. After having a thorough visit of the stalls, students were led by the teachers and Dr Dinesh Kumar towards the fields. Dr Dinesh Kumar told the students about "Organic Nitrogen Management in Basmati Rice-Wheat System". The field trip was both informative and enjoyable.

There are more lectures and offline visits planned to make students acquainted with the real life practices of organic agriculture. The Department of Botany and students are grateful for this opportunity of getting a chance to know more about organic agriculture via the add-on course.

Online Lectures



Visit to Krishi Mela

Valedictory Lecture

Yashasvi Saini, Co-editor

Gargi College Botanical Society - TARU organised the Valedictory Event for the session 2021-2022 on 12th April 2022 at 3 pm on Cisco WebEx with Dr. Anil Kumar Tripathi, Director of the Institute of Science and Professor at Banaras Hindu University being the Chief Guest. The event commenced with Dr Garvita (Faculty Advisor, GCBS) welcoming Dr. Tripathi- Director of the Institute of Science and Professor at Banaras Hindu University followed by lamp lighting by the chief guest. Pallavi Sahu (Secretary, GCBS) performed Saraswati Vandana, as mark of respect towards education and teachers and introduced the audience to the Department of Botany and the Gargi College Botanical Society- TARU and Departmental Annual Magazine, ANTHESIS. The much-awaited talk on "Synthetic Biology" started with Dr. Tripathi accentuating that Molecular Biology, Genetic Engineering and Synthetic Biology are indeed all different from each other based on some unique features. He elaborated on how synthetic biology aims to design and engineer biologically based parts, novel devices and systems as well as redesign the existing natural biological systems. involving four main steps- Design, Modeling, Synthesis and Analysis, where design and modeling steps are computational, and the synthesis and analysis steps are experimental-based. The concept was beautifully explained by the speaker who incorporated the examples of Lego Building Blocks and Assembling a Car in his talk to emphasize that by synthetic biology, we can fabricate a variety of structures by using different permutations and combinations to make a new living system or recreate the existing one. Dr. Tripathi further explained the first self-replicating synthetic bacterial cell, Mycoplasma mycoides along with some important examples related to the applications of synthetic biology.

GFP- Green Fluorescence Protein used to produce clones with green fluorescence
Production of volatile plant terpenoids (rose oil) from yeast cell factories
PROVEN- a Biofertilizer that reduces the need for corn plants for nitrogen
CALYNO- high oleic acid soyabean oil
THE IMPOSSIBLE BURGER- a vegetarian burger that tastes like meat

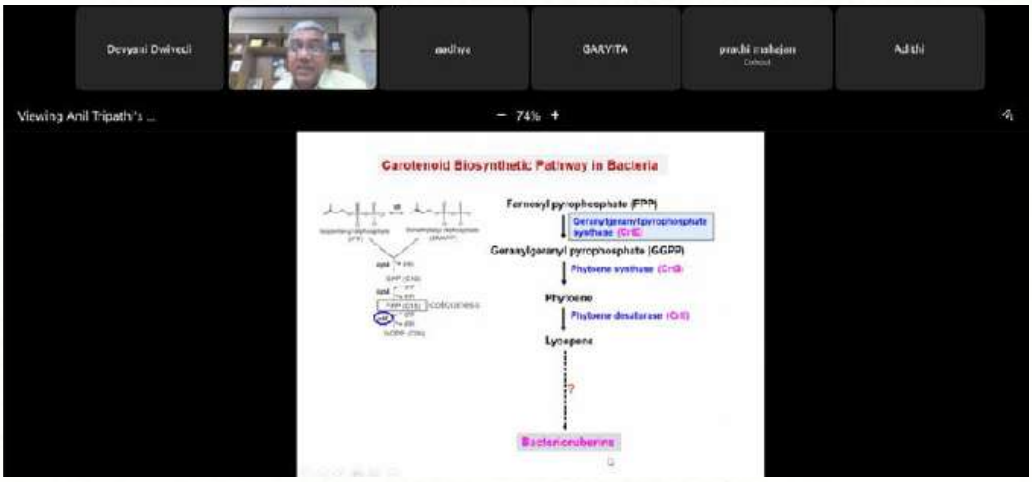
Dr. Tripathi also took the young audience back to their basics in biotechnology, elaborating on the Lac Operon Model, from there the session developed further into the details and working of BioBrick technology, which uses DNA sequences that conform to a restriction enzyme assembly standard. These building blocks are used to design and assemble larger synthetic biological circuits from individual parts and combinations of parts with defined functions. Professor.

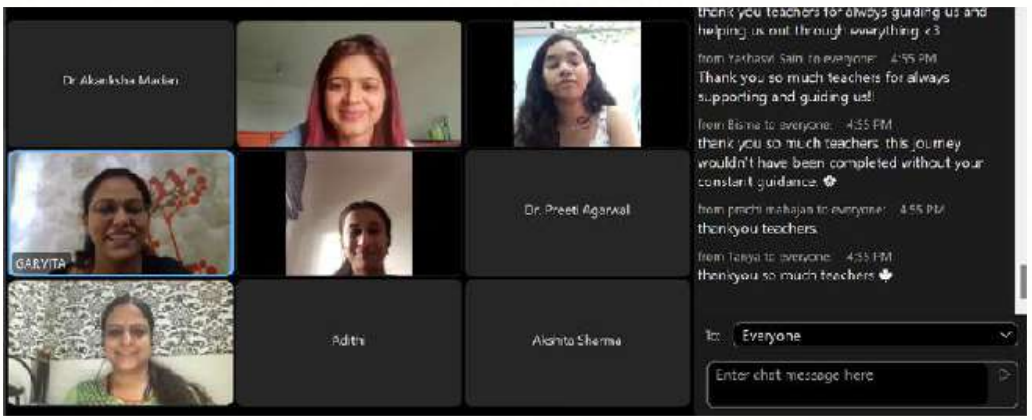
The lecture was made even more exciting and enriching as Dr. Tripathi shared with the audience his recent ongoing research projects on *Azospirillum brasilense* and inducing glucose utilization in the *Rhizobacterium* and artemisinin production). All the participants were thrilled and excited by the lecture and were eager to ask questions related to his talk WHO enthusiastically settled a storm of questions pouring in from the students. The valedictory lecture was featured with the cover reveal for this year's annual magazine- ANTHESIS.

With gratitude, on behalf of the entire department and audience, Shubhi Srivastava (Vice-President, GCBS) delivered a vote of thanks to Prof. Anil Kumar Tripathi who had made place for us in their busy schedule and delivered an enthralling talk. Shubhi also thanked principal ma'am Prof. Promlia Kumar for supporting the department throughout the session, superannuated teachers for always supporting us with their warm presence, teacher-in-charge Dr. Renu Soni for encouraging us throughout and the teachers of the department for guiding the students throughout. On behalf of the entire GCBS Team, Shubhi thanked faculty advisors- Dr. Garvita Singh, Dr. Preeti Agarwal, Dr. Akanksha Madan and Dr. Pritam Kaur, for their constant efforts and support to make this event a success and GCBS & Anthesis team members for working beyond their comfort zones for this event.

She then proceeded to thank the non-teaching faculty of Department of Botany who have always played an integral role in the success of the session and in all activities organized.The session ended with a small compilation beautifully putting together this session's memories and achievements.

Glimpses of the Event





Special Feature

Articles by esteemed retired professors and alumni of the Botany Department

Origin and Evolution of 'Anthesis'

Dr. Gita Mathur

Anthesis is the annual publication of Gargi College Botanical Society. Sixteen volumes have been published, let us glance at its origin and evolution over the years. In the year 2005, when Gargi College Botanical Society was still at a growing stage the thought of starting a publication was welcomed by the students. With advancements in information technology and developing online social media, a wave of short forms and acronyms had gripped the youth and good hold on communication skills seemed to be threatened.

This was the right time to encourage students to inculcate writing skills. Thus, the seed of origin of GCBS publication was sown. Search started for a good, meaningful, and appropriate name. As the staff advisor to GCBS, I insisted that the students should find the suitable name. The then GCBS president, Neena Priyanka took this up and discussed with all the students. Basis for selection was that the name should be a botanical term which identifies with the spirit of the publication. She was successful in shortlisting three names and the third-year students organized a discussion and finalized the name as "Anthesis" which is the botanical term for opening of a flower. Seemed very appropriate and hence was instantly accepted by all.

The aim of Anthesis was to encourage students to learn to write well, know the difference between writing an assignment and a scientific article for publication, develop good vocabulary, learn to express well and not just ask for articles and select good ones for publication. The idea was to help students to grow, not just test them. This was the basic difference from any other college publication.

How did we start this process? First, we asked interested students to make an editorial team with representatives from all three years. This team met me in college EC breaks to discuss and pool ideas. Students were asked to select some botanical topic to write about and make a basic layout for the article in points. These we called as 'concept cards'.

Anthesis editorial team members then discussed with the writer, and faculty advisors on the Anthesis team helped in deciding what details should go into writing and where to get more information from. With many readings and working together the writer developed confidence to structure the article, improve the content as well as make the language crisper and free flowing. In the process editorial team members also picked up skills for editing. All writing was done in Microsoft word Arial font size 12 to ensure uniformity as most writers were familiar with this. Discussions were held on ensuring originality of writing, how to detect and prevent plagiarism, and issues related to copyright. Adding photos was kept to minimum as there were no grants for expensive printing. For the first issue we managed to get a sponsor who got front and back cover printed, and all pages photocopied and spiral bond. Neena Priyanka designed the cover page using a photograph of *Calotropis procera* with flowers at anthesis stage. It was a great learning experience for the whole Anthesis team to go to Nehru Place and get the first issue processed.

The first issue of Anthesis.... The happy smiles of President Neena Priyanka and Vice-President Divya Vashisht.

The Editorial Team with Principal Meera Ramachandran releasing the first volume

Covers of Anthesis Volumes 1 to 5 as printed

Next four volumes were published with coloured covers and binding, all covers were designed by students. As the cost of printing increased, it was decided in a staff meeting to stop the publication or find some regular sponsor. Student enthusiasm had built up by then, hence we started looking for a solution. It was decided to bring out soft version and distribute on CD, pen drive or email to all students and staff. Hence started a new chapter of Anthesis.

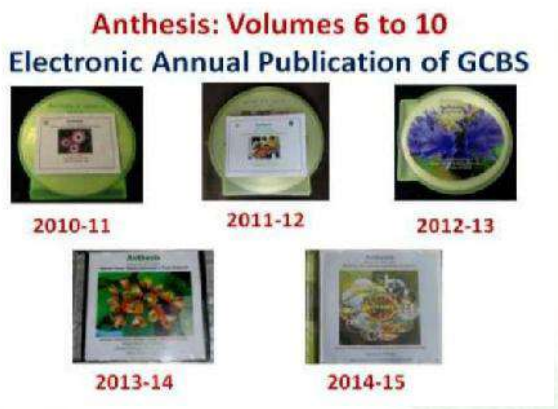
Volume 6 was distributed on CD, the editorial team of Sohini Deb as a student editor, spent time and efforts in writing the CD's as well as pasting the cover on top and contents page at the back. The result was an amazing output with numerous coloured photographs, all the GCBS members were thrilled to receive the Anthesis Volume 6 on CD.

GCBS e-Anthesis vol 6

In addition to our publication being environment-friendly by not printing, the compilation was also totally paper-free as all editorial interactions were through email. There are many more advantages of making Anthesis an e-publication.

Botany Hons. 2011 batch with CDs

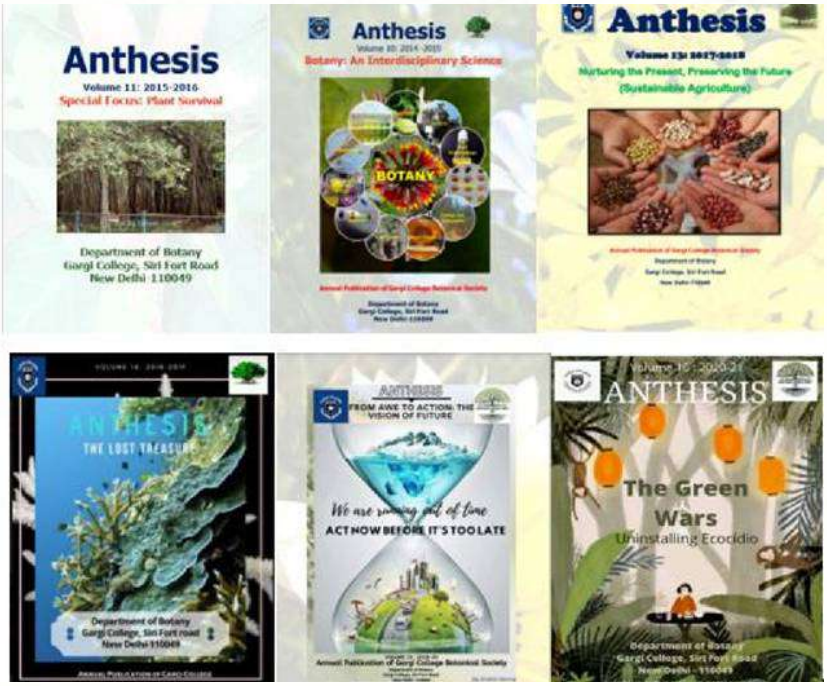
- Copies of e-Anthesis 2011 were distributed in the form of CD's and it was available to anyone who wanted a copy on a pen drive.
- Link to the online e-Anthesis was sent to all interested.
- This way we reached more readers and readership was not limited by the number of printed copies.
- We certainly saved on the heavy cost of printing numerous copies.
- Students were learning the skills for this electronic mode of publication.
- Active discussion sessions instilled confidence in students for using advancements in information technology.



CD covers of Volumes 6 to 10

• This gave our students an edge over their peers.
• Writing, modifying, and editing was so much more conveniently done without having to write and rewrite the articles.
• Value addition in the form of photographs was a great asset and made reading more enjoyable.
• We added photographs of our Gold Medal winners and academic achievers too.
• Most of the photographs added to articles, were self-clicked or scanned by the editors, those downloaded from the net were checked for belonging to the free domain.
• Students were made to understand copyright issues and all articles were cross-checked to prevent plagiarism.

Anthesis Volume 6 was released by the chief guest on Gargi College Day with words of appreciation by the then principal Dr. Meera Ramachandran. Anthesis CD was given to all guests on the dais. It was thrilling to be informed later by the principal that Anthesis was highly appreciated by many guests including the college chairperson and well-known educationist Professor Panchapakeshan. All other departments were encouraged to bring out their publications in the form of electronic version*. Now, within ten years college has all publications including the college magazine as electronic versions linked to the Gargi College website. Our department is the proud pioneer with eAnthesis.



Covers of Anthesis Volumes 11 to 16 soft copies

Another first in this volume was the addition of a section where our alumni have sent write-ups about what they did after graduation from here and what they remember about Botany department. This generated an interaction among our present and old students. It also helped students to get informed guidance from their seniors. Other new sections added with this
issue were on 'Famous Botanist' and 'Famous plant'.

In the sixth volume the articles on 'Father of Indian Botany' and on the 'Chocolate Tree' marked the beginning of these sections. These sections were looked forward to in subsequent volumes. A small compilation on academic and laboratory staff was also added for the first time. Superannuated members will be among us always through this mode. The readers enjoy the fun pages too. This detailed restructuring was possible as there was no limit to the number of pages in this electronic mode.

Seventh volume of Anthesis added another feature, it was decided to have a 'Special Focus" for the articles every year, in addition to general ones. The articles were hyperlinked to contents page to facilitate easy excess for the readers. The whole volume was also converted to email friendly PDF format. The steady growth every year is very encouraging to note. Everyone in Botany Department is proud of this annual publication. It is very commendable that despite the ongoing pandemic Anthesis is being published, the editorial team carried out the whole process without even meeting for a group photo as evident from the photos of editorial teams here.

We would like to thank all the teachers, alumni and students who have contributed their time and efforts for writing articles, editing, collecting information, and helping in compiling and reviewing all the published sixteen volumes of Anthesis. Constant support and encouragement of our college Principals Dr. Meera Ramachandran, Dr. Shashi Tyagi and Professor Promila Kumar has been a great source of inspiration for the student editorial teams and the faculty advisors.

Looking forward to the next volume and wishing that Anthesis will keep on rising with more innovations by coming editorial teams.










Editorial teams of digital volumes of Anthesis 7 to 16

Fascinating Lores of the Plant Kingdom

Dr. Ahalya Chintamani

What exactly is a plant? We all have some notions as to what a plant is, usually a green organism that we eat and use for decoration and shade. It is difficult to completely define the word plant for example, not all plants are green and some plants consume animals. Indeed, many plants do not look like or act like plants at all! We have not given plants much thought.

To dispel this notion, consider the giants of plant kingdom- *Sequoia* (*Sequoiadendron giganteum*) which is tall and slimmer relative to the coastal redwood *Sequoia sempervirens*. These cloud piercing trees are the world's tallest organisms as they would tower above our nation's capital, dwarf the Saturn as well as the rockets that flew astronauts to the moon! A 20-year-old sapling mere spring of a thing is often more than 1.5 metres to 50 feet high.

The general Sherman Tree of California weighs 14,000 tons which is equivalent to 13 space shuttles, 20 million boxes of toothpicks, 200 elephants or 10 blue whales – animal kingdom's largest representatives. The oldest giant *Sequoias* are almost 3200 years old! Meaning that the trees growing today were already 200 years old when King David ruled the Israelites!

In its 70s - the sunset years for humans, a *sequoia* is still a teenager and bears its seeds. A mature tree produces about 8000 cones per year each of which contains about 200 seeds.

Each of these seeds weigh less than 0.01 grams, a mere hundred billionth fraction of the weight of a full-size tree. Even the large redwoods seem like youngsters when compared to bristle pine cones- gnarly low-lying conifers that seldom grow higher than 9 meters (30 feet).

http://justfunfacts.com/interesting-facts-about-giant-sequoias/

Many of these pines are more than 5000 years old meaning that they have been growing since 500 years before the pyramids were built. Unfortunately, recent wildfires have killed up to a fifth of all giant *Sequoia* trees. (source- The Associated Press Los Angeles November 20, 2020 one 3:10 PM)

Although *Sequoia* trees are fire friendly as they have thick bark that insulates them from fires. Also heat helps in release of large number of seeds from the cones. The recent Castle Wildfire killed approximately 9,530 arcs of giant *sequoia* trees. The average age of the burned trees is estimated to range from hundreds to as much as 2000 to 3000 years.
Plants affect virtually all aspects of our lives, many of which are economically very important. Foxglove (*Digitalis purpurea*) contains cardiac glycosides used to treat congestive heart failure. These plants have saved the lives of many heart attack victims along with *Digitalis lanata*.

The Maritime search for pepper!
Piper nigrum is the source of black pepper which is the most commonly used spice around the world. The lore of pepper- the only spice that could make decaying or heavily salted meat edible, is such that pepper drew Columbus and medieval merchants to discover the rainforest areas of earth. For Europeans, North America was a by-product of maritime search for peppers.

Tea is made from leaves of *Camellia sinensis* , a small evergreen shrub.
Each year more than 2 million tons of tea is produced from about 25 countries. North America drinks about 40 billion cups of tea per year.

https://images.app.goo.gl/ctY745TQGtJvMJsZ9

The lore of Choclate!

Chocolate is made from seeds of cocoa (*Theobroma cacao*). Because the seeds of cocoa were believed to be of divine origin, botanist Carolus Linnaeus named the plant.

Theobroma meaning "**food of the gods**". It is famous as the main ingredient of the drink given by Cortez to the emperor of Aztec-Montezuma in 1513. Cocoa beans were also used as the currency by the Aztecs who paid their taxes in cocoa beans until 1887. Chocolate has long been considered as an aphrodisiac and it was said that Casanova had preferred chocolate over champagne. Even today, chocolate remains a popular gift for romantics.

Linum usitatissimum with its wing stems and distinctive flowers has been used for centuries for its fibres (stems used to make linen) and linseed oil (crushed from the seeds). Flax fibres are about three times stronger than cotton fibres. The lustre of linen is due to the property of reflecting light by the fibres. Money is one of the most important things we make from plants. Paper money is made from fibre of flax.

Coffee- a tale in currency!

Coffee originated in the Middle East more than 1000 years ago since then it has been used as food, medicine, wine and even as an aphrodisiac. Ever since the Boston Tea Party in 1773, coffee has been America's most popular beverage. Today many people treasure quality coffees and pay more than $100 per pound for gourmet brands. Coffee beans are used as currency in some isolated parts of Africa and you'll be amazed to know that the failure of a Turkish husband to provide his wife with coffee was once considered as grounds for divorce.

https://en.vneconomy.vn/vietnam-the-worlds-second-largest-coffee-producer.htm

Gourmet coffees are made from *coffea arabica* beans. Most plants produce **Robusta** beans which are used to make grocery store varieties of coffees. Each of these coffee trees produces 500 fruits, 1.4 kg (3 pounds) of coffee per year. Robusta coffee is about 2.5% caffeine.

Gourmet coffees are made from *arabica* seeds which are more susceptible to disease and more costly to harvest. Today half of the people in the United States do not start the day without a cup of coffee which amounts to the average consumption of about 13 pounds per year worldwide.

Per year more than 15 billion lbs of coffee produced annually in 50 countries provide more than 20 million jobs. Brazil produces more than 1/3rd of its world coffee helping to make coffee the world's second largest commodity secondary to oil international trade.

Sweet Potato and Shakespeare

Sweet potato was once considered as a strong aphrodisiac. When Sir john Falstaff, a character by William Shakespeare shouted "let the sky rain potatoes" in the Merry wiles of Windsor he was hoping for sweet potatoes and not the potatoes we now use to make French fries.

Plant Kingdom is brimming with Unending tales of fascination!

The average *sequoia* needs more than 11 hundred liters of water per day. The energy required to lift water to the tree leaves each day is enough to launch a can of Pepsi into the lower orbit of the earth. Clearly, these giants belie the notion that plants are too static or too quiet to be as thrilling as stupendous elephants or tail preceding dinosaurs. However, these stories of fascinating and useful plants do not stop at sequoia and redwoods. Indeed, plants have fascinating lore.

A Journey: *From being an average student to becoming an Assistant Professor*

Dr. Julie Thakur, Alumna batch 2008

My professional timeline begins in 2005 when I joined as an undergraduate student at Gargi College. I got admission through sports quota as I used to play Volleyball at the National level. I took up Botany (Hons.) because I love plants and genuinely, I found this subject simpler than zoology or microbiology. After taking admission I barely attended any class or practical for the first few months. I was terribly busy with my volleyball practice and tournaments.

But whenever I would attend any practical class, I would do so well in those practicals that my professors would say we should make these slides as permanent slides. They all have been so encouraging and helpful. I knew I have that thing in me, I am just not good at sports, I am good at science too.

When I was studying, it used to be an annual system, so first, we will have internal exams in January and then final ones in April or May. So during the very first exam of Phycology, there were 2-3 subjects clubbed together and I had no idea about it, so I remember correctly that I prepared for half of it and was unaware of the other half. When I saw the question paper, I realised I was supposed to study the half too. But somehow I managed to score decent marks in it and didn't fail. Then we had our Mycology exam, I was surprised that I scored the highest in that exam because I was totally shocked after my phycology exam, so I over-prepared. I had my ups and downs, this is how life is right. Sometimes you are doing too good and sometimes you don't.

So I knew, I have something in me, my faith was so strong that I can do wonders. My classmates, If I could name them: Pooja Ghosh, Gurpreet, Shanaya, Shruti, Asha, Neha Mathur have been really helpful to me, if I will miss some practical, they will give me the instructions as to how to perform those experiments during the final exams. It was during my final year when students are usually confused about what to do, I was confused too. My parents and my volleyball coach wanted me to go for higher studies, I didn't know what do I want for myself. My classmates thought I will do better in sports than in studies, But, my heart wanted something else (Pursue Higher Studies). I got selected for senior national volleyball camp, a step closer to becoming an international player, I left that opportunity and decided I will pursue higher studies.

After my final year exams got over, I started preparing for the M.Sc. entrance exam, Since, I wasn't a very regular student, I didn't have sufficient notes. That time I felt, I wish I had attended classes regularly, because my teachers used to provide the best notes and I decided instead of regretting it, I should really get geared up and start preparing. I used to go to our college library, prepare notes and appear in the entrance exam. I prepared really hard for 15-20 days for the M.Sc. Botany entrance exam, and made sure I don't use my phone, no Facebook, no Orkut (We had Orkut back then) and fortunately, I cleared that entrance and I got admission in M.Sc. Botany, in The Department of Botany, University of Delhi. Since I knew I love plants, I am gonna pursue it further, I am going to do a Ph.D. in it. I had a couple of friends in my class, who demotivated me, and said "you don't know how difficult a Ph.D. is, and you shouldn't be going for it". But again, my faith was so strong that I didn't listen to them, I went for it, and fortunately again, after preparing really hard for the NET exam, I cleared it as well and got into Ph.D. from the same institution, the Department of Botany, University of Delhi. After completing my Ph.D., and publishing a couple of international papers I appeared in Gargi college's job interview.

The very first time I appeared in our college's interview, I couldn't get a position. It was a little surprising, I absolutely didn't like it, but I had to accept it right! Then next year again, I appeared in the interview and I cleared it and I was so happy, my parents were so proud of me that I can't explain it in words. I wouldn't express it in front of people, but I used to feel it in my head that the place where I used to study, I got a job there, I am a lecturer there! I am not dreaming, this is really happening. It is a great achievement. See, I never gave up, I failed quite a lot of times, but as they say "Perseverance is the key". Hard work and sincerity paid off. I want to say to all my readers and students, that never give up, give your best, be honest to yourself, work hard, really hard. If you don't crack any entrance, it is not meant for you, better things are waiting for you. At the same time, have faith in yourself and your capabilities. Choose your direction well and if you love what you do, nothing can stop you from achieving your goal and fulfilling your dreams.

I wish you all Good luck!

Dr. Julie Thakur
Alumna, Batch 2005-08
Assistant Professor
Department of Botany
Bhaskaracharya College of Applied Sciences
University of Delhi, Delhi

Thrive with no Regrets!

Lavleen

Alumna Batch 2019

'Botany besides imparting its scientific knowledge, has made me wonder and respect the creation around us in all forms'

Hello dear readers. I am Lavleen, a Delhiite and an alumina (Batch- 2019) of the home where you are (and I was) fortunate to be a part of. It's a pleasure for me to again wear my writer's shoes and share a few insights on how I was able to maximally soak into what Botany and Gargi as a whole had to offer and how it changed me as a person.

Being a nerd, an intelligent introvert and aiming to be a doctor one day, I took admission into Gargi in Botany (H) in 2016 since I thought it will aid me in my NEET preparation, I will stay here for a year (till I clear NEET 2017 and take admission into MBBS and so, why should I waste my time participating in events and giving interviews to get into TARU or any other society). I also started taking my NEET coaching simultaneously, but by the end of 2016, I had realized that I wasn't Ajay Devgn to ride 2 horses together. It was a year after joining Gargi that I realized I hadn't fully participated (since I wasn't fully present) in fresher's, Zistava, Reverie, Scintillations and other attractive ECAs- this began creating a hole in my heart, with this, a heartbreak was like icing on a cake. I couldn't bear the pain, so I left my coaching and started to fully dwell into what my life had thrown me into. This finally led me to open myself into the vast ocean- a doorway to new holistic learning opportunities – gave interviews (though didn't clear them all, but got to learn from each one of them).

As I let go of my past, more and more opportunities (from participating in almost every event in college, winning medals in Gargi Olympiad , being an integral part of ECO club, and NSS to volunteering in the most awaited fest – Reverie) made me surprised at my potential and that I would have missed a lot had I not let go of my past. This was accompanied by the "learning the names of all the plants in college" spark ignited by our awesome teachers of the Botany department. I was so much drenched by the nectar of Botany, that I started naming spices at my home with their scientific names and now whenever I prepare palak paneer, I recall our experiment of separating plant pigments using spinach in the lab. Botany besides imparting its scientific knowledge, has made me wonder and respect the creation around us in all forms. Can't describe everything in this short article. In the end, I want to convey is the lessons that I have so far learnt- be open and believe that you are at the right place and that it will definitely make you a better version of yourself, be true to yourself, no matter what, don't try to be someone else to fit in because each different type of plant adds to the beauty of the garden (and make it colourful- diversity is the nature's feature), live fully to and see what surprises does Gargi unfold for you. Today I am preparing to be a school teacher with an open heart to what life has to offer and carry zero regrets from my past- yes I am being honest! Hope you gathered a chunk of interesting stuff from my story. Stay blessed everyone.

P.S: shared my favourite pic from college- me sitting at lhs wearing violet top

Love.

Bioremediation: Inherent Phenomenon of Nature

Samiksha Sharma
Alumna, Batch 2019

Bioremediation is natural reduction of toxic chemicals into the less toxic or non toxic forms by microorganisms. Microorganisms are widely distributed because of their ability to tolerate wide range of environmental conditions and their impressive metabolic activity. Certain species of algae (*Cladophora fascicularis* , *Spirogyra spp.*, *Spirullina spp.*), archae (*Haloferax volcanii*, *Haloferax mediterranei*, *Holococcus spp.*), bacteria (*Arthrobacter spp.*, *Pseudomonas veronii*, *Burkholderia spp.*,) and fungi (*Penicillium canescens*, *Aspergillus versicolor* , *and Aspergillus fumigatus*;) have the ability to convert, modify and utilize toxic pollutants in order to obtain energy and cause biomass production in the process (Abatenh et al. 2017; Coelho et al. 2015; Krzmarzick et al. 2018). This capacity of organisms has been accelerated and used in environmental waste management to clean toxic chemical waste.

There are many case studies which show how microorganisms perform their role of cleaning in polluted areas. One such example is of Prestige oil spill where the oil tanker Prestige caused a major oil spill as it sank off the coast of Galicia of North-western Spain on November 19, 2002. According to reports of Safety4sea in 2018, about 22,000 dead birds were found immediately after the incident. They (some experts) also said that marine life could suffer for more than ten years due to this spill.

In 2006, Gallego et al. in their paper reported considerable hydrocarbon depletion from shorelines within the first months after the spill. Also, hydrocarbon depletion was found to be highest in areas where fresh water flowed through the shore rocks. In their study, they isolated heterotrophic bacteria and fungi which are likely to cooperate with cyanobacteria in hydrocarbon biodegradation, from the areas where natural attenuation was taking place. Gallego et al. found that hydrocarbon-degrading microorganisms were widely distributed at the polluted sites, revealing rapid adaptation to the presence of large amounts of fuel.

The case study of Deepwater Horizon in which the explosion occurred on April 20, 2010 in Gulf of Mexico is another evidence for the role of microorganisms in bioremediation. The explosion caused the pipe leakage located 1.6 km under the sea surface. Manuel C. Molles describes that oil flowed for 87 days and up to half the oil released in the Deepwater Horizon spill was consumed and respired by marine organisms, while others believe that the blooms of microorganisms observed after the spill resulted from consumption of natural gas that leaked from the well rather than the oil itself . By both ways it became clear that the environmental impact of the oil spill was lessened by the action of marine microorganisms.

For sustainable future it is important to make use of such natural processes like bioremediation at the commercial scale as it has many advantages like it is a natural process; equipment requirement is minimal; can be carried out in situ or ex situ etc. But there are also some disadvantages associated with it like biological processes are often very specific; time consuming; doesn't cause complete destruction of pollutants; limits its usage. These challenges open the door for scientific community to do further research in this process and make it more sustainable .

As described earlier, the ability of microorganisms to degrade the toxic compounds is now utilized by scientific community in bioremediation technology. One such example is of Namami Gange Project which was approved as Flagship Programme in June 2014 by Union government. Under this programme 261 projects have been sanctioned, one of them is bioremediation. In this, government is spending 26.94 Cr on 8 bioremediation projects of river Ganga (2018 report in nmcg.nic.in).

www.wikepedia.com

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The Road to Sustainable India via the Northeast

Avi Mendiratta, Alumna batch 2018

www.nationalgeographic.com

Have you ever wondered what is the best way to reach the destination of 'The sustainable land'? Is it via the urban developing cities or is it via the places close to nature? Is it via the expensive technology or is it via the modest effective natural techniques? Is it via the weapons of machine world or is it via the weapons of nature? Here is your source of wisdom from the North-East to find these answers!

North-East India is full of traditional practices and is a rich land of about 166 tribes which still live remotely in forests and hills.

These age-old tribes are dependent on natural resources particularly forests and have their own distinct methods to make the most judicious use of nature. It is the homeland of traditional groups who came to this area from various directions. From using natural traditional dyes for dyeing clothes and threads by the Karbis, Tiwas, Mishings, Lalung, Bodos etc. to various unique methods of farming by Mishmi, Angami, Chakesang tribes, we have a lot to learn from them. Here are 3 practices to learn from the North-East, to make our way to a sustainable future.

1. Living root bridges:

Ever wondered that we can do sustainable construction without using concrete, iron, timber, and steel. The Khasi Tribes of Meghalaya grow specialized living root bridges across the riverbanks. These roots function to form a solid bridge. *Ficus elastica* is the star of the show here, which has a lot of secondary roots that are used to form bridges. The bridges contain entangled massive thick roots, that have been intertwined in the form of a

www.tripoto.com

bridge. These bridges are not only eco-friendly but have the potential to allow several people to walk on it at a time. A typical live root bridge takes about 15 years to become strong functionally. The best part of these live root bridges is that they tend to grow even stronger with time. The lifespan of these bridges is about 500 years which is comparatively much more than modern man-made bridges. This process is called bioengineering.

www.cpreecenvis.nic.in

2. **Apatani Water management system:**

The Apatani tribe have a sense of valley cultivation of Rice. Over the centuries, they received the tag of advanced tribal societies in the north-east. The Apatanis have optimized the use of water along with the use of nutrients in the paddy fields.

This has been done with the efforts of village headman. This water management system has multipurpose properties. It functions to integrate water, land, and farming systems. The main idea is to protect soil erosion and conserving water for irrigation along with paddy-cum-fish culture.

Each stream rising from the hill is trapped soon after it emerges from forests channelized at the rim of valley. It is further diverted by a network of channels that are primary, secondary, and tertiary. There is sequential distribution of water from upper fields to lower fields. The tribals utilize the indigenous varieties of paddy and fish. The success rates are very high and has been practiced for many years. It perfectly explains the efforts of tribal farmers towards indigenous and sustainable technology of farming.

www.cpreecenvis.nic.in

Major areas of Apatani system are Hong, Siro and old Ziro. They cultivate *Amo* and *Mipa* varieties of Rice. This system of cultivation can be adopted in the rest parts of the country.

3. **Zabo farms:**

The Chakhesang tribe from Nagaland (the Kikruma village). They practice another indigenous farming technique called Zabo system of farming. The system is based on rainwater harvesting. There is a main tank for water collection, from which water for irrigation is passed via an animal yard. The idea behind is to carry all the urine and dung of the animals to the field that lies below the slope. Apart from this, the farmers make efforts to put in succulent branches and tree leaves in the field for the purpose of enhancing soil fertility.

Zabo Kikruma | DIPR Nagaland-Department of Information & Public Relations, Nagaland

Moreover, Alder land system (*Alnus nepalensis*) is practiced in Kohima district of Nagaland. It is a combination of forestry, agriculture, livestock-rearing, and fishery. It also uses rain-water harvesting techniques.

The sustainable use of resources in the North-East and the strong efforts of these tribal people are a great source of inspiration for the rest of the people of the country. This is a diverse resource-use pattern which is a wise method of using natural resources. No wonder as to why, North-East India is one of the 12 mega hotspots worldwide and is having all the attention!

Unnoticed

Anshita
Alumuna batch 2019

I, a thorn of a weed growing alongside the rose in your ethereal garden. Garden full of gardenias, magnolias, sunflowers and a cactus in that neglected corner.
Cactus might be misunderstood as being dead. For water does not seem to be a desideratum of it's wheezing soul.
To my mind, it is disregarded for it cannot make you happy anymore ;for now you have ceased using it's gel.
That's indeed a misery, for I will be facing the same too in the coming blossoms.

I , a prickling shortest branch you call me, do not possess any fragrance or siderophores to decorate myself.
But believe me, I am alive. I wave when the breeze passes by us both, to compete with you. And to judge the air, I often dangle.

Rose, being beautiful with longer roots absorbs all the water from the soil which looks even barren to my existence besides ignoring me.
Rain clouds which are mine too, but partially shower love on the red petals, drizzling so calm, so gentle that I keep forgetting they dislike me. I reckon, they must be partial in shape and thoughts as well expressing how conservative they are.

Oh Rose! You are beautiful. And beauty craves attention.
Being dominant, you have been inheriting scrutiny since ages.
Let me be with you. For I don't want to stay unnoticed anymore.

Enamored of the rose, I always stumble between aches and being torn .Its corsage begets a fear in me, of ignorance and heart break.
Yes, heartbreaks are dangerous. Since I am ugly, I could not find anyone to love me. And you just left me without any goodbye. Without a farewell note.

I should complain. Shall I?

And now Rose sojourns to new peace without hushing me to death. I wonder. I roam. I stray. Hurting the people coming my way. Is this what you left me alone for ? Tell me ,You are not just mature but selfish.

Oh rose, are you an obligatory parasite or a beguiling human?

Biodiversity and Intellectual Property Rights: Can they Co-Exist?

Tamanna, Alumna batch 2019

https://lawsisto.com/legalnewsread/

Biological diversity is the **hallmark of life on earth.** It forms the **backbone of sustainable development.** The current Intellectual Property Rights (IPR) regime is boosting the commercialization of seed development, monoculture, and protection of the latest plant varieties, microorganisms, and GMOs. As a result, our rich biogenetic diversity is being destroyed permanently. We must determine a path to develop a different approach that would bring a balance between formal IP systems and sustainable aspects of biodiversity.

Biodiversity is the basis of our sustainability. The developed countries aren't rich in biogenetic resources but are better equipped in research and development. They use the biogenetic resources from developing countries. As a result, there is a beginning in the unshielded flow of genetic information from the developing countries to the capital-rich west, and a shielded flow within the reverse direction mainly through patents and Plant Breeders Rights (PBR). It has both visible and invisible impacts. Genetic erosion is one among the foremost important invisible impacts that are at the end of the day manifested visibly with the loss of biodiversity. The Biological Diversity Act (2002) of India has defined several terms. "Biological Diversity" means the variability among living organisms from all sources and thus the ecological complexes of which they're part and includes diversity within species or

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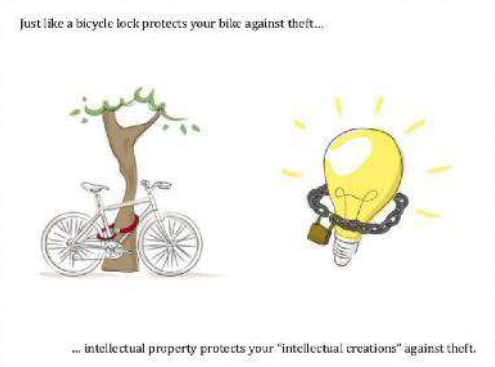

https://images.app.goo.gl/9EDcmX7nn9qeWCyH9

between species and of ecosystems.

Biological resources" means plants, animals and microorganisms or parts thereof, their genetic material and by–products with actual or potential use but doesn't include human genetic material. Intellectual Property Rights (IPR), are meant to be rights to ideas and knowledge, which are utilized in new inventions or processes. These rights enable the holder to disregard imitators from marketing such inventions or processes for specified period of time; in exchange the holder is required to disclose the formula or idea behind the product/process. The effect of IPR is therefore monopoly over commercial exploitation of the idea, for a limited period of time. The stated purpose of IPRs is to encourage innovations, by offering higher monetary returns than the market otherwise might provide.

IPRs like copyrights, patents, and trademarks are centuries old, the extension of IPRs to living beings and knowledge/technologies associated with them are comparatively recent. The U.S. Plant Patent Act was passed in 1930, which gave IPRs to asexually reproduced plant varieties. In 1961, a world Convention for the Protection of latest sorts of Plants was signed. Most signatories were industrialized countries, who had also formed a Union for the Protection of latest sorts of Plants (UPOV). This came into force in 1968.

Plant varieties or Plant breeders rights (**PVRs**/**PBRs**) give the right holder limited regulatory powers over the marketing of their varieties. Till recently, most countries allowed farmers and other breeders to be exempted from the provisions of such rights, as long as they didn't enjoy branded commercial transactions of the varieties.

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https://images.app.goo.gl/EsDqCqbEjHU5DPgX6

Now, however, after a modification in 1991, UPOV itself has tightened the exploitative nature of PVRs/PBRs, and many countries have significantly removed the exemptions to farmers and breeders.

In addition, in many countries, patents with full monopolistic restrictions are now applicable to plant varieties, micro-organisms, and genetically modified animals. The U.S. Supreme Court in 1972 ruled that microbiologist Ananda Chakrabarty's patent claim for a genetically engineered bacterial strain was permissible. This has validated the view that anything made by humans and not found in nature was patentable. Genetically altered animals, like the infamous 'onco-mouse' of Harvard University (bred for cancer research), were also soon granted patents.

Till very recently, these trends were restricted to some countries, which couldn't impose them on others. This has changed however, with the signing of the TRIPs agreement. TRIPs require that each one signatory country accept:

Patenting of micro-organisms and "microbiological processes"; and a few "effective" sort of IPRs on plant varieties, either patents or some single (new) version.

To be eligible for cover, varieties need to be:

- Distinct from the existing, commonly known varieties,
- Sufficiently homogenous,
- Stable and

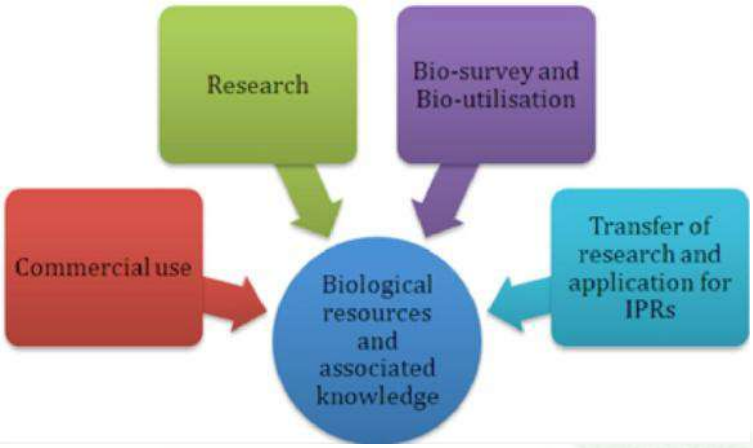
- New in the sense that they must not have been commercialized prior to certain dates established by reference to the date of application for protection.

Value of Biodiversity:

- Diversity is that the most ecologically sustained form.
- Diversified crops maintain soil fertility.
- Diversity improves soil management in rain fed belts.
- Diversity means insurance against crop failure.
- Diversity ensures food security.
- Diversity of variety of foods ensures nutritional balance.
- Diversity provides a variety of fodder to the cattle keeping them healthy and productive.

The advent of new biotechnologies and the capacity to identify and incorporate foreign genetic material into commercial products has forced the pace of change in industry and in Intellectual Property systems. Widespread commercial exploitation of genetic diversity catalyzed by research and development for obtaining IPR will decide the long run of our rich biodiversity.

https://www.ips.lk/talkingeconomics/2011/01/21/guarding-what-is-ours-the-trips-agreement-and-the-protection-of-plant-varieties-in-sri-lanka/



https://allindialegalforum.in/

Conservation and Sustainable Use of Biological Diversity

The successful growth of biological diversity will depend on relationship which will be encouraged between two opposite poles - formal innovative and community systems. For this to figure, policymakers must implement technology transfer with a robust inclination towards active participatory approaches to research and extension. Active contribution means exercising practical power and command over genetic resources by farmers and rural folks that would be reciprocated by the formal system with their analysis, experimentation, professional, institutional and policy changes from time to time so as to release our international commitments at an equivalent time keeping in sight of sustainability of biodiversity. Ultimately, the rationale to conserve our genetic diversity and to encourage innovation out of those biogenetic resources is to enhance the standard of human life and this could always be kept in mind before any invention or policy changes, otherwise our own existence will be at stake.

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The Red Walls

Avi Mendiratta, Alumna batch 2018

A place is not called a home because of its infrastructure and built, it is called one because of the warmth and memories of the family members. Today I can proudly say that although many years have passed but the Botany department of Gargi College is still my second home. My graduation started in the year 2015 and it was astonishing how the very first day we got so familiar with the red walls, the best faculty ever and the adventurous Botany labs.

Every teacher of the Botany family of Gargi College has taught us with a motherly tenderness in their eyes. From helping expertise my subject to focussing on my overall development, they have left no stones unturned in building my future brick by brick. There wasn't a single day which wasn't a growing experience. From addressing our curiousness to taking on excursions to putting in their hearts and souls in planning events, the Botany faculty has never failed to deliver the best of everything. The GCBS-TARU always organised fun events like Pictionary, quizzes, cooking competitions and various others.

Gargi College Botany Department also provided me the great opportunity of a project under 'STAR COLLEGE SCHEME by DBT', Gargi College on the topic "Effect of Heavy Metals on Seed Germination and seedling growth of *Vigna radiata*".

In 2016, we visited Manali as a botanical excursion. The trip was very knowledgeable and filled our college albums with pictures and memories we can never forget. The annual day function used to be my favourite day of the year. Personally speaking, the department has done every possible thing to recognise the efforts of the students.

I gained a lot of exposure to scientific writing by writing for the annual botanical magazine- Anthesis. Lab staff was always sweet to us and always promoted a safe learning environment.

I am highly grateful to the department for helping me grow my interest in Botany and being my pillar of encouragement in life. Thank you!

Man and Earth: From the Outset and Throughout

Surbhi
Alumna, Batch 2021

"Preserve and cherish the pale blue dot, the only home we have ever known" - *Carl Segan*

From the very beginning of our history, Earth has been the supreme power. Nature has its own way to maintain balance, to provide with all the nourishment and flourish life.
Right from the Paleoprotozoic era till today, earth has sustained life with benevolence and unleashed its wrath to cure any disbalance. Earth has been considered holy and honorable in all civilizations of mankind. According to The Hindu literature Vedas, *Prithvi Devi* or the prakriti (primeval energy) has five independent elements: space, water, air, fire and earth, which create the environment. The Egyptians saw the earth personified by *God Geb*. In Greek mythology *Gaia* is one of the primordial deities. It is the ancestral mother of all life. *Tellus* is the Roman goddess of earth.

The man-environment relationship has its foundation lying in the direct linkage of our sensory organs with the elements of earth. Man understood its relationship to the environment and it was considered our moral responsibility to treat it with utmost respect. It was our duty to take care of this symbiotic ecosystem, through simple and sustainable practices. But, along with industrialization and modernization comes our ignorance of the favors of the earth. There have been a lot of consequences of our exploitation. Biggest one being the increased rate of this sixth mass extinction. Numeral floods and draughts aren't to be mentioned, including other lots of extreme weather events, wildfires and so on. Also a lot of biological weapons in the form of zoonoses like plague, Ebola, SARS and of course, COVID 19.

https://www.onegreenplanet.org/animalsandnature/nature-vs-civilization-photos/

According to the 2012 report of the department of international development, UK, zoonoses are responsible for over 2.5 billion cases of human illness annually and this threat increases every year. Deforestation could be the primary reason for this as lack of forest cover and land use increases human contact with them. According to the report in The Lancet, 2009, climate change is the biggest health threat of the 21st century. The mutations occurring in these pathogens are numerous and even with all the advancements in our health sciences, we aren't able to cure them all completely. In the areas with compromised biodiversity, the prevalence of pathogens in blood of reservoir species are found to have increased threefold as compared to undisturbed habitats.

Nature has its way of coming back at us; we occupy the wetlands and we face the calamities, as in Kedarnath; we pollute the oceans and we are awarded with increased frequency of harmful algal blooms, Biomagnification; we interfere in the natural ecosystems and we lose important species and so forth.

What we now need to do is, change our approach a little bit, from every benefit we take, we should do our bit to give it back. It could be as simple as planting more trees or big projects of ecological restoration. It includes revegetation, habitat enhancement, remediation and mitigation. Such as in Everglades, Louisiana wetlands and Mau forests in Kenya. For instance, BRSTM is one such organization of sustainable business experts that works to build a sustainable world. More such initiatives are yet to come and spread. Sustainable future can be concurred, it is achieved by small steps every day.

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Visit to Yakult Danone India: A Day Full of Learnings and Everlasting Memories

Tamanna, Alumuna Batch 2019

I am feeling extremely happy as well as nostalgic writing those moments and the beautiful memories we created that day. Actually Gargi is very special to me and those three years can't be expressed by writing, words fall short to describe what Gargi means to me. Gargi had made me self-confident and helped me to realize my self-worth. It's a full package of academics as well as personal development of its students. According to the rules, I will try to express my experiences and lovely moments which I cherish forever. Every day in Gargi was just wonderful and amazing be it: lectures and practical classes, departmental events, fests, inaugural lectures etc. Everything was just a bundle of knowledge, learnings and experiences shared by Professors. So yes I will now share that day's experience only and will not write more because as I already said Gargi is a feeling which can't be described in words.

In the final year of the course there is a paper Industrial and Environmental Microbiology in which a visit is assigned in the syllabus to any educational institute/ industry to see an industrial fermenter and other downstream processing operations.

Hence the factory Yakult Danone India Pvt. Ltd. was decided for visit which is in Sonipat, Haryana. We went on 15th April, 2019 and everyone was there in the college on time. In the morning, everyone was silent and busy with their phones and gossip. So the morning journey was normal and we reached Yakult factory on time. The staff members of the factory welcomed us nicely. There was a board for our welcome at the entry gate whose picture I am sharing here. After that one person from their team gave us a tour of the factory and made us familiarize with the industrial applications of fermentation at Yakult Danone India Pvt. Ltd. Sonipat, which manufactures Yakult, a fermentation product. This was followed by a presentation session and a group picture. They greeted us with a chocolate and Yakult drink.

Now begins the return journey. We also took lunch in between at a dhaba. Actually the same day I had to go home as well and I came with my big heavy bag. I am from Rohtak so I thought that I would not go to the college again and would take a bus midway so that I could reach home early. But when I asked Reema Ma'am she was like "beta road cross karna padega, it's not safe college chalo and then fir vaha se chale jana." She said so sweetly, how can I deny her? I didn't think twice, and I was like okay Ma'am. This is the best thing about every Professor at Gargi. They treat us as their own children which I love about them. So finally I accompanied everyone in the bus and then started our fun moments. High music, dancing, photographs, selfies and lots of fun and happiness filled the day that was. Renu ma'am, Preeti ma'am, Priyanka ma'am, Gita Mathur ma'am, Ruchitra ma'am, Geeta Prabhakar ma'am all were with us. Everyone danced their hearts out to their favorite songs, and made videos. Some of the pictures I am sharing here.

And we reached college and I would say our short trip ends here with not so short memories but with the everlasting memories. Everyone was like "college bhi aa gya" because we were busy enjoying ourselves together. That day was the best of the days I had in Gargi. I would really like to thank Reema ma'am because of her I would have all the fun and lovely memories, if she didn't stop me that day I would have missed those moments. I reached home late that day but yes it was worth it.

Apart from our visit, I would like to mention the way Gita Mathur ma'am shared her experiences and knowledge with us which was commendable. She was always fond of taking our extra time to show us the pictures/videos she clicked during her visit to excursions. Not just showing us the pictures but also she was equally excited to describe each and every thing that happened. Having knowledge is a good thing but sharing it with your students is what I should say is the best quality of her which is worth appreciating, she is a gem of a person. I would also like to mention that I was selected as the executive member of the GCBS- (Gargi College Botanical Society) in my final year and during the group picture of the team members after the inaugural lecture was over, I was standing at the back and my face was not visible Renu ma'am sitting at the front loudly said "Tamanna beta come in front and sit, your face is not visible their picture sahi nahi aayega". These small- small things matter to me a lot.

One last memory I would like to share is about the research project that me and 4 other girls performed under the DBT Star college scheme. Department of Botany Ramjas College organized a National Level Poster Presentation Competition and we the 5 girls took part in it. We reached College to present our poster and surprisingly after sometime Kiran Prabha ma'am came. Actually she came there to deliver her presentation. We all waited for the result till evening and ma'am was also there and guess what...,we got the 2nd prize. Kiran ma'am gave us a very big smile like she was literally happy and we took lots of pictures with ma'am which I am sharing here. So that day was also a very memorable one for me.

I would like to thank Renu ma'am, Reema ma'am, Geeta Prabhakar ma'am for being the most helpful advisors in our research project because of your guidance, we would have accomplished this and our paper also got published.
With due respect to all Professors of the Botany Department while writing this I remembered and cherished all those moments which shall remain with me forever. Thank you so much for providing me this opportunity to share my experiences for the beloved magazine "ANTHESIS".
In the end, I just wanted to say, "Ek hi to Dil hai Gargi valo, kitni baar logey."
Thank you again.

Once a GARGIAN, always a GARGIAN.

Climate Refugee

Muskan Verma, Alumna batch 2017

Since 1985, when UN Environment Programme (UNEP) expert Essam El-Hinnawi defined "environmental refugees" as "those people who have been forced to leave their habitat, temporarily or permanently, due to environmental disruption that jeopardized their existence and seriously impacted the quality of their lives."

According to the Intergovernmental Panel on Climate Change (IPCC), the most significant single effect of climate change could be human migration, with millions of people displaced owing to shoreline erosion, coastal floods, and agricultural disruption (IPCC 1990).

Climate Refugee in India

India already has a large population and is experiencing rapid urbanization. The population of cities is growing faster than the population in rural areas. The coastal megacities of Chennai (population 6.9 million in 2005), Calcutta (14.3 million), and Mumbai (18.2 million) are all only a few meters above sea level. Due to increased population pressure combined with increasing cyclone frequency and sea-level rise resulting from climate change, millions of people will be at risk of storm and flood disasters. Coastal India is expected to be home to 142 million people by 2050. The total number of flood-affected people in India might be between 20 and 60 million, with 30 million being a plausible estimate. Over 700 million rural Indians rely on climate-sensitive sectors (agriculture, forests, and fisheries) and natural resources (water, biodiversity, mangroves, coastal zones, and grasslands) for their survival and livelihood.

India is one of the world's most flood-prone countries, with annual flooding affecting one-eighth of the country. India is vulnerable to around 10% of the world's tropical cyclones due to its 7516-kilometer coastline. Extremely high temperatures have been observed across the country. In the country's northern parts, on average, 5-6 HW occurrences occur each year.

Challenges faced by Climate Refugees

1. India loses over 2% of its GDP each year due to natural disasters and tragedies. The Kerala floods of 2018 and Cyclone Fani in Odisha in 2019 have cost the country about INR 26000 crores to INR 28000 crores, respectively.
2. Due to institutional and resource constraints, new immigrants face several obstacles in getting a city's services, particularly housing and healthcare services.
3. Many urban migrants are having difficulty finding adequate, affordable housing and shelter. According to the World Bank, due to rural-to-urban migration, developing countries would need to plan for an additional 2.7 billion people by 2050.
4. In addition, healthcare services are typically out of reach for newcomers.
5. Finally, they rarely have legal documentation at their new jobs, making municipal health centers inaccessible.
6. Climate migrants enter systems that typically struggle to accommodate existing populations

Existing National Policies and institutional Frameworks in India

Initially, there was no direct provision for environmental protection in the Indian Constitution. Following the Stockholm conference, In 1976, the Indian Government passed the 42nd Amendment to the Constitution, making environmental protection and improvement a constitutional requirement.easing cyclone frequency and sea-level rise resulting from climate change, millions of people will be at risk of storm and flood disasters. Coastal India is expected to be home to 142 million people by 2050.

Under the Directive Principles of State Policy and Fundamental Duties section of the Indian Constitution, there are particular provisions for environmental protection.

- **Disaster Management Act, 2005**

The Government of India (GoI) established a multi-tiered institutional system that includes the Prime Minister's National Disaster Management Authority (NDMA), Chief Ministers' State Disaster Management Authorities (SDMAs), and District Disaster Management Authorities (DDMAs), which are led by District Collectors and co-chaired by Chairpersons of local bodies.

- **National Policy of Disaster Management (NPDM)**

The Central Government approved the National Policy on Disaster Management (NPDM) on October 22, 2009, and it was sent to all parties involved. The policy envisions a safe and disaster-resilient India by establishing a holistic, proactive, multi-disaster focused culture of prevention, mitigation, readiness, and response.

- **Governmental Scheme**

The Indian Government has implemented various programs. Some of them are

Mahatma Gandhi Rural Employment Guarantee Act (MGNREGA) for employment

- National Rural Livelihood Mission
- Pradhan Mantri Krishi Sinchai Yojana with Watershed component
- Pradhan Mantri Fasal Bima Yojana for crop insurance
- Public Distribution System (PDS)
- National Rural Health Mission, Education for All
- National Make in India
- Solar Mission

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Themed Articles

SEGMENT 1
ALTRUISTIC GAIA: STILL ONE EARTH

SEGMENT 2
ROOTS OF CHANGE: THE STRIFE AGAINST CLIMATE CRISIS

SEGMENT 3
STILL ONE EARTH: A KALEIDOSCOPIC VIEW INTO THE SUSTAINABLE FUTURE

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Volume 17

ANTHESIS

Altruistic Gaia

BREAKING DOWN THE SELFLESS CHRONICLES OF THE EARTH

SEGMENT 1

Lessons from Nature

Surbhi Chaturvedi
B.Sc. Botany (H.), Second Year

At some point or another ; nature teaches us something important in our lives. Only when we look deep into nature, will we understand everything far better and absolute. Whatever we have, whether directly or processed, everything is provided by nature. Love, affection, joy, energy, water, food, shelter, and anything we can think of ever having existed.

The more we detach ourselves from nature, the more we miss out on essential things and learnings. Nature is the one who teaches every living being the act of compassion and selflessness without expecting anything in return.

Following are some lessons we can learn from nature:

What do seasons teach us?

As the season changes, the leaves of the trees turn from green to brown which is a natural process and trees do not stop this, they accept all the changes nature has to offer. These changing seasons teach us to appreciate all changes in our lives and accept them as a natural process. Just as nature is not constant, neither is our life. They are full of twists and turns, highs and lows.

https://www.jetsetter.com/magazine/tv-locations-you-can-visit-in-real-life/

What does a plant teach us?

When we sow a seed in the soil, it takes a long time to germinate and become a plant. It never tries to fasten its process; it grows day by day. Similarly, we should try to achieve our goals in our lives. It can take time, but one day it will all pay off. They teach us slow and steady wins the race.

What do roots teach us?

When we see a tree trying to absorb water and the soil is dry, we can observe that the roots reach out further and further to a point and sometimes we even see that the roots crack through concrete to reach moist soil and absorb water. Similarly, to achieve our goals, we sometimes have to go through harsh conditions but eventually, we reach out to achieve our goals.

What does the sea teach us?

As we know, the ocean is made up of small drops of water, and every drop counts, every drop is important. In the same way, everyone in this world has their importance, be it humans, animals, or plants, only then does this world exist. That's why having faith in yourself is important to move forward in life.

https://www.youramazing places.com/10-beautiful-places-on-earth-that-are-real/

What does a flower teach us?

Flowers spread their fragrance all around the world irrespective of where their fragrance reaches, they only give happiness to the world. They always manage to find a soft corner in our hearts. In this world, the best thing one can give to other people is happiness. Whatever good is inside us, we must share with others.

Every element of nature teaches us something, whether it's the sky, the ocean, soil, plants, the sun, the moon, the stars, whatever exists in nature. It shows us seamless opportunities and fills us with positive energy. Nature never harms anyone; it only supports the world to move on. So be calm, never harm anyone, and spread happiness wherever possible.

As humans, we tend to focus on what's not there for us, we focus on the problems, and that stops our life from moving forward. Instead, we should take lessons from nature and try to improve ourselves into better beings. The lesson is to know what's there, to know when your heart goes on to say yes to everything, to achieve big, that's when your life force comes up and calls for action.

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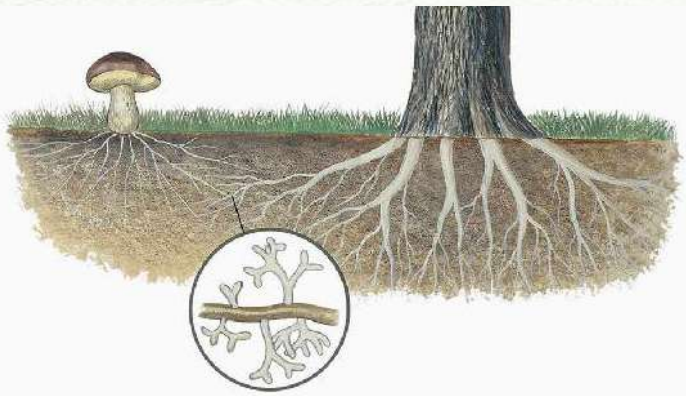
Wood Wide Web : Trees in an Underground Network !

Shubhi Srivastava
B.Sc. Botany (H.), Second Year

Unlike the famous World Wide Web, there exists a secret and more efficient network that could not fail to amaze us, and is more crucial, for not just us, but all life on earth. It is the Wood Wide Web! An underground network of trees. And no, they haven't laid down cables underground, but it is something even more interesting devised by nature itself.

As we all know that forests are essential for producing oxygen on this planet. These forests have hundreds or thousands of trees. But do these trees exist individually with no connection to each other? No. Right below our feet, under the soil, these trees form wide networks with the help of fungi, more specifically mycorrhizal fungi. Much older than the social networks we humans formed, they have been there for about 400 million years, when the first land plants appeared in the Palaeozoic era. These fungi live near the roots of the trees, forming a network of hyphae, which are thin, filament-like structures arising from these fungal bodies.



https://www.sciencefocus.com/nature/mycorrhizal-networks-wood-wide-web/

These fungi live near the roots of the trees, forming a network of hyphae, which are thin, filament-like structures arising from these fungal bodies. The hyphae of fungi can pump water with greater ease than the roots of the plant itself! They are even capable of producing acid that helps them bore into the rocks and extract nutrients like nitrogen and phosphorus, which comes in handy when trying to negotiate the terms of exchange with the trees. Yes. They provide the trees with these nutrients and in exchange, take up the extra glucose the tree produces by photosynthesis, establishing a symbiotic relationship between them and the trees.

A tree in such a relationship can give 20% to 80% of its glucose produced to the fungi. In a forest, the older and denser trees are called the “hub trees”, since they have greater access to sunlight for the production of glucose, they produce more of it than they need to lock up carbon dioxide from the atmosphere whereas the local networks of Arbuscular Mycorrhizae release more carbon dioxide. It is important to understand here that we are slowly replacing larger forests with more local ones, and it will be affecting the global temperatures.

Time and again, we are reminded that forests are immensely important for the survival of all other species on the planet. Studying these forests has proved to help build better and more resilient forests. And who knows if we treat them right, they might put in a good word for us through their language to mother nature!

They are also called mother trees because they are responsible for nurturing the younger trees around. When all the branching of the fungi connects over a large area formed by the “mycelium” (the mass of threads), they form an invaluable network for the exchange of chemical signals, glucose, and sometimes even chemical attacks!

https://www.mountaineers.org/blog/mother-tree

Several studies by renowned scientists from all over the world have proved this phenomenon exists in a forest between trees of the same species as well as between some trees of different species. An interesting experiment by ecologist Suzanne Simard using two Carbon tracer isotopes, Carbon-14 and Carbon-13, on trees such as birch and fir, revealed the exchange of Carbon dioxide between them. The hub trees were found to help young seedlings in the network by sending their excess carbon dioxide gas through the mycorrhizal network, which increased their survival rate by 4%. Not only do these trees transfer nutrients, but they are also found to send chemical signals to the surrounding trees when under threat such as an insect attack. They would let the other trees know so they device or activate their defence signals and save themselves from the insect attack. When dying, the trees will send their nutrients and chemicals into the underground network to be used by the younger ones.

However, Black walnut trees are found to send some harmful chemicals to the nearby trees when they need space for themselves! The mycorrhizal networks, when observed over the globe, were found to be of two different types. The Ectomycorrhiza (EM) were found in the cooler climates, whereas another type called the Arbuscular Mycorrhizae (AM) were seen in rather warmer climates. The EM type forms larger networks as compared to AM type which forms more local networks. However, there is supposed to be a balance between these two since they play a pivotal role in the global climate. How? The Ectomycorrhiza which grow in large forests having bigger and denser networks tend to lock up carbon dioxide from the atmosphere whereas the local networks of Arbuscular Mycorrhizae release more carbon dioxide. It is important to understand here that we are slowly replacing larger forests with more local ones, and it will be affecting the global temperatures. Time and again, we are reminded that forests are immensely important for the survival of all other species on the planet. Studying these forests has proved to help build better and more resilient forests. And who knows if we treat them right, they might put in a good word for us through their language to mother nature!

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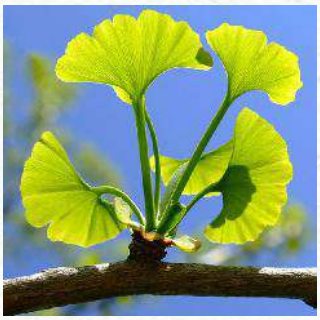
Plants and their Healing Miracles

Devyani Dwivedi
B.Sc. Botany (H.), Second Year

Homo sapiens live in an era where a tiny block having healing properties can vanish any kind of body ache. However, are they the only approach? Rather, should they be the only resort? These manufactured products hold a supreme position in our lives but the power of nature can't be overpowered by anything other than nature itself. Even with these engineered options available at the click of our fingers, a lot of us find ourselves heading back to the old techniques. Slow yet effective for a long period of time, medicinal plants play a major role in not only the physical but also the mental wellbeing of a person. Here are a few plants that help our body heal with the utmost attention.

1.GINGKO (***Ginkgo biloba***)



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In Chinese medicine, Gingko is considered to be a homeopathic herb. The leaves of the plant are of utmost importance as they are used in the making of capsules, tablets, and extracts.Sun-dried leaves of the plant can be consumed as a tea. However, Gingko seeds are poisonous so it's best to not consume them.

Gingko is considered to be beneficial for –

•Dementia
•Alzheimer's disease
•Diabetes
•Bone healing

(**2**) **TURMERIC** (***Curcuma longa***)

Indian households don't work without turmeric being a part of them. From giving an alluring yellowish hue to gravy to applying on wounds to heal them, turmeric has various purposes. Haldi, as it's called in India, has been used for its healing properties since ancient times.

Many ancient texts mention the long history of medicinal use of turmeric in South Asia. Originated in India, turmeric is truly regarded to have anti-cancer properties and can prevent DNA mutations. **Turmeric is beneficial for :**

https://www.google.com/search?q=turmeric+plant+images&sa

•Pain caused by inflammatory diseases like arthritis

•Preventing cancer

•Preventing DNA mutations

•Skin diseases

(**3**) **Tea Tree Oil** (***Melaleuca alternifolia***)

Native to Australia for about a hundred years, tea tree oil is now available worldwide as both neat oil and as an active component in various products. The oil is believed to have anti-inflammatory and antiseptic actions.

•Being popular for its miracle treatment of acne, this oil is much more than that.

•Moisturizes dry skin – It helps to soothe dry skin as well as reduce itching and irritation. It can be applied with olive or coconut oil on the scalp to reduce dryness/dandruff.

•Promotes hair growth – The oil helps to stimulate and increase blood flow near the hair follicles which strengthens hair and promotes healthy hair growth.

•Treats dark spots – It helps in healing and reducing the appearance of scars that cause discoloration, dark spots, and hyperpigmentation.

•Reduces inflammation – Because of its anti-inflammatory action, this oil calms redness, swelling, and inflammation.

It works as an antiseptic for cuts and scrapes .

(**4**) **CHAMOMILE** (***Matricaria chamomilla***)

Chamomile tea is one of the world's most popular herbal teas and is a very healthy beverage. It is considered to have antioxidant properties.

The potential aid of chamomile includes –

•Reducing menstrual pain

•Treating diabetes and lowering blood sugar level

•Slowing or preventing osteoporosis i.e. the loss of bone density

•Reducing inflammation

•Cancer treatment and prevention

•Anxiety and stress

•Insomnia

(5) GUGGUL (*Commiphora wightii*)

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Guggul is also referred to as 'Pura' which means 'wards off disease'. It has been in action for centuries in the Ayurvedic medicine to protect against a variety of diseases. It can be taken as tablets, powder or capsules. It is used for a number of purposes some of which are listed below. •Joint pain: It helps in relieving bone and joint pain by applying externally to the required area.

•***Treating acne***: Guggul extract has anti-inflammatory and antibacterial properties. It inhibits the acne-causing bacteria by reducing the production of sebum and thus works well in treating acne on the back, face, and chest. It is also helpful in treating psoriasis and eczema.

•***Osteoarthritis:*** It reduces swelling, stiffness, and pain due to its anti-inflammatory property thereby helping managing osteoarthritis.

•It lowers total cholesterol of the body.

•***Hypothyroidism:*** Guggul improves hypothyroidism by increasing the iodine uptake and by improving enzyme activity.

(6) GILOY (*Tinospora cordifolia*)

Giloy is an authentically essential herb that is popular by different names all over India. In Sanskrit, Giloy is referred to as 'amrita' which signifies that it is the root of immortality. In the Hindu mythology, it is called 'Giloe' meaning a blest potion that prevents ageing. Giloy has been in constant use in the present times due to the Corona Virus as it boosts the immunity. It has many other uses as described below.

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•Diabetes: Giloy improves blood glucose levels and manages complications related to diabetes such as ulcers, wounds, kidney damage.

•Liver disease: Liver injuries are generally caused due to overconsumption of alcohol. Giloy acts by lowering cholesterol levels in the liver and also improves metabolism.

•Cancer: Giloy has anti-proliferative property which helps in managing cancer. It inhibits cell proliferation and growth of cancerous cells.

•Kidney health: Giloy works by dissolving kidney stones and decreasing blood urea levels.

•It is helpful in healing wounds, eye problems, hair loss, dengue, diarrhoea, asthma, fever, and many more.

(**7**) **Ashwagandha** (***Withania somnifera***)

Ashwagandha is an economically important medicinal herb. It is the Sanskrit word for 'smell of the horse' which refers to the scent of the herb, quite literally, and its ability to increase energy levels and concentration, passively. It is also called as the 'winter cherry'. It has many potential benefits.

•Stress and anxiety: Ashwagandha is an adaptogen i.e. it helps the body cope up with stress. It helps to calm the brain and build up a sensible response during stress and anxiety.

•Diabetes: It controls blood sugar level by increasing insulin production in the body. This would lead to more sugar consumption by the body and presence of less sugar in the blood. This leads to the patient being energetic and not so dull anymore.

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•Brain function: Consuming ashwagandha improves cognitive functions like concentration, reaction time and better memory.

•Hypertension: High blood pressure is a stress related problem. Stress increases cortisol levels in the body while ashwagandha reduces cortisol level and reduces stress and stress related disorders like hypertension.

•Parkinson's disease: This disease occurs due to nerve cells damage which effect movement and muscle control of the body. Ashwagandha has antioxidant properties and prevents nerve cell damage thus reducing the risk of Parkinson's disease.

(**8**) **Sarpagandha** (***Rauwolfia serpentina***)

It is also known as the Indian Snakeroot. It is found on the foot hills of the Himalayan range. It has snake like roots which is why it's also called as snakeroot. The roots are a rich source of reserpine alkaloids. It is used to relieve a number of disorders –

Insomnia: Insomnia is a sleep disorder due to which people can't sleep even when they are tired.

•Constipation: The roots of the plant have laxative properties

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which helps in providing relief from constipation.
•In serpent bite, root powder of sarpagandha is applied on the wound as it can heal it.
•Hypertension: Ayurvedic tablets contain sarpagandha as it's a vasodilator that reduces the tone of blood vessels and thus reduces blood pressure.

(9) NEEM (*Azadirachta indica*)

Neem is a medicinal plant. All parts of the plants i.e. leaves, flowers, seeds, fruit, roots, and bark are used. The name of the genus Azadirachta has been derived from the Arabic language Azadirach-E-Hind which means 'a free growing tree of India'.

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Neem has numerous benefits as follows-
•Treats acne: Neem has anti-inflammatory properties and thus reduces blemishes and acne. It also has vitamin E which nourishes the skin cells.
•Detoxification: It helps in the detoxification of body both internally and externally.
Increases immunity: Neem has antibacterial and antimicrobial effects and thus play a major role in boosting immunity.
•Reduces dandruff: A lot of anti-dandruff shampoos and conditioners contain neem. Neem has antifungal and antibacterial properties which eliminates dandruff and strengthens hair.
•Joint pain: Neem oils, when applied to affected area, can reduce pain and discomfort. Therefore its used widely to treat arthritis.

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Beekeeping: A Way of Sustainable Livelihood

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Beekeeping, also known as 'Apiculture' is a process of maintaining colonies of social bees among many species of bees which provides economic, nutritional, and ecological benefits. *Apis mellifera* is the most widely used species for beekeeping. This whole establishment of beekeeping is done for the production of honey mainly, but there are other benefits as well which result in different kinds of beekeeping. These include the rearing of queens or package bees for other beekeepers who are producing honey. In another type of beekeeping colonies of bees to are made to pollinate crops, since, it is observed that in many areas of large-scale agriculture, the native pollinators are sometimes destroyed. Irrespective of the type of beekeeping, the management of colonies to stimulate the bees to do what the beekeeper wants is the prime requirement. For instance, to rear more young house bees to produce royal jelly or more foragers to pollinate crops. Beekeeping is considered as a high value income-generating activity in the agriculture sector.

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The soul members of the establishment: Honeybees:

Honeybees belong to the order Hymenoptera and to the genus *Apis* which has many species. These social insects are well known for providing their combs with large amounts of honey. A colony of honeybees is a highly complex cluster of individuals that functions virtually as a single unit or organism. Generally, it consists of the queen bee, a fertile female capable of laying thousands of eggs per day, some sexually undeveloped females, the worker bees and male bees, or drones.

Functioning: Work routine

The beekeepers tend to start the process in early autumn. The first step is to requeen the colonies in which the queens are not producing adequate amounts of brood and ensure that each colony has sufficient stores which are at least 50 pounds (22 kilograms) of honey and several frames filled with pollen. Sometimes beekeepers need to treat the colonies with a drug called fumagillin, which is used to reduce possible damage to the adult bees caused by a disease called Nosema disease. Nosema disease causes heavy losses in honey production and also severely weakens colonies.

Bees usually need exposure to sunlight and protection from cold winds. Some beekeepers in northern and mountainous areas wrap their colonies with some insulating material in winter. On the other hand, some beekeepers kill their bees during autumn, harvest the honey, store the empty equipment, then restock with a two- or three-pound (0.8- or 1.4-kilogram) package of bees and a young queen the following spring. If the colonies are well prepared in the fall, they need little attention during the winter. When the spring season arrives, an examination of the colonies by the beekeeper is vital. Oftentimes, strong colonies deplete their food supply and starve only a few days before flowers begin to bloom in abundance. Only a few pounds of sugar syrup, 50-50 sugar water, or a honey-filled comb from another more prosperous colony might save such a starving colony. In such a case, fumagillin, pollen substitute, or pollen supplement may be fed to the colony. Requirements for successful honey production are strong colonies, young queens (preferably selected for mite resistance), minimal swarming and good locations with plentiful food resources and strong nectar flow.

Greatest role: Pollination:

The most significant role played by bees is of being pollinators. Almost 70% of food crops are dependent on pollination by insects, performed primarily by the honeybees. Bees are also beneficial in the pollination of some forest and range plants that produce seeds on which birds and other wildlife feed. Not to mention, these pollinators help in sustaining a healthy, genetically diverse ecosystem of wild plants. Different types of bees, such as honey bees, bumble bees, and solitary bees, are the most prominent and economically important pollinators worldwide.

Building a sustainable livelihood with Beekeeping

There is a vast variety of importance attached to bees and pollination other than agriculture and food production. Bees and their habitats provide ecological, cultural, financial, health, human and social values. Beekeeping is essential for local development as it commonly requires minimal investment, generates diverse products, can be performed any without land ownership or rent, and provide flexibility in timing and locations of activities.

Beekeeping can help in acquiring and sharing knowledge about ecological processes. Products created by stingless bees, such as honey, beeswax, the pollen collected by them, and the bees themselves, are used by the locals for different purposes, which include food, traditional medicine, activities related to their spiritual and meditative life, and hand-crafting.

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Mangroves: Warriors against climate change

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Mangroves are trees, shrubs, palms and ground ferns that are found where the sea meets the coast and are the only known plants around the globe that can thrive in saltwater. The mangrove forests are scattered along the shores of the tropical and the sub-tropical region and straddle the category of both terrestrial and sea plants. These majestic forests are truly unique not just for their scenic beauty but also for their resilience to survive in stressful environment, have tremendous social and ecological value, and are amongst the most productive ecosystems on planet Earth. These incredible forests are also known for their extremely efficient carbon sequestration and can bury and store more than double the amount of carbon dioxide than the designated lungs of the earth itself, the tropical rainforests. It is because of the impressive ability of these salt-tolerant trees to capture and effectively fix large amounts of carbon present in the atmosphere that the mangrove forests are emerging as one of the best nature-based solutions in our fight against climate change.

Climate change is real and it is one of the biggest threat our world faces. One of the major causes for the change in the climate is the increased greenhouse gases in the atmosphere which are resulting in the rise in temperature worldwide leading to warming of the Earth. It is a known fact that all trees need carbon dioxide to grow. As trees grow and develop, they help absorb carbon dioxide from the atmosphere and acts as natural carbon sink. Thereby, trees help in fixing carbon that would otherwise contribute to global warming. As the trees absorb oxides of carbon from the atmosphere, it becomes locked within the tree's leaves, roots and branches. But when these parts of the trees fall into the soil, they eventually decompose and release some of their carbon dioxide back into the environment.

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Unlike other trees mangroves are distinct as they trap the carbon-rich plant material in their water logged soil with the help of their tangled root system and thus seal it off from the atmosphere, thereby, making them more efficient in trapping carbon than their terrestrial counterparts. This stored underground carbon can remain secured for millions of years as long as these forests remain intact and acts as natural carbon stores.

It's interesting to note that though tidal forests make up less than one percent of the total world's forest cover yet they can fix more amount of carbon than terrestrial forests. The mangroves worldwide are known to absorb 24 million metric tonnes of carbon in their soil per year, which is a massive portion of the 43 billion tonnes of carbon that we emit each year. It is estimated that the amount of carbon stored beneath these halophytes is four times greater than that stored by the tropical rainforests, making these tidal forests extremely valuable for tackling the climate crisis.

Not only do mangroves capture the greenhouse gases at a very high rate depositing it beneath in their soil but their complex root system is also a safe home for many small animals like insects, snakes, birds, larger marine mammals like dugongs and provide habitat to a number of saltwater fish populations, molluscs and supports many thriving ecosystems. They also supply nutrients and sediments for the coral-reef habitats. The interlocked and strong network of roots act as a protective barrier for the locals living near the coastlines from extreme weathers like flooding and erosion caused by hurricanes and tsunamis. The coastal communities also benefit from the mangrove forests as they provide them with many livelihood opportunities like shellfish gathering, fishing, and beekeeping and offer multiple ecosystem goods and services. If the tropical forests are the lungs of the earth then it would not be wrong to call the mangroves the kidneys of the planet due to their special ability to filter the dirty water, with the help of their ocean-submerged roots, as it flows into the sea.

https://ocean.si.edu/ocean-life/plants-algae/mangroves-photos-plants-and-animals

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Mangrove forests are evolutionary marvels and are critical for the health of the ocean and the planet. Despite mangroves being a highly effective nature based tool for tackling climate crisis, they are actively being destroyed in the name of development, timber, fuel, palm-oil plantation and shrimp farming. Cutting down mangroves does not only eliminate their potential for storing carbon but in turn also releases significant amounts of carbon back into the atmosphere which was stored in their soil. Destroying the mangroves does not only weaken our fight against climate change but also puts the entire species on Earth at grave risk by increasing the effects of climate change and sea-level rise. It's high time to turn the tide over and take radical steps to preserve these precious ecosystems of the sea around the globe. Mangroves do not only help in mitigating the impacts of climate change but also paves way for sustainable living and are of great ecological value. It is crucial to understand the importance of these coastline forests and vital steps should be taken to restore and conserve mangroves for the health of the ocean and the planet.

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Nature Blooms in Pandemic : A Picturesque Year

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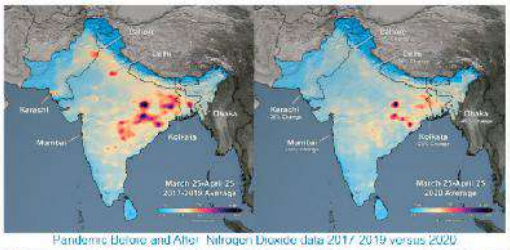
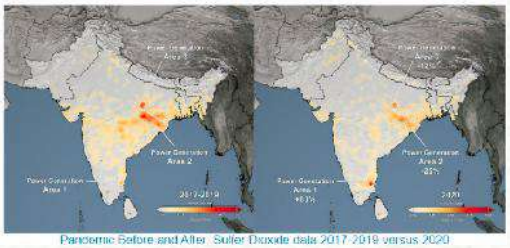
When the people were closed behind the doors and living within the four walls of there room, it seemed like the entire world got the indication of “pause” and would not able to move forward. On one hand , where human confined in their houses, animals seems to be enjoying their much needed space. An individual of one of the critically endangered species (fewer than 250 matured individuals); *Malabar civet* was spotted roaming free on the street of Meppayur town, Kerela. In another incident, forest officials were stunned when they found an extremely rare Albino Turtle at the Rushikulya river in Odisha.

Also, the forest officials dappled the event of spectacular visuals of a huge flock of flamingos migrating to Mumbai in reach of less polluted water, air and also for the better quality of food which is actually an algae (primary food the flamingos). When all the animals were enjoying their gleeful freedom in the awkward silence of the streets meanwhile nature also found a different way to amaze the humans behind their windows by showing us it’s sensational heavenliness.



Pandemic Before and After Nitrogen Dioxide data 2017 2019 versus 2020



Pandemic Before and After Sulfer Dioxide data 2017 2019 versus 2020

https://www.sciencedirect.com/science/article/pii/S004896972034095X

The significant decrease in the pollution level during lockdown gave nature a chance to unveil it’s true beauty. The snow-capped gigantic Himalayan Ranges were visible to the resident of Jalandhar and Punjab after several decades (almost after 30 years) and a noticeable drop in pollution level was recorded. Similar view was witnessed by the people of Saharanpur too. The Rivers also unbosomed, displaying it’s sterling beauty at the time of pandemic.

Within a month since lockdown, our holy river Ganga started becoming more purified all the way from Haridwar to Hugli. According to scientists , the water quality has shown remarkable improvement and even declared fit for drinking purposes. Lake Nainital became three times more transparent and clean. In 2019 ,when the surface of Yamuna was covered with white toxic foam, it left every soul in distress but during the lockdown it's angelic clean sight acquired the heart of every citizen.

After witnessing all these unprecedent views we cannot deny the negative impact of our deeds on the environment. In agreement with a report from NASA, air pollution decreased to it's lowest level with a drastic increase in the visuality during pandemic. Recently, Central Pollution Control Board [CPCB] released a report describing effects of '*Janta Curfew*' on air

https://economictimes.indiatimes.com

pollution and found that due to the restrictions and reduction of transportation vehicles throughout India; there was a drop of 51% in Nitrogen Oxide [NO] levels and 32% drop in carbon dioxide levels especially in the month of March. In accordance with "The Indian Express", the water of Ganga at Haridwar and Rishikesh was found clean and safe for drinking due to a jaw dropping, 500% decrease in sewage and industrial effluents. Moreover, the water quality improved by 40-50%. The Mean Value of DO was found to be >6mg/l whereas BOD [biological oxygen demand] was <2mg/l and pH ranged from 6.5 to 8.5.

When we look on the brighter side, we find that fortunately we got the opportunity to witness this intense and pleasing beauty of our environment but again the realization hit that we would never be able to keep this beauty forever. Many people have actually adapted the so called "new normal". But as a responsible citizen, we can always take a positive lesson from the smiling nature which we have witnessed for the very first time during this outbreak. We should definitely learn about how to care for our environment and reduce the carbon footprints by using sustainable methods. For example, we should travel by vehicle when absolutely necessary and always opt for greener transportation methods like cycles to reduce pollution .

Currently, everyone is eager to return to assemblance of life but we should never forget the message that we have learnt from lockdown of maintaining the ecological balance of our mother earth through conscious efforts, actions and choices.

Although there has been a positive impact on the environment due to the lockdown but “still there is a question of worry- Will we be able to witness this beauty forever?”.

This Covid pandemic has given us the chance to watch the planet heal. At last, I conclude by sincerely hoping that together, we can save our Mother Earth and we must take a step forward to sustain 'Go-green' practices even after the quarantine ends.

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Gangetic Dolphins - A Reliable Indicator of the Health of the River Ecosystem

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India is a country which is very rich in biodiversity , but on the other hand it is unfortunate that the country currently hosts 199 critically endangered species of plants and animals according to the IUCN Red List.

One of these critically endangered species is *Platanista gangetica* commonly known as “gangetic river dolphins” is worth mentioning here. As it represents the uniqueness of the species of India because it is one of the four species of river dolphins existing all over the world. But one out of the four species of river dolphins (*Lipotes vexilifier*), found in Yangtze river (China) was declared functionally extinct in 2006. Now, only three species of river dolphin exist all over the world.
Just like other animals, which are facing severe threat due to their habitat destruction. Eventually they can become extinct, Gangetic dolphins are no exception.

The gangetic river dolphin is a species of toothed whale classified in the family Platanistidae. They are locally named as *susu*. They have a triangular lump about 2/3 down their back. Their pectoral fins are larger than most of the dolphin species. There is no crystalline lens in their eyes , making them effectively blind. The gangetic dolphins find their way and prey in the river waters through sonar echoes. They live by echolocation and sound is everything to them, to navigate, feed, flee from danger, find mates, and to breed.
These live in the Ganges and related rivers of South Asia, in countries like India, Nepal and Bangladesh.

In India, the distribution range of these dolphins covers the state of Assam, Uttar Pradesh , Madhya Pradesh, Rajasthan, Jharkhand and West Bengal.

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Climate change has impacted the habitats of gangetic dolphins, particularly to Ganga and its tributaries. The water level and the flow of Ganga river and its tributaries have been decreasing very fast. Not only the dolphins, climate change has also impacted the population of fishes in the river. Thus, reducing the food supply of dolphins.

Dolphins are sighted in the deep water since they need to come to the surface to breathe, calves hit the surface every 10 seconds – 1 minute while adult dolphins surface every 3 minutes.

Gangetic dolphins shift their habitat every year during the rainy season. When the level of water rises, they tend to move towards small tributaries and floodplains to avoid strong currents and also in search of food.

Climate change

The Gangetic river dolphins found in the Ganga and the Brahmaputra and their tributaries are categorised under Schedule 1 of the Indian Wildlife Protection Act 1972. They have been placed on the "Red List" of the International Union for Conservation of Nature (IUCN) which signifies that the species is on the verge of extinction.

As far as climate change is concerned, we should not see them in isolation. They are part of the ecosystem."- R.K Sinha (an expert on gangetic river dolphins).

The Ganga river has been ranked as one of the most polluted and the dirtiest rivers in the world, with the WWF listing the 2,520 km long river as among the world's most endangered .

Ganga river dolphins are a reliable indicator of the health of the ecosystem. Therefore, if the dolphins are on the verge of extinction, so does the entire river ecosystem along with the river itself.

Anthropogenic activities

These are the major reason for the decline of Gangetic river dolphins. These activities are taking place in the deep regions of the river. It is a big threat to dolphins because their habitat is the deep water of the river. The deep water in the river has become a soft target of fishermen and their motor boats. Such activities are disturbing the quiet habitat of dolphins.

Sand miners activity in several riverbanks are posing an immense threat to these dolphins. The situation is worse because the water from the river is pumped out for irrigation and industrial purposes. In Bihar, the water flow of the Ganga is primarily maintained by tributaries such as Ghagra, Gandak and Kosi. Though, officials of different govt. agencies admitted that Ganga has been recording a low inflow in recent years.

Gangetic river dolphins in their low land riverine habitat, encounter millions of people residing near the river and anyhow contributing to the degradation of their habitat.

Government efforts

The Bihar govt. is scheduled to conduct a survey of the Gangetic dolphins . The last survey was conducted in 2018 and nearly 1,363 dolphins were counted in the rivers of the state. Bihar is home to around half the estimated 2,500 – 3,000 gangetic dolphins in India.

WWF India with various stakeholders has formed a collective of dedicated community members who are called dolphin mitras, an inspiring community-lead conservation program.

In 2020 prime minister , Narendra Modi, launched the dolphin project to boost the conservation of both river and sea dolphins.

Ganga river dolphin is a rare species found only in Ganges–Brahmaputra river systems and thus their conservation policies are to be made in a very precise manner. With the involvement of all stakeholders,it can be made possible.

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Phycoremediation : Biosaving from Ruination

Janvi
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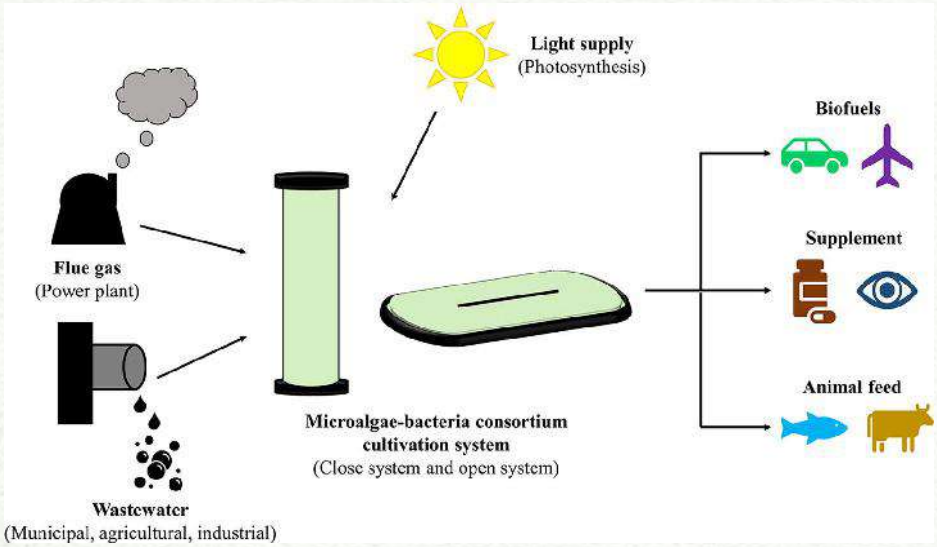
Nature has beautifully incorporated the problems and solutions in it. Like every coin has its two sides, it depends on us how we acknowledge the wonders hidden in nature. Almost every one of you might have noticed the green patches (algae) covering a waterbody in the surroundings and might have even felt disgusted by it. But you would be surprised to know their contribution to the purification of the air you are continuously breathing to survive so effortlessly accounts for more than 40%.

Phycoremediation refers to the use of various kinds of algae for reduction and biotransformation of pollutants and finding solutions to other such problems for maintaining an eco-friendly environment using the potential of the existing.



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Ways to solve the environmental hazards are being explored using the hidden potentials of these creatures. Research and experiments are being conducted on various levels. Few research papers of the year 2021 by notable scholars have revealed that the species of *Chlorella, Chlamydomonas, and Scenedesmus* have the potential to remove toxic substances from industrial wastes.

Vishal Prasad Gupta, an engineer from Jharkhand with the help of a few researchers developed a biofuel utilizing the microalgae from the state's pond in the year 2021 which is cheaper than petrol by Rs.27. The species called *Azolla pinnata* was taken out of the pond and put in hexene. The species was found to contain a considerable amount of oil. After being treated in a plant, it was converted into a lipid form following which the bioethanol or biodiesel was obtained. **It was also found that growing the algae on one acre of land could decrease the air quality index (AQI) of the area by 60 percent**. The water used in biofuel manufacturing can later be treated to mineral water. Besides utilizing the algal species for animal feed and biofuel manufacturing, the antioxidants present in it make it suitable for use in beauty products and anti-cancer medicines.

https://5.imimg.com/data5/ON/BW/MY-10411558/phycoremediation-500x500.png

Another research was carried out to analyze the potential of *Chlorella* species in removing the pollutants from the Thirumanimutharu river (A tributary of river Kaveri) as *Chlorella* was the dominant species found in the river. In its Scanned Electron Microscopic (SEM) study, some explicit morphological changes were observed on the species treated as compared to the untreated which confirmed absorption of certain pollutants.

Humans in their blind less greed for luxury and comfort lifestyle have exploited the natural resources which will gradually turn their future nightmarish. However, searching for the solutions in nature itself, it is also needed to use the resources judiciously and exist beautifully with the fascinating creatures.

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Deep Sea-Bed Mining : An Impending Catastrophe

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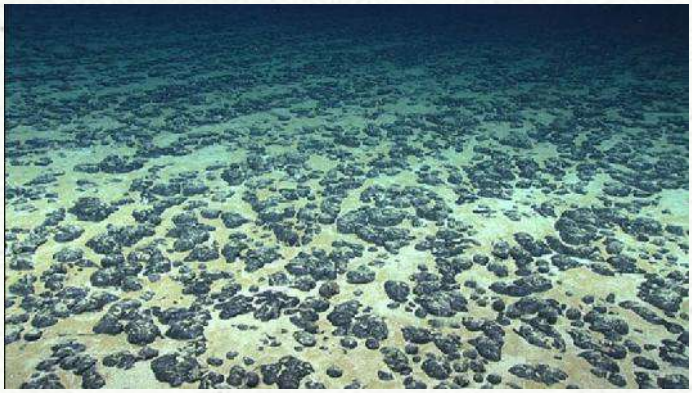
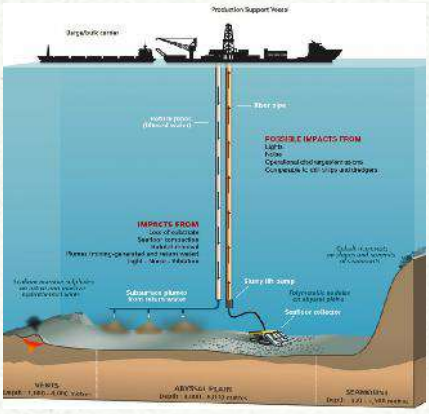
Deep seabed mining is the process to retrieve mineral deposits from the deep sea- the area of the ocean below 200 m, that covers about 65% of the earth's surface. There are some special kinds of rocks found in the seabed. These clumps that just look like rocks, at first sight, are polymetallic nodules or manganese nodules.



https://www.maritime-executive.com/media/images/article/Photos/Ocean/manganese-nodules-seabed-noaa.30209e.jpg

Cobalt, copper or nickel are metals that you might not even think about in real life and, while it may seem that they are everywhere around us, they are pretty rare.

From smartphones and batteries to photovoltaic systems and electric vehicles, these metals help in various kinds of power storage. The extractable amount of these metals are found in very few amounts and they may get exhausted.



https://www.iucn.org/sites/dev/files/styles/graphics/public/media-uploads/2018/07/potential_impacts_from_deep-sea_mining.png?itok=jufrdVfg

Countries regulate seabed mining within their marine territories. Farther out for areas beyond national jurisdiction, the International Seabed Authority was established to manage seabed mining in international waters. To date, they have granted 31 licences for deep seabed mining, 19 of them specifically for the mining of polymetallic nodules. India also holds such a licence. More than 1.5 million kilometre square of the international seabed has been set aside for mineral exploration in the Pacific and Indian oceans and along the Mid-Atlantic Ridge.

Nodules play an important role in the development of sea fauna. Glass sponges, that look like tulips, grow attached to the nodules and can host a variety of species on them.

Scraping of the ocean floor by machines will lead to the destruction of habitat and fragmentation of the ecosystem. It can wipe out the entire species-many of which are yet to be discovered. Recolonization for the soft sediment will take around a hundred to thousand years. Mining of the sea bed can also disrupt the complex food chains in the ocean. The scraping of the ocean floor will also lead to the release of a lot of sediment that may blanket or choke filter-feeding species (species that feed by straining suspended matter and food particles from water, typically by passing the water over a specialised filtering structure) on the seafloor and fish swimming in the water column.

The only way to stop this mineral rush is to protect and use our resources very wisely. Optimising recycling and reducing our consumption of these metals will be a stepping stone in reducing our consumption which is considered to double till 2026. A Circular economy is another aspect that would help us maintain our requirements as well as sustain our economy in the most environmentally friendly way.

https://www.nioz.nl/application/files/5416/2324/6148/Anemones_on_sponge.jpg

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The Aquartic Crisis: Apocalypse of Earth's Future

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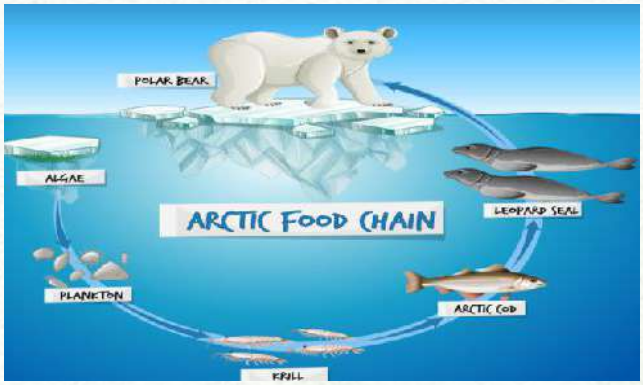
"WE START LISTENING TO SCIENCE AND THAT WE ACTUALLY START TREATING THIS CRISIS AS CRISIS IT IS".

The above statement is quoted by the very famous Swedish climate activist Greta Thunberg, which, in itself, points towards the gravity of the climate crisis.

We all know that Global warming and climate change have adversely affected every sphere of human life as well as that of the organisms surrounding it. But our focus in this article, specifically, would be on two entities i.e., tundra animals and aquatic life, the change of climate's dire consequences on them, which might even pave the path to their extinction.

According to a recent report by ECO WATCH, Climate change is drastically affecting the environment, the ecosystem as well as a food chain of organisms of both the Marine and Antarctic Biomes. According to Sarah Kaplan, of the Washington Post, the temperature of the coldest places on earth has been increasing at an unexpected rate which is a matter of serious concern as the polar regions act like giant air conditioners and reflect off a huge amount of radiation back to space whereas, in contrast, deep waters absorb heat resulting in more Glacier Melting, which will mean more heat absorption which will automatically result in more Climate Change. This can lead to catastrophic disturbances in the food chain of that area as sea ice is the basis of Algae formation which, in turn, is the basis of survival for many creatures such as seals, whales. If their population deteriorates, then the population of bigger creatures such as polar bears will automatically be endangered. Dwindling sea ice might even lead to the disruption of natural habitats of numerous



https://www.vectorstock.com/royalty-free-vector/arctic-food-chain-diagram-concept-vector-37080234

creatures including walrus, polar bears, etc. Now let us shift our focus to aquatic life. We all know that ocean or sea creatures are very fragile and vulnerable to any change in the environment. The rising temperature is leading to an increase in temperature of ocean currents which in turn is leading to Coral Bleach, affecting a dizzying amount of marine biodiversity as well as the people dependent on it. Climate Change might also force sea creatures to migrate to other areas of better living conditions. But these are not the only problems. The real problem lies in the carbonization of sea or ocean waters which is caused due to burning of fossil fuels.

https://www.noaa.gov/education/resource-collections/marine-life/coral-reef-ecosystems

The smoke dissolved in water turns into acid and dissolves the shells of many aquatic creatures such as coral reefs, crabs, lobsters, etc. which are critical for not only the maintenance of the food chain of marine life but also for the reason that they provide a natural habitat for millions of organisms. Climate change emerges as a major problem for the very existence of these creatures.

Till now we have discussed all the issues concerning global warming and its adverse effects on both aquatic and tundra ecosystems. Now let us move towards the solution. The only solution to this problem is reducing carbon emissions as well as Ocean Acidification. We should move towards the renewable energy sector which has enormous scope in India. We have set a target of reaching zero carbon emissions by 2070. To save the Tundra Biome, some industrial activities must be eradicated which would decrease the harm to native plant varieties such as lichens, plants etc. But only state contribution won't be enough. We can contribute at an individual level also, towards this cause, by promoting afforestation to ensure a better future for both the Human and Aquatic as well as the Tundra world.

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SEGMENT FINALE

Altruistic & Quirky Roots

READ ABOUT PLANTS THAT HAVE BECOME TOURIST ATTRACTIONS!

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Volume 17

TRAVELER'S PALM

Ravenala madagascariensis

https://www.junglemusic.net/Ravenala/The_Traveler_Palm.html

Ravenala madagascariensis, commonly known as The Traveller's Palm belongs to the family Strelitziaceae and is not truly a palm and resembles more to banana trees. The Traveller's Palm got its name because of the base of the leaves which had space to catch and hold water for travellers. A close relative to *Strelitzia reginae*, typically called The Bird of Paradise plant, this plant species is native to Madagascar and is widespread in tropical landscapes. The leaves are soft and massive which are usually arranged in the shape of a fan.

The Traveller's Palm is beautiful looking plant which takes only a little maintenance and is not invasive. It grows up to 20 metres tall and bears fruits which are brown capsules, enclosing numerous seeds covered with bright blue arils. Its seed oil is sometimes used for cooking.

- Shreya Singh

MANDRAKE

Mandragora officinarum

https://i.pinimg.com/236x/09/b5/85/09b5853b2d487931211e0fe1b996a7fd--exotic-flowers-elixir.jpg

Mandragora officinarum, belonging to the family Solanaceae, is a low growing Mediterranean plant with large expansive leaves up to 40cm in length and a short central stem. The plant bears large purple white flowers which gives rise to orange-red fruits.

Mandragora officinarum is also known as Mandrake. This plant shows strange root morphology. The dividing roots resemble human figures with legs and arms. Apart from this, the plant is important for its deliriant hallucinogenic tropane alkaloids and its usage is often seen in many magical rituals. Because of its involvement in magical rituals, it is also known as 'Satan's Apple', 'Love Plant', etc.

- Yashasvi Saini

BAOBAB : THE TREE OF LIFE

Adansonia digitata

https://beautyworldzambia.com/the-baobab-fruit-mabuyu-mawuyu/

This one-of-a-kind 'upside-down' tree, with the scientific name *Adansonia digita*, belongs to the genus *Adansonia*. The genus includes nine species of deciduous trees known as baobabs and are placed in the family Malvaceae. The majestic baobab tree is native to Madagascar, mainland Africa, Arabian Peninsula, and northwestern Australia and lies at the heart of many traditional African remedies and folktales. When bare, its crown resembles a root system, therefore famously called the 'upside-down trees'. The baobab trees are a pre-historic species and are known for their longevity and ethnobotanical importance.

The baobab is truly magnificent both in terms of its morphology and physiology possessing an unusual barrel-like trunk that can hold up to 60,000 gallons of rainwater and have compact crowns. Another astonishing fact is that they can resist drought, fire, termites and can simply re-grow their bark if it is stripped. These awe-striking trees can attain height equivalent to an eight-story building and have massive trunks that have been used as jails, pubs and post offices. They produce fruits in the dry season which is extraordinarily rich in nutrients and antioxidants and the only fruit known around the globe that dries naturally on its branch, instead of dropping and spoiling.

These trees represent the world's largest succulent plants and can grow in areas with extremely dry and arid climate, thus symbolizing life and positivity in a landscape where little else can thrive. Every part of the baobab tree is of utmost value and vital for the local people, thereby, entitling it as "The Tree of Life". The baobabs can be utilized for many purposes, including shelter, ceremonies, food, fibers, herbal remedies, medicine, juices and beer.

It's interesting to note that this strange yet fascinatingly beautiful-looking tree is known by many names, including bottle tree, upside-down tree, boab, boaboa, tabaldi, monkey bread tree and the dead-rat tree.

- Khushi Singh

NEELAKURINJI

Strobilanthus kunthiana

https://www.keralatourism.org/neelakurinji/about-neelakurinji

It is also known as *Strobilanthes kunthiana*, known as Neelakurinji in Malayalam and Tamil. It belongs to the Family- Acanthaceae Genus- *Strobilanthes* and Species *kunthiana*. Kurinji grows at an altitude of 1300 to 2400 metres. The plant is usually 30 to 60 cm high. They can, however, grow well beyond 180 cm under congenial conditions. This beautiful purple-bluish shrub is found in the shola forests of the Western Ghats in Kerala, Karnataka and Tamil Nadu.The genus has around 250 species, most of which show unusual flowering patterns. 46 species of the genus are found in India.

Neelakurinji is also found in Shevroys in Eastern Ghats. The flower got its name due to its appearance, Neela means blue and Kurinji meaning flower in the local language. The seeds of the shrub sprout according to its intervals and continue the cycle of life and death. The most interesting and wow fact about it is that it all together bloom only once in 12 years giving the Nilgiri hills a purple-blue shade blanket and spreading the landscape with its hue. All the tourists come from the nook and corner of the world to witness the beauty of such mysterious flowers which also add extra picturesque beauty to the hilly land, Munnar. Moreover , you cannot find Neelakurinji flowers in any other region of the world, which makes it rarest of the rare. It can be represented as a symbol of craving for love, joy for the poets and also the symbol of self-awakening of a female. Mast blooming of Kurinji is believed to be a survival mechanism of this species.

According to Botanical Science, Neelakurinji plant have an internal calendar that helps them to study the variation or differences in day-length. The plants usually record the periodical variations based on the total day length, and manages to count the exact time period for the next blossom.
Its last blooming was in 2018 and the next will be in 2030. So if you have the zeal to visit this 8th wonder of the world...quest your thirst in 2030.

- Tanya Dogra

SKELETON FLOWER

Diphylleia grayi

https://plaza.rakuten.co.jp/stera3962/diary/201609170000/

Diphylleia grayi is one of the only three genus of *Diphylleia* belonging to family Berberidaceae of the order Ranunculaece. The floral bloom of the plant is of mystical fascination as the milky white flowers turn crystal transparent when it rains! *Diphylleia grayi* is a decidious perennial herb of shade that grows in moist, wooded mountains of only 3 parts of the world- Japan, China and Appalachian Mountains of the United States. The plant characteristically shows deeply lobed foliage that spreads over the stem resembling an umbrella shape.

The beautiful flowers of the plant are born milky white in colour with thin, delicate petals and bloom optimally from March to June. The petals of *Diphylleia grayi* show a rare phenomenon of turning crystal transparent upon exposure to moisture or rain. The magical turning of petals from opaque white to transparent like a window is a fascinating rare feat. No scientific evidence have been found yet as to what causes the petals to turn completely translucent, however it appears to be a physical phenomenon rather than chemical which happens as the light, instead of getting reflected begins exhibiting the phenomenon of refraction upon exposure to moisture.
Refraction is the bending of light as it travels from one medium to another which is also an inherent property of water.
As the cells in petals are exposed to water, the water occupies intercellular spaces, which somehow impacts the pigmented organelle, causing the light to easily penetrate across the cellular structures and matrix thus resulting in maximum refraction of light instead of reflection.
No evolutionary evidence have been found yet suggesting as to whether the phenomenon is of any adaptive value to the plant. But Japan has seen a surge in domestication of this rare plant as an ornamental bloom, even though it is quiet difficult to grow out of the wild!

- Jayati Pandey

BASEBALL PLANT
Euphorbia obesa

http://www.llifle.com/Encyclopedia/SUCCULENTS/Family/Euphorbiaceae/1966/Euphorbia_obesa

Euphorbia obesa, belonging to the family Euphorbiacea sometimes also referred to as "baseball plant", is a subtropical succulent species of flowering plant in the genus *Euphorbia*. It comes from South Africa, especially the "Cape province".
Its also known as baseball plant due to it's shape, *Euphorbia obesa* resembles a ball"thornless" and "decorative".
Its diameter is between 6 cm and 15 cm depending on its age. Young plants are spherical, but become cylindrical with age. They contain water reservoirs for periods of drought. It is generally green in color with horizontal lighter or darker stripes. In the wild, and with exposure to direct sunlight, it shows red and purple areas.

The plant is dioecious, which means that it has only male or female flowers. The small flowers are insignificant in apex. In fact, like all *Euphorbia*, flowers are called cyathia. But *Euphorbia obesa* is such an easy plant to grow and propagate (each female plants can easily produce hundreds of seed every year, and under greenhouse conditions, germination rates of 95% and higher are possible) that the need for field collected material was virtually unnecessary from the start, but at the turn of the century, there was little interest in protecting wild populations, and most commercial greenhouses were not in the habit of propagating plants which could just as easily be legally gathered from the wild.

- Prachi

THE WITCH'S BUTTER
Tremella mesenterica

https://www.nationalgeographic.org/photo/yellow-fungus/

Witches' butter or *Tremella mesenterica* is an intriguing common jelly fungus found in the family of Tremellaceae. Unlike its name, some *Tremella* species recorded in China have been found to have bioactive compounds that help in cancer prevention and immune system enhancement. Seeing this plant is a feast in itself as its gelatinous, luscious yellow fruit body grows up to seven to eight centimeters in diameter and has a lobe surface that is greasy to touch. It is spotted on dead or fallen branches of plantand has a cosmopolitan distribution, i.e., it has been found in Canada, Europe, South America, Asia, etc.

Coming across *Tremella mesenterica* is like witnessing magic as this beautiful yellow fungus grows in dark crevices during the rainy season and withers into a thin film as if it's asking for more moisture and blessing of nature itself. The fungus is edible, and unlike its appearance, it's very bland in taste and has carbohydrates that have taken the interest of many scientists.

The fungus was first described from Sweden under the name *Helvella mesenterica* and its name has taken its existence from the Swedish folklore that considers it as a medium for witches to put hexes on people. And even though the gelatinous mass is "flavorless", it is used in China to give more texture to the soup.

- Astha

PASSION FLOWER

Passiflora incarnata

https://plants.ces.ncsu.edu/plants/passiflora-incarnata/

Passiflora incarnata of the family Passifloraceae is a fast-growing perennial vine with climbing or trailing stems. They have two characteristic glands at the base of the blade on the petiole.

The passion flower varies in form from a shallow saucer shape to a long cylindrical or trumpet-shaped tube, producing at its upper border five sepals, five bluish-white petals.

It also has many threadlike or membranous outgrowths from the tube, which constitutes the most beautiful part of the flower, the corona. The flowers normally begin to bloom in July. The plant bears a fleshy fruit, also known as maypop, which becomes green to yellow on maturity. The egg-shaped green fruits 'may pop' when stepped on. This phenomenon gives the *P. incarnata* its common name, as well as the fact that its roots can remain dormant for most of the winter underground and then the rest of the plant "pops" out of the ground by may, unharmed by the snow.

-Ananya Chamola

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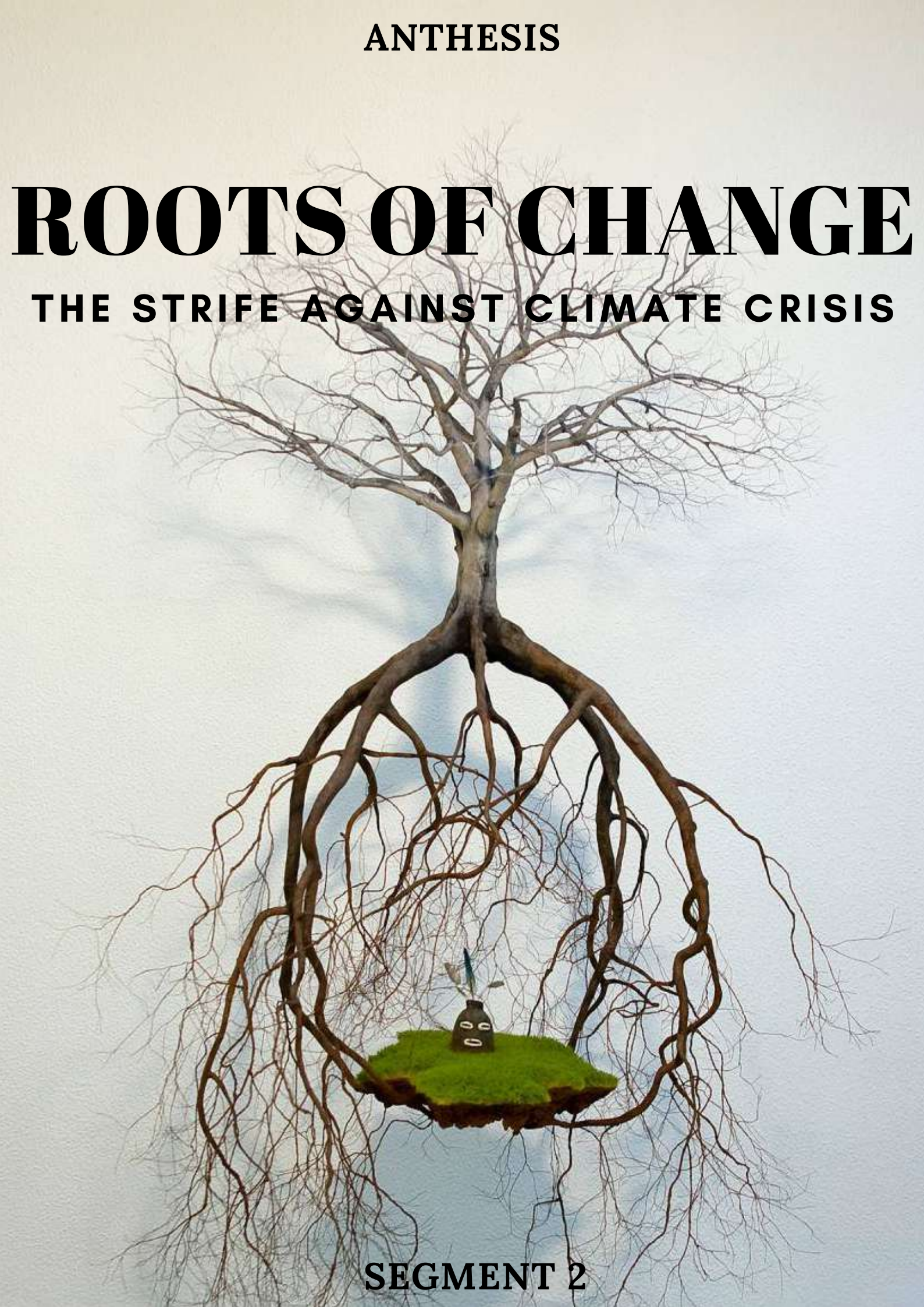
ANTHESIS

ROOTS OF CHANGE

THE STRIFE AGAINST CLIMATE CRISIS



SEGMENT 2

Millets can help Mitigate Malnutrition and Climate Change

Sushri Suhasini Maharana
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Millets, the dryland crop and powerhouse of nutrients, can help the world to achieve the second sustainable development goal of WHO i.e. ***"Zero Hunger Goal by 2030"*** by not only mitigating malnutrition but also climate change and can help in boosting the economy. Millets have carbohydrates and fats similar to wheat and rice but with higher protein content. They are rich in micronutrients, vitamins B, iron, calcium, minerals, and antioxidants**. One cup of cooked millet contains 207 calories, 41g carbohydrates, 2.2g fibers, 6g proteins, and 1.7g fats**. Millets are known to release sugar very slowly as compared to rice and wheat. Therefore, the sugar dissolves in the blood after a long time of ingesting food and thus helps one to not feel hungry frequently. Millets possess immense potential in the battle against climate change and poverty and provide food, nutrition, fodder and livelihood security. It also helps in providing feedstock for bio-ethanol production and check land degradation.United Nation General Assembly has adopted a resolution in 2021 declaring 2023 the "International Year Of Millets" as proposed by India.

https://www.deccanherald.com/opinion/millet-revolution-important-to-debate-implementation-760906.html

Millets can deliver far greater returns than rice, wheat or maize. It uses 40% less energy than Maize and just 20-30% of water as compared to rice or wheat for cultivation. It is drought tolerant and a short term yielding dryland crop.

Inter-cropping of millets with different crops is also very beneficial because the fibrous root of millets helps in improving the soil quality, keeps run-off water in check, and aid in soil conservation in erosion-prone areas, thereby restoring natural ecosystems.

The cultivation of millets is deep-rooted in the Indian Culture and traditionally millets have been grown for over 5000 years in our country. **India** accounts for 41 % of the global produce and the compound annual growth rate of 4.5 % is projected in the coming decade.
There are about 6000 known varieties of millets around the world. Some of the varieties are Foxtail (*Setaria italica*), Ragi/Finger, Kodo (*Paspalum scrobicuatum*), Proso (*Panicum miliaceum*), Browntop, Little, Barnyard, Jowar (*Sorghum bicolor*), Bajra (*Pennisetum glaucum*). Some Hybrid Genotypes finger millet are E&MS(4.61kg/plot), E&M10(4.08kg/plot) and E&M7(4.04 kg/plot) and some Hybrid Genotypes Pearl millets are 97111A×R13, 02555A×R13 etc.

In 2021, India announced that the year 2025 has been set as the deadline for achieving 20% of ethanol to be blended with petrol, a measure taken with the aim of reduction of the carbon emissions from the combustion of fossil fuels. Most bio-ethanol in India is produced using sugar molasses and maize. Carbon emissions can be lowered down to half with the help of Bio-ethanol produced from sorghum(Jowar) and pearl millets (bajra).


https://www.newindianexpress.com/lifestyle/health/2

HEALTH BENEFITS:

Reducing risk of colon cancer: Millets are rich in dietary fibers, both soluble and insoluble. The insoluble fiber in millet, known as a "prebiotic," supports good bacteria in digestive system. This type of fiber adds bulk to stool, which reduces the risk of colon cancer.

Aids Weight loss: The calorie content of millets is low, thus, they are an excellent food product for weight loss and also maintain energy levels throughout the day.

Blood Sugar Level Low: Millet has a low glycemic index, therefore, consuming millets regularly lowers the risk of developing diabetes.

Boost Immunity: Protein intake is responsible for building the body's immunity.

Fields To Fumes

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One of the recent lockdowns in Delhi was because of the poor air quality. There are various reasons for this rise in air pollution like construction activities, emissions from factories and vehicles, burning of fossil fuels etc. But one of the major contributors is the burning of stubble around the month of October when the harvesting of paddy begins in the north Indian states.

Stubble burning is the process of setting fire to the residue (straw) which is left behind after the harvesting of the crops. Burning seems a cheap and easy way in order to get a fresh fuel for sowing the seeds of the crops of winter season, i.e Rabi crops like wheat. It also seems the fastest way to get rid of the stubble.

Because of the use of mechanised harvesters, large amount of stubble is left behind in the farms. Farmers are compelled to use these harvesters because of various factors like labour shortage and farmers' poor economic condition as they cannot afford other methods. Lately residue burning is not just limited to paddy. It has also been seen after the harvesting of wheat and in some places sugarcane as well.

There are some serious repercussions of these burnings which include:

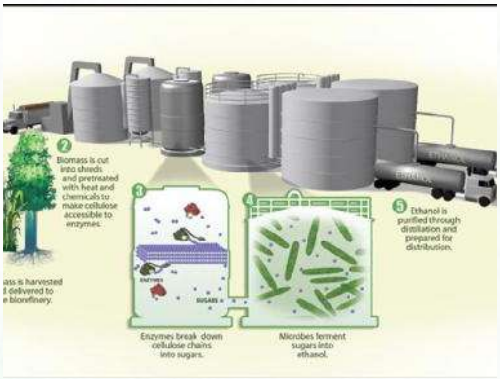
-**Health problems:** Breathing problems are the most common issue. Cough and irritation in eyes, nose and throat are also prevalent among people.

-Pollution: A study by Down to Earth magazine crop residue burning crop residue burning released 149.24 million tonnes of carbon dioxide, over 9 million tonnes of carbon monoxide, 0.25 million tonnes of oxides of sulphur, 1.28 million tonnes of particulate matter and 0.07 million tonnes of black carbon. These directly contribute to environmental pollution, and are also responsible for the haze in Delhi and melting of Himalayan glacier.

-Soil Fertility: Burning of straw also leads to decline in the fertility rate of the soil.

There are some alternatives present which can be taken up to tackle stubble burning:

-**Happy Seeder:** Truck mounted happy seeders remove the stubble and plant wheat seeds simultaneously.



https://i0.wp.com/www.ecoideaz.com

-Chopper-cum-Spreader: These machines cut down the stubble and disperse them on the field itself. These machines can be used well with tractors of 45-50 HP or more.

-Pusa: It is a solution developed by ICAR -Indian Agricultural Research Institute(IARI) which decomposes the stubble into manure. These can reduce the excessive use of fertilizers and increase soil fertility.

-Ex-situ treatment: This way the crop residue can be used as fodder for cattle.

-Change in cropping pattern: It is the most fundamental solution to this problem. Varieties of paddy which take less time to mature can be grown. This way there will be optimum time for the decomposition of the crop residue and sowing of wheat seeds.

The above mentioned methods can only be effective in tackling the problem of stubble burning if they are backed by the government. The government needs to step in and provide the farmers with various incentives and subsidiaries to take up these new technologies. Some steps have already been taken viz. they are bringing in various schemes eg. up to 50 percent subsidy for machines which deal with crop residue. Several laws are also being formed.

https://d2xsikgwxkxyoe.cloudfront.net/media/10797/happy.jpg

Recently the Central Government passed an ordinance to set up a committee of over 20 members to look after the issue and any contravention of any rule or provision made by the commission may lead to serious punishments. Government at both Centre and state levels in the constant watch of the Courts are devising methods to cure the problem. However, this can only work if both the government and the farmers work together with the aim of eradicating stubble burning and creating a clean Earth. There are some alternatives present which can be taken up to tackle stubble burning:

Stubble burning is one of the major causes of climate change and environment degradation as it is major contributor of green house gases in the air. But if not checked today, it will become a huge obstacle, difficult to overcome.

Reduces Cardiovascular Risks: It contains essential fats, which provide the body with good fatty acids that prevent excess storage of fats as well as effectively lower the risk of high cholesterol, strokes, and other heart complaints. The potassium content in millets regulates blood pressure and optimizes the circulatory system.

Prevent Asthma: The magnesium content in millets can reduce the frequency of migraines. It can also bring down the severity of asthma

Helps in Digestion: Millets are a rich fiber source that benefits digestion by alleviating bloating, gas, cramping, and constipation. In addition, good digestion keeps issues like gastric/colon cancer and kidney/liver problems away.

Acts as an Antioxidant: It helps the body to detoxify because of its antioxidant properties; Quercetin, curcumin, ellagic acid, and other valuable catechins flush the toxins from our body and neutralize the enzymatic action of organs.

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Do I Need to be a Superhuman?

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Glaciers are big chunks of ice that are created from falling and accumulating of snow over a period of time. They are produced in areas where the temperatures are exceedingly low. Today, about 10% of the land area on Earth is covered with glacial ice. Almost 90% of which is in Antarctica, while the remaining 10% is in Greenland ice cap.

Glaciers act as a protective cover by reflecting the excess heat into the space, thus keeping the planet cooler. Glaciers around the world range from ice which is several hundred to several thousand years old and provide a scientific record of how climate has changed over time. Through their study, we gain valuable information about the extent to which the planet is rapidly warming. A study led by Jean-Baptiste Bosson in 2019, shows that most of the 'World Heritage Glaciers' have lost a significant portion of their mass since the 1900s; some even completely disappeared, e.g., in Africa or the Alps. But what causes the melting of glaciers?

People believe that the main reason is abrupt and rapid industrialization. An increase in the release of carbon dioxide (less of it being absorbed by trees as trees are constantly reduced in number owing to deforestation) hastens global warming and affects the environmental balance.

https://eartheclipse.com/wp-content/uploads/2019/05/Lambert-Glacier.jpg

During the months of summer, ships break through the ice at sea and end up leaving trails of open waters. Nonetheless, open water has a lesser ability to reflect sun rays than ice does, thus the water takes in more of the heat and, consequently, melts more ice.

https://www.climate.gov/news-features/understanding-climate/climate-change-glacier-mass-balance

Scientist Walt Meier said that even in summer, the sea ice can reflect at least 50% of the sun's heat, the ocean is only capable of reflecting approximately 10% of the heat while 90% is absorbed, therefore warming the ocean and the environment.

Effects: Today, the Arctic is warming twice as fast as anywhere on earth, and the sea ice is declining by more than 10% every 10 years. The glacier melt affects air temperatures and disrupts normal patterns of ocean circulation. As glaciers melt and oceans get warm, weather patterns disrupt worldwide. As a result, coastal communities continue to face billion-dollar disaster recovery bills as flooding becomes more frequent and storms become more intense. Humans are not the only species impacted. In the Arctic, as sea ice melts, wildlife, predominantly walrus are losing their homes and polar bears are spending more time on land, causing higher rates of conflict between humans and bears.

With the increasing water temperatures and levels, aquatic plants are affected and so is the survival of the birds and animals that are dependent and adapted to the glacier habitats. When water levels increase due to glaciers melting, sufficient sunlight is not able to reach the coral reefs. This weakens their quality and probably ends up killing them in the long run. Without the coral reefs, the fish species depending on them also die. Scientists project that if emissions continue to rise unchecked, the Arctic could be ice-free by the year 2040.

The worst part is that it is not possible to stop the fast melting of the glaciers due to escalating rate of global warming, but we can try to slow down this process by taking a few measures. We can reduce the consumption of natural resources by powering our homes with renewable energy which would reduce the emissions of fossil fuels and carbon dioxide in the air.

We can minimize the wastage of electricity as it not only saves the fuel that would be used to produce that electricity, but also helps to prevent pollution caused by the burning of that fuel. Vehicles are a major contributor to air pollution, hence use of public transport, bicycles will significantly reduce the amount of pollution in the atmosphere. We can also reduce the use of plastic by buying products in a cardboard package. We can urge the governments to put filters on the chimneys of industries and factories. We should do whatever we can to plant trees and use sustainable development techniques. Yes, we don't need to be superhuman to save the planet. Every small step can make a big difference. Let's join hands to live economically and ecologically.

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Is Blanketing Glacier a Cure to the Climate Crisis?

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https://images.app.goo.gl/EyRGfedp5CzNBrSY8

Glaciers preserve the Earth and its oceans by acting like a protective layer. These dazzling white spots reflect excess heat into space, keeping the Earth cold. Rapid glacial melt in Antarctica and Greenland influences ocean currents by mixing enormous amounts of cold glacial meltwater with warmer ocean waters, slowing ocean currents.

Sea levels will still increase as land ice melts, as temprarure rises, glaciers melt and shrink. To stop this trend, scientists are covering up the glaciers in huge white blankets that reflect the sunlight to prevent melting. The idea is to use white material to reflect much of the sun's energy into the atmosphere, insulating the vulnerable glacier ice and snow deposits. Light colours have high reflectivity. As a result, they reflect much more radiation (heat and light) than dark colours. Practical use of these blankets can be seen in glaciers on Mount Titlis in Switzerland. It worked so well that the same method is now being used to protect glaciers in Italy and Germany.

These white blankets may appear to be a gimmick or a fast fix, but they have the potential to minimize seasonal melting by up to 70%. In an experiment, over a 500-square-meter section of the glacier, they covered the area with these white blankets. After two and a half months, they found the area insulated by the blankets had iced up to one meter thicker than areas without blankets. It's also not the only attempt to halt or delay glacier melting. Scientists are now proposing more high-tech methods to help glacier ice around the world, to cope up with the effects of global warming. One idea is to construct sand and stone mounds underwater at the mouths of at-risk glaciers near the ocean, such as the Thwaites Glacier in Antarctica. The undersea walls, which would run for miles, would halt or stop the seafloor from collapsing.

If these mounds are successful, glaciers that would have normally vanished in a century could be preserved for another millennium. Not only would the concept safeguard the glacier, but it would also limit sea-level rise by keeping meltwater from entering the ocean.

Another group of scientists proposed a scheme last year to cover the glaciers with artificial snow. They suggested taking water from the ocean and delivering it via pipes to the melting area of the glaciers, transforming the water to artificial snow, and then blasting it onto Antarctica using cannons. The objective was to create a more technologically advanced version of the giant blankets, with the blankets and the snow both reflecting rather than absorbing the sun. These concepts, unlike the usage of blankets to preserve ice, are still hypothetical. So far, it's unclear whether these changes have any real-world use. Another problem is that, without measures to combat climate change, these plans would be useless. In the end, the only viable solution is to reduce greenhouse gas emissions and slow down the present global warming trend. Even if we have a way of restoring ice in the Arctic, it does not solve the excessive Carbon dioxide emissions, the acidification of the oceans, or solve anything unless we step forward and bring the change.

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Is Ladakh balancing well between Ecology and Economy?

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Life on Earth revolves around two very powerful words starting from the letter 'E' namely Ecology and Economy. Humans happen to have the power to use these two in a way that can either shatter the planet ruthlessly or make the two words dance on the rhythm of harmony. With the glasses of sustainability, a thoughtful mindset, and the warmth to conserve the planet in our hearts, we still have the scope for our eyes to see a green Earth.

India with its beautiful and breath-taking destinations, is an excessively famous tourist hotspot. Ladakh being one of them because of its thrilling, adventurous, and sensational experience but the question is- Is the development in the union territory happening in a sustainable manner or is it slipping our minds in the race of fame and fun?

Sustainable development aims at meeting the needs of the present without compromising the ability of future generations to meet their own needs.

https://www.google.com/imgres?imgurl=https%3A%2F%2Fwww.ssla.c

The **Club of Rome** in association with other partners organised a two-day conference on "**Creating a Sustainable future for Ladakh-New opportunities for an inclusive and green development**" **during 16-17 January 2020 in New Delhi**. Various issues were elaborated like climate change, glacier melting, agriculture, horticulture, and nature-based solutions for sustainable development.

Importance of natural forests, soils and wetlands in natural water conservation was discussed. **Water management and regulation** is disturbed when forests are cut down. Looking from a development point of view, water shortages lead to reduction in farmer income and **problems with food security.** Hence, water conservation strategies like **insulated pipes** and **water metering** were discussed.
Another key problem that the city deals with is jillions of garbage. It is a pity that more than 30,000 plastic bottles are dumped every day in summer. Tourist guidelines in the eye of cleanliness and sanitation were issued. Use of reusable steel bottles is suggested instead. Dry toilets i.e. compost toilets have stayed in Ladakh for years and are still promoted because of their eco-friendliness. Use of excessive vehicles in the city have led to an average rise of 3 degrees in a decade, which is a very high range of increase. Hence, shared taxis are being promoted. Instead of big hotels, tourists are suggested to stay at homes of localites which increases their income as well reduces net waste. This also promotes traditional food and clothing items. Constructing artificial glaciers was discussed to mitigate the influence of climate change in Ladakh. The documentary depicted how artificial glaciers are constructed between different levels between the village and the natural glacier. The mild temperature during the early springtime can trigger the meltdown from artificial glacier at a lower level providing timely water for sowing seeds and recharging groundwater.

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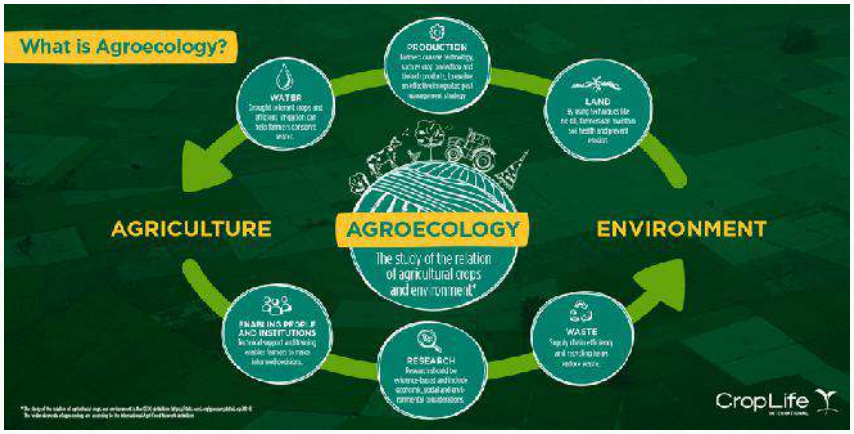

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Moving towards a Greener Future, One Click at a Time

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What is the first thing that one does in the morning? What do most of us do nowadays? Check our phones, sometimes even before we have gone to the washroom to freshen up. Such is our dependence on technology, the most visible example of which would be the smartphones! But have you ever wondered about the environmental impact of the thousands of clicks one does throughout the day? Not to worry, we'll be delving into that now.

Every little click you do or every time you pick up your phone to do some work, you actually expel greenhouse gases. And with approximately 4.1 billion people, or 53.6% of the global population using the internet, this is a huge emission, albeit made up of tiny bits. The carbon footprints of our gadgets, the internet and the systems supporting them account for about 3.7% of the global greenhouse emissions, which may appear minor but have drastic impacts on the environment. Even more worrying is the fact that estimates show that this percentage will double by 2025.

Say Yes to the Mess(age)!

A single email you sent may have a footprint varying from 0.3g CO2e for a spam email to 4g (0.14oz) CO2e for a regular email and 50g (1.7oz) CO2e for one with a photo or a hefty attachment, also depending on the gadget to which the email has been sent.

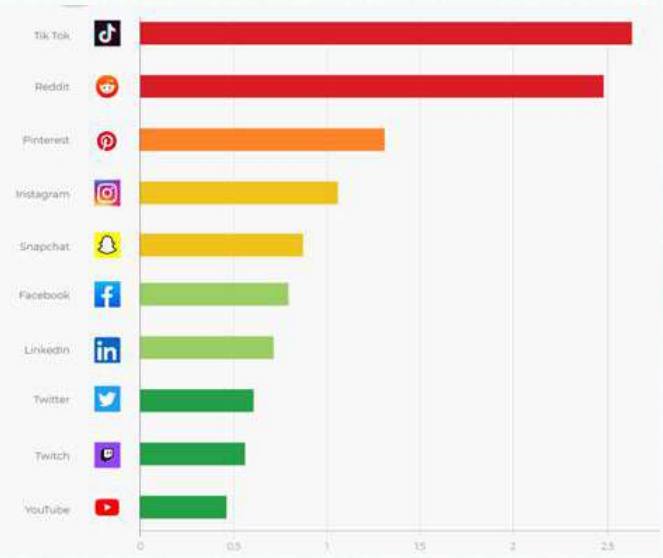
https://www.azocleantech.com/article.aspx?ArticleID=2

A shorter and better alternative would be to avoid sending unnecessary emails. If people equivalent to the population of the United Kingdom didn't send unnecessary emails, it could save 16,433 tonnes of carbon a year – the equivalent of taking 3,334 diesel cars off the road, as stated by an energy company, OVO. Another option could be unsubscribing from useless emails, thereby reducing greenhouse gas emissions.

Search it up!

Searches on Google and other search engines also emit greenhouse gases, but with the growing times, the companies are trying to do better. Google has been reported of using a mixture of renewable energy and carbon offsetting to reduce its carbon footprint and Microsoft, which owns the Bing search engine, has promised to become carbon negative by 2030. Another interesting case is Ecosia, which stated that it will plant a tree for every 45 searches it performs.

A case study worth noting would be that of Crypto currencies. One recent study estimated that 'BitCoin' alone is responsible for around 22 Million tonnes of carbon dioxide emitted every year – greater than all the carbon footprint of the whole of Jordan. Huge amount of computing power is required for the "proof-of-work" algorithm that is used to run the authenticity of the transactions in Blockchain technology.



https://greenspector.com/en/social-media-2021/

So for those of us aiming to be sustainable, might want to have a second thought about investment in cryptocurrency.

What's on the Social?

For all Social Senseis, here's some good news! It has been found that social media is the least carbon-intensive medium out of all online entertainment media. According to the sustainability report by Facebook, a user's annual carbon footprint is 299g CO2e, which is lesser than carbon emitted during boiling of water for a pot of tea. However, we must also consider the millions of users that it has, thereby increasing the emissions manifold.

One can minimize carbon emission by disabling some features of some apps, notifications for apps that you don't constantly use and uninstalling the ones that you don't require.

To conclude, we will need to change our habits to promote a more sustainable and eco-friendly future. It is here, it is now that change can be effected, one person at a time. Together we can bring a change for the better of the world, for the better of us all. In the words of Larry Page, “It really matters whether people are working on generating clean energy or improving transportation or making the Internet work better, small groups of people can have a really hugeimpact.”

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Fast Fashion: Are we Buying Climate Crisis at Cheap Prices?

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As appealing as the cut rate fast fashion may be, especially to us frivolous teenagers- the Rs. 50 Ribbed Crop Top at Sarojini comes at an inevitably higher and disguised price compared to what is understood by most people. The youth rebellions against the climate crisis are lost to instant gratification that comes along trending with the trend. As contemporary culture continues to desire the latest fashion- clothing, shoes, bags- all New Season! At 70% off! It feeds into the sink of an exponentially growing market that carries the sole purpose of capitalistic gains through unsustainable means that in no way justify the ends.

Fast fashion is the mass production of 'Cheap Replicates' of Catwalk trends, which more than often entails unethical exploitation of labourers, overuse of materials like nylon and polyester, overconsumption of agricultural resources for fibre cultivation, overconsumption of petrochemicals and environment degrading manufacturing processes along with an ever-increasing burden of disposing dyes into water bodies. Additionally, fast fashion has now created a massive problem of disposing of an increased quantity of clothes and accessories that never met the amount of usage even barely equivalent to the damage their production had inflicted on the environment. ‘Quick Response Manufacturing’ being the technical term as used by manufacturers, blatantly label their products as “Affordable” when, in disguise their manufacturing is costing heavily to the environment, against all legalities. It is hence, a thriving, unethical and most times an illegal manufacturing business model, that rose to stardom during the 20th century.

How do we fall prey?

The quick manufacturing of new season's clothing and accessories, that are frequently cheap replications of stolen designs by Authentic Brand Labels, creates "The Trend". Social Media too, plays its part and we easily tend to inherit a predisposition, influencing our choices, urging us to be a part of the trend. With each new season, sets in a new 'latest trend' and the clothes bought last season? Discarded. If the issue at a personal level seems insignificant because, after all we only ever throw away one or two pieces, let us look at it from the perspective of a manufacturer, who had tonnes of Ribbed Crop tops at the storage, waiting to be sold but turns out nobody is buying ribbed crop tops anymore since there's already a different alternative trending, at the same price! More often than we realise, these 'out of fast fashion' clothing pieces and accessories are discarded in similar ways as other factory trash, hence adding onto the burden of disposing of chemicals and polyester on the planet.

Understanding the Actual Cost of seemingly cheap Fast Fashion

The fast fashion sector is based on ever-increasing production and sales, fast manufacturing, low product quality and product's short life cycle, as a result leading to unsustainable consumption and generation of substantial waste which accounts for the heavy price to be paid by the planet amidst a climate crisis.

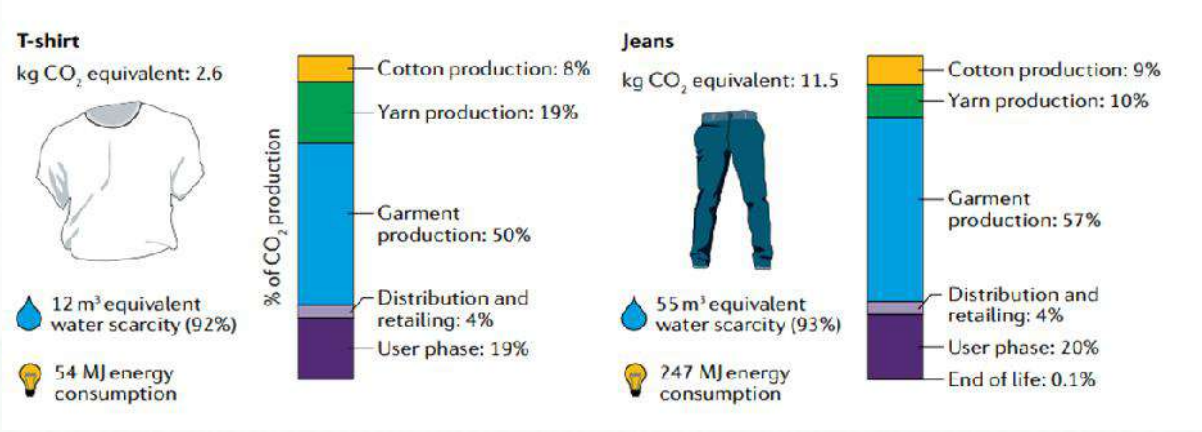
Carbon Footprint of Fast Fashion

Clothing and Textile production has been accounted to be producing about 12 billion tonnes of greenhouse gasses every year, which is more than the emissions caused by international flights and shipping in total!

The Intergovernmental Panel on Climate Change claims that the textile industry causes 10% of global greenhouse gas emissions; however, the means of these estimates do not include the carbon footprint in the use phase- involving transport, retail and disposal.

Following this, a study conducted in Sweden found that the use phase alone contributes to 14% of the total climate impacts of clothing consumption.

High energy consumption in production and transport is a significant factor costing the environment a heavy price, the type of energy used during production largely influences the carbon footprint, for example, use of Coal based energy in China for textile production results in its carbon footprint 40% larger than that of Europe and Turkey.



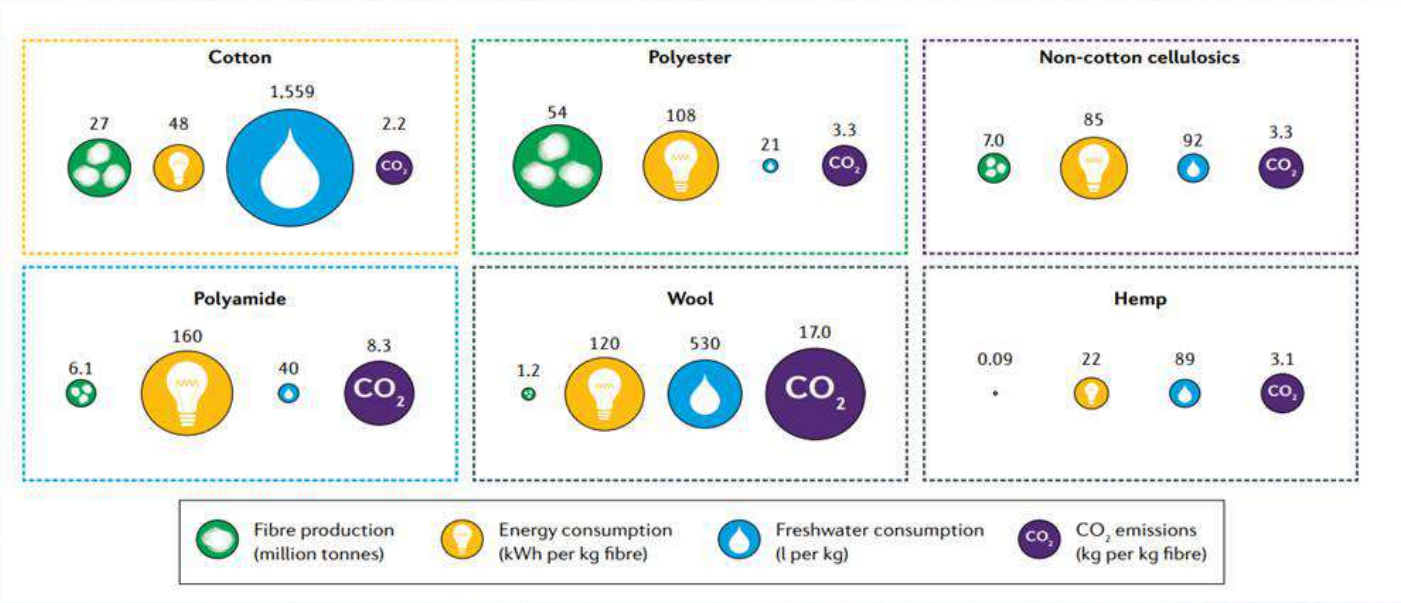
https://www.researchgate.net/publication/340635670_The_environmental_price_of_fast_fashion

Overconsumption of water supplies

Large amounts of water, that amounts to 79 billion cubic metres in 2015 along with earning an average score of 200 tonnes of water is consumed during the production of one tonne of textile! Water is involved at various steps starting from cultivation of textiles, to bleaching, drying, printing and finishing.

Textile production requires an estimated 44 trillion litres of water annually for irrigation which makes up 3 percent of total water used in irrigation annually.

In addition to the massive Water Footprint of the textile industry, fast fashion manufacturing is also associated with local scarcity of water. The Quick and cheap production measure often cut back on various capital consuming steps necessary for wastewater treatment. Chemicals used during manufacturing are toxic, and frequently disposed into the nearing water bodies rendering it non usable. In Cambodia, for example, the fashion industry has caused an estimated 60% of water pollution and 34% of chemical pollution.



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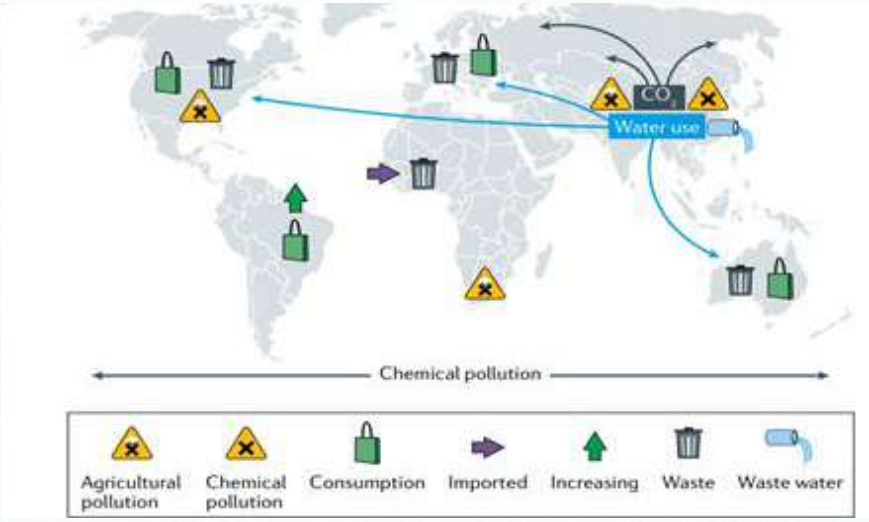

https://www.researchgate.net/publication/340635670_The_environmental_price_of_fast_fashion

The rising efficiency of cheap production is the cause of ever decreasing prices in Fast Fashion, which in turn promotes the tendency of over consumption on a daily basis. Low costs that promote the phenomenon of buying more further amplify the tendency of wearing less. The average use time of a garment has decreased by a whopping 36% since 2005.

However, just as the rise of this extremely implausible business had been through the hands of the consumer, the power to its much-needed undoing also remains in the hands of the consumer.

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Geoengineering: an Incredible Hack to Revive Planet or a Self-Destruction Button

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"If the world continues to move on the current path, global warming will be significantly more than 2° Celsius by the end of the century." - The Indian express.

Everyone is aware of the suffering of our planet, about how it's struck by different climatic issues. Everyone reacts to it in their own way, while some choose to ignore it, some are working day and night hoping that they will bring some improvement even though little but still they'll contribute.

We all are taught different methods by which we can contribute to fixing the earth's current condition, which varies from simply turning off the light to taking part in the plantation drive. But what if, it is told that, there are some crazy hacks to revive the earth, which varies from building a giant mirror in space to ejecting aerosols into the atmosphere. This might sound something like Thanos's plan to destroy the earth but some scientist believes that this can be used to cool down the earth. These scientific hacks are collectively called "Geoengineering". These measures are massive in scale that they might undo centuries of human behavior or make everything much worse.

Geoengineering consists of different methods like seeding clouds with salt to fertilizing the oceans with iron to speed up the growth of algal cells. Most methods of geoengineering incorporate very different things such as sucking carbon dioxide out of the sky so the atmosphere will trap less heat or reflect more sunlight away from the planet.

Let us try to understand this in more detail, Carbon dioxide doesn't heat the planet on its own and almost all the energy comes from the sun in the form of electromagnetic radiation. Most of it is absorbed by the earth's surface and this absorbed energy is emitted again as infrared radiation and carbon dioxide can trap this infrared radiation and keep it in the atmosphere for a while. So, one way to cool down the planet is to prevent it from getting energy trapped which already happens naturally and more than 28% of the solar radiation is reflected in space by surfaces like ice, deserts, and clouds. In a nutshell, more reflection, less energy, less warming. So where did this idea come from?

Well, this concept is not new. In 1965, President Lyndon Johnson's Science Advisory Committee warned it might be necessary to increase the reflectivity of the Earth to counterbalance the rising of greenhouse-gas emissions.
The best-known geoengineering method, which involves spraying particles into the stratosphere also known as "stratospheric injection" has also been demonstrated by nature.

A very famous incident, the massive eruption of MT. Pinatubo (1991) poured out millions of tons of compounds and particles into the sky. The gas which drew the attention of geoengineers was sulphur dioxide. High in the atmosphere, it produced a haze of sulphuric acid droplets that mixed with water and created a giant blanket to earth atmosphere as this blanket reduced the sunlight reaching earth by roughly 1%.

The global temperature dropped by 0.5° celsius and it took three years until this cooling effect had stopped. So, humans can imitate this by injecting sulphur dioxide directly into the atmosphere. As some scientist believes that it is super easy to do and they don't even need new technology to do this, cool right? No, unfortunately, there are some side effects to this like - rainfall patterns could change due to this or an aerosol injection which could negatively affect agriculture and cause a famine. Even though scientists had suggested another compound that may prevent these side effects research and experiments are needed to be performed even though these side effects don't occur, there are still some other risks. Politicians and industries might use the cooling effect to delay the switch to a carbon-neutral economy.

So even if geoengineering cools down the whole planet humans are still adding extra CO2 to the atmosphere. If humanity continues to enrich the atmosphere with CO2 while preventing it from heating, we are setting a time bomb, as once we stop geoengineering natural cycle would take up and the earth would heat up but this time it will heat much quicker. This time this temperature shock in such a short time would disrupt every major system on earth that it would be impossible to adapt in time. Humanity might survive but the survivors would inhabit an unfamiliar and hostile world. So, the answer to the question that geoengineering could completely revive the climate is NO - although it might help us to buy the time if the world understands the existential danger of climate change. Geoengineering can rent us a decade or two to transition our economy.

In conclusion, Geoengineering is a scary concept that is not a solution to climate change and might even be a welcome excuse to the fossil fuel industry to delay the fossil fuel age. Geoengineering is so controversial that many scientists and researchers couldn't even perform the experiment they wanted to do.

Hopefully, we never get to use geoengineering but if we might have to do we better have the proper technology for it or panicking humanity might press the "self-destruction button"

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Tackling the Menace of Solid Waste

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As a sense of uneasiness highs
My mother earth signs
While the world lies
The Earth cries.....

According to a report by the planning commission, India generates 62 million metric tons annually with an appalling amount of 1.7 million metric tons waste generated daily. Further it is projected to rise 165 million tons by 2031 which is possible and unnoticed at worst. Have you ever thought about how the garbage generated at our homes reaches its final end? Well, the journey starts from collection, segregation, transportation and finally to disposal. Unfortunately each stage has its own problems.

https://www.google.com/imgres?imgurl=https%3A%2F%2Fthecityfix.com%

Solid waste is the waste that gets generated through the discharge of it from residential, nonresidential areas like industry, agriculture, and many other sources. It includes- biodegradable, non-biodegradable waste. The list ranges from leftover electronic waste like batteries, defective chargers, computers, mobiles to heavy metals, vegetable peels to leftover food, broken glasses to twisted wires, used acid bottles to laboratory instruments, etc. Mainer times the ordinary people handling waste, may not be aware of the toxic gasses included with the whole heap of rubbish due to which sometimes they inhale gasses leading to deaths. Hence proper vigilance is required.

Realities:

Since it is the ragpickers (constitute 2% of the population) who are mostly indulged in the collection of garbage, their ordeals remain etched in this whole process. The majority among them are children who are left engrossed in this not-so-fun-loving activity which is rather arduous at best and hazardous at worst. At times their inexperience and unawareness leads to hurting themselves(through discarded scissors/knives/blades/e-waste etc). Adults on the other hand face the problem of tipping fees which don't work in their favor. It places the waste generator source at an advantageous position by every time he discards the waste to kabadiwala or ragpicker who in return promises some amount back to him. Hence places the person who toils, in a disadvantageous position.

Solutions:

Since ragpickers constitute the majority of the workforce in this job, they should be roped in with municipalities so that every government initiative relating to the improvement of their livelihood can be taken care of. Every recommendation taken out by committees should be socially audited to ensure effective implementation. At the national level already there have been acts like the solid management act 2000, another act of 2016, or even recently enacted mission like Swachh Bharat mission 2.0 further provides a boost to the overall system. At the individual level, people should also start strictly segregating the waste and rules should be made of fining any act not done to ensure this action. Along with this adherence to 5 hours-refuse, reduce, reuse, repurpose, recycle is required.

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Agro-Ecology: Paving way to Sustainable Agriculture

Riya Arya
B.Sc. Botany (H.), Second Year

While ecology is the study of relationships between plants, animals, people and the environment and the balance between these relationships, ***agro-ecology*** is the application of ecological concepts and principles in farming. **Agro-ecology is an integrated approach that simultaneously applies ecological & social concepts and principles to the design and management of food and agricultural systems.** The ***term agro-ecology made its first appearance in 1928*** under the pen of American agronomist **Basil Bensin**. In the 1990s and 2000s, agro-ecology became much more global. ***Agro-ecologists promote crop diversification*** (***polycultures, crop-livestock combinations, rotations, agro-forestry systems, etc.***) as an effective agro-ecological strategy for introducing more biodiversity into agro-ecosystems, which in turn provides various eco-friendly services to farmers such as natural soil fertility, regulation of pests, pollination, and others.

https://images.app.goo.gl/beteop6aiWwTsSqY9

The approach of agro-ecology entails the application of blended agricultural and ecological sciences with aboriginal knowledge systems. Potentials include raising crop yields and total farm output, increasing stability of production through diversification, enhancing resilience of farms to climate change, improving diets and income, conservation of natural resource base and biodiversity. Agro-ecological principles can be applied to break the monoculture nature of modern mechanised farms.

https://www.google.com/imgres?imgurl=https%3A%2F%2Fyoumatter.

Strategies include complex crop rotations, cover cropping in vineyards & fruit orchards, strips intercropping and so on.

AGRO-ECOLOGY AND RIGHT TO FOOD

Oliver De Schutter, 2011
A Case Study

In Cuba, it is estimated that agro-ecological practices are used in **46-72%** of peasant farms, generating over **70%** of the domestic food production. This equates to **67% of roots and tubers**, **94% of small livestock**, **73% of rice**, **80% of fruits** and the majority of honey, beans, cocoa, maize, tobacco, milk and meat production.

Agroecology gets a lot of praise but little support, the practices are knowledge-intensive, focus on details and follow a small scale and long-term approach. This makes them unappealing for public or international large-scale development assistance projects intended to quickly achieve the "best" possible and easily measurable results with as little effort as possible. For this reason, agro-ecology has been systematically promoted in a few countries, such as Brazil, and is often neglected by public funding, despite assertions to the contrary. According to **UN's special Rapporteur on the Right to Food,** governments must shift subsidies and research funding from agro-industrial monoculture to small farmers using 'agro-ecological' methods. Modern industrial agricultural methods can no longer feed the world, due to the impacts of overlapping environmental and ecological crises linked to land, water and resource and availability.

Agriculture needs a new direction: agro-ecology, Modern agriculture, which began in the 1950s, is more resource intensive, fossil fuel dependent, using fertilisers & toxic pesticides based massive production and mono-culture. This policy has to change. According to prof. Elver, Empirical & Scientific evidence shows that small farmers feed the world. ***According to UN Food & Agricultural (FAO),*** 70% of food we consume globally comes from farmers.

A letter to the FAO signed by nearly 70 international food scientists congratulated the UN agency for convening the agro-ecology symposium and called for a "UN system-wide initiative on agro-ecology as the central strategy for addressing climate change and building resilience in the face of water crisis."

A new term was introduced namely- **Naturonomics** i.e. nature plus economics. Naturonomics is the only way for sustainable development. Renewable energy sources were promoted. Ladakh is a potent place for **solar energy** as it receives **330 days** of direct sunlight with clear skies. Micro hydel projects were also encouraged as small rivers are capable of meeting the requirements.India's first PPP (Public-Private-Partnership) in faecal sludge management was introduced in Leh for improving sanitation.

The trans-Himalayan belt has a variety of wildlife and maintaining harmony with other creatures is a key part of tourism guidelines. Offering packaged food to wild animals is strictly prohibited in the city. PAGIR (People's Action Group for Inclusion and Right) is a group of people that promote the eco-friendly development vision for Ladakh. This two-day conference was an eye-opener for taking steps towards green development. Although these are just laws in the future until we decide to bring this into practice. So let's be the change we wish to see!

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National Agroforestry Policy

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The burgeoning population in India is an urgent reminder of the prolific and sustainable use of agricultural land. Agroforestry is a promising tool to achieve this goal. Agroforestry is the amalgamation of forestry and agricultural techniques to devise integrated, diverse, and high-yielding land-use systems. It is a system of using land for growing trees and shrubs among or around crops or pastureland. This farming system has been in use since ancient times across the world, both in temperate and tropical regions. The vast majority of the agroforestry systems are a part of the long-established traditional knowledge of indigenous communities. These systems are implanted slightly differently in nearly every part of the country due to the presence of varied climatic conditions in the respective areas. Keeping all this in mind, and to enhance the use of the agroforestry systems, the Government of India, in 2014, brought in the National Agroforestry Policy, to deal with the issues of quality planting material, publicizing agroforestry produce, tree insurance, limitations on transit and harvesting, extension, and research.

It is a wide-ranging policy framework devised to sustainably enhance agricultural livelihoods by boosting agricultural productivity for mitigating climate change. This policy has a set of goals for achieving the end product. Some of the important goals are: - establishing a National Agroforestry Mission/ Agroforestry Board to execute the national policy by instituting coordination and cooperation among various stakeholders; improving the livelihood opportunities, productivity of rural households, predominantly of the small farmers, through agroforestry; to meet the growing demand for food, fuel, timber, etc.; safeguarding natural resources and the environment; and increasing forest cover.

But like a rose, enticing and gorgeous, has its own set of flaws in the form of thorns, this system also comes with its own set of challenges. One of the common problems, it faces, is that of lack of awareness and proper implementation. Also, agroforestry being a long-term concept, creates hesitation among farmers who want hassle-free and short-term gains, and hence invest more in horticulture instead of agroforestry.

Participation of business and development sectors is also unsatisfactory and integration of hi-tech agroforestry systems with the traditional ones is also not given adequate attention. Nevertheless, efforts are still going on and some key proposals towards agroforestry have been introduced as well, including, placing it as a priority area under the Corporate Social Responsibility programmes, disseminating awareness about the systems and simplifying the rules and regulations, encouraging public-private partnerships (PPPs) for promotion of the systems in roadside/ barren/ canal-side community lands, encouraging R&D both in private and government sector to meet the local needs of fodder, fuel, timber, etc.

https://images.theconversation.com/files/274632/original/file-20190515-

Scientists project that if emissions continue to rise unchecked, the Arctic could be ice-free by the year 2040. The worst part is that it is not possible to stop the fast melting of the glaciers due to escalating rate of global warming, but we can try to slow down this process by taking a few measures. We can reduce the consumption of natural resources, reduce the emissions of harmful substances into the atmosphere, walk on foot, use bicycles or other energy-efficient vehicles, buy products in a cardboard package, if possible, therefore reducing the usage of plastic bags and more.

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If implemented appropriately and in an efficient manner, this policy can spread the use of agroforestry to every corner of the country, hence enhancing the productivity and sustainability of agroforestry in India.

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SEGMENT FINALE

Eco-Warriors

WARRIORS OF CLIMATE CRISIS

ANTHESIS | 2021-2022
Volume 17

The Padma Shri Awardee R. Pappammal

Then 105 year old R.Pappammal from Coimbatore, received the Padma Shri award in 2020 for popularising organic farming. She owns a 2.5 acre land in her village Thekkampatti. She believes in doing hardwork for herself. She mainly grows bananas in the farmland. Earlier she used to grow lentils like horse gram and green gram. She would travel alone in several villages and would attend the farmers meet to learn new methods and techniques of agriculture. She was probably the only woman attending such meetings. It was in one such meeting only when she acknowledged that the use of chemicals as fertilizers and pesticides was not only deteriorating soil quality but also harms the crops and the consumers. She then switched to growing completely organic crops. Over the years, she has been working closely in collaboration with the Tamil Nadu Agricultural University. The university also used to send its students to the field land to learn the practices from Pappammal. She would also visit the sites suggested by the university to observe and learn the techniques being followed there. Pappammal revealed the secret to her health was her lifestyle. She would eat healthy (like ragi, kambu and lots of greens) and what's required. She would not refrain herself from doing manual work like removing weeds from the farm. Even being 105 years old, she wakes up early before sunrise and enjoys her stroll around the village.

Janvi| Team Anthesis

READ THE FULL BIO ON–: **https://www.thehindu.com/news/cities/Coimbatore/the-105-year-old-grandma-who-was-awarded-padma-shri/article33912110.ece**

Seed Mother
Rahibai Soma Popere

Popularly known as 'Seed Mother', Rahibai Soma Popere is a tribal farmer from Mahadeo Koli, a Tribal community from Ahmednagar district of Maharashtra. Rahibai Soma Popere comes from a remote village called Kombhalne in Ahmednagar, has been awarded the Padma Shri on November 8th, 2021.

She is known for developing a Blackberry nursery and giving them out as gifts to members of the Self-Help Group (SHG). She also travelled across Maharashtra and beyond to conserve indigenous seeds. Later, she established a nursery of hyacinth bean seedlings, rice, vegetables, and bean landraces, which she distributed to many farmers.

She also established an in-situ germplasm conservation facility, which conserved and grew about 43 landraces of 17 different crops (paddy, hyacinth bean, millets, pulses, oilseeds, and so on). Today, Rahibai owns a seed bank with nearly 200 types of indigenous seeds.

Shreya Singh, Khushi | Team Anthesis

READ THE FULL BIO ON-: **https://www.opindia.com/2021/11/rahibai-soma-pompere-seed-mother-padma-shri-brief-profile/**

Mumbai's Green Warrior Seema Adgaonkar

56 years old, Seema Adgaonkar is a very bold lady. She glides through the swampy mangroves in ankle-deep muck. Despite the hot and humid climate, the fragrance of *Avicennia marina* (the grey mangrove) makes the trail pleasant. The grey mangrove are the most widely spread species in Mumbai. She instructs them where the saplings are to be planted and shares ways to identify some of the species with their regional and scientific names.

Formerly, she was one of the four range forest officers of the Mumbai Mangrove Conservation Unit (MMCU). Later with a promotion, she now trains the young minds to guard the ecosystem and mangroves. MMCU, a 36 member body solely dedicated to protect the city's declining mangroves, falls under the Maharashtra forest department's Mangrove Cell. She was the only woman in the cell. Initially, she faced lot of issues but conquering them all, she reached to the men and women(working in kitchen of their homes) in villages spreading awareness about the city's mangroves.

She believes no government policy can be successfully implemented until all men and women of the society are equally involved. The mangroves of the city are facing a great threat due to increasing land use, anthropogenic actions, climate change etc. These mangroves act as natural buffers in guarding the city from floods by obstructing the flow. However, due to the plastics accumulated, the pneumatophores get choked leading to death of mangroves. However, cleanliness and plantation drives are timely conducted. Seema urges that the need is to acknowledge the importance of mangroves. It was also said that if mangroves are saved, Mumbai is saved else these towers would fall like leaves.

Janvi| Team Anthesis

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Forest Encyclopaedia
Tulsi Gowda

The 72-year-old environmentalist, Tulsi Gowda, from Karnataka, was bestowed the prestigious Padma Shri award on November 8, 2021 for her contribution towards the protection of the environment. She is a tribal women environmentalist who has planted more than 30,000 saplings and has been involved in environmental conservation activities for the past six decades. Far from any kind of formal education, Smt. Tulsi Gowda has been conferred the title of 'Encyclopedia of the Forest' as she has massive knowledge of diverse species of herbs and plants.

Back when she was 12, Gowda planted thousands of trees and nurtured them. Later, she joined hands with the forest department as a temporary volunteer. It was this job as a volunteer where she was recognized for her dedication to preserving nature. Later she went on to get a permanent job in the department. Even at the age of 72, Gowda continues to inspire the younger generation about the preservation of nature with her selflessness and hard work and shares her immense knowledge about plants with the world.

Shreya Singh, Khushi | Team Anthesis

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Mother of Trees
Saalumarada Thimmakka

A true legend, Saalumarada Thimmakka of Karnataka is 109-years-old who is known to be the mother of more than 8000 trees. At the age of 40, she gave up all hopes in life as she could not conceive. But as we know there is no age that is bigger than the aspiration to something in life. She then started planting banyan trees along with her husband and found a purpose in it. Both Thimmakka and her husband started with 10 banyan saplings on either side of the road along a stretch of 4 km in the first year.

They took care of the plants just like their children. Every year, the count of these trees kept increasing. To date, there have been more than 8000 other trees grown by her and her husband. Not only did she plant those trees but also fenced, watered, and guarded them. Later, she was awarded the Padma Shri in 2019. When asked that how many trees they had planted in one of her interviews she said “We didn't count them. My husband never told me how many we planted. They just grew. Now they are so big that three people are needed to hug them. They are 70-year-old trees.”

Shreya Singh, Khushi | Team Anthesis

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ANTHESIS

STILL ONE EARTH

A KALEIDOSCOPIC VIEW INTO THE SUSTAINABLE FUTURE

SEGMENT 3

Is the Future of Farming Indoors?

Adithi Rao
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Indoor or house plants have been in the news quite often lately. With everyone at home for the past several months, acceptance of these plants seems as if it has reached a fever pitch. The rapidly growing admiration towards house plants is because of the many benefits they provide; apart from the mental and emotional boost, they also create a connection with nature and spaces while sitting comfortably on our couch. The plants absorb toxic chemicals and produce oxygen sending happy and calm vibes across the home. What can be considered as an added advantage is the fact that taking care of plants, watching them grow every day, is tremendously rewarding. Variants of indoor planting like aqua scaping are also growing. For people who love an aquarium but aren't keen on keeping fish, growing aquatic plants in a tank introduces the tropical mangrove to your household.

Now as we start to discuss whether the future of farming will shift indoors, we need to look into some facts. By 2050, the world population is predicted to reach 9.7 billion. It is estimated that to feed everybody, global food production needs to increase by up to 70% in the next 30. According to the Food and Agriculture Organization, border closures, quarantines, and commotions to supply chains are restricting people's access to food, especially in nations hit hard by the virus.

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There is a developing accord that the farming industry has to adapt to use less water and chemicals, and produce more reliable yield. These facts are of great importance as indoor farming may not have the above-mentioned problems and can be the potential solution to the increasing food needs. The indoor farming technology market had a value of $23.75 billion in 2016 and is estimated to reach a whopping $40.25 billion by 2022.

Indoor plants are independent of external weather conditions and thus the yields are higher. The use of technology can enhance the productivity of the house plants; by using AI to ensure the environment is ideal for each plant, as well as the day and night temperatures and amount of CO_2 needed. Another plus point is that home farming helps acclimatize to the rising temperatures of Earth, by using less water and releasing lesser emissions. One more shocking revelation is that these plants don't need pesticides and chemicals and produce abundant yields with net zero-waste generation. Farmers can build indoor farming amenities anywhere, thus providing their communities with year-round access to fresh yield.

So, what will the future be like? To be specific, it can't be predicted right now. There are certainly many advantages of indoor farming, but the question is: whether it will be able to sustain all the food requirements of the world? As of now, certain crops like leafy greens, herbs, tomatoes, and cucumbers can be grown very well indoors. But other agricultural supplies like grains or fruits can't be produced.

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Indigenous Community of Andhra Pradesh fights Climate Change with Coffee

Shruti Apurva
B.Sc. Botany (H.), Second Year

Tribal people or the “Adivasis” are known to be close to the nature and the environment. Their intimacy with nature comes from the fact that they not only worship nature but their rituals and traditions are about conservation and sustainability. They’ve proved it time and again that they care a lot about mother earth and the resources she blesses us with. There is no doubt that the indigenous community of a certain region love and respect their land and devote their lives to protect and conserve it. We all have heard about the legendary “Chipko Movement" in which the Bishnoi community of Gharwal region started a non-violent but powerful movement against deforestation. Many such examples can be found which are not only inspirational but also extremely educational, that guides us towards sustainable development.

Another such example can be seen in Andhra Pradesh, where the tribal people are cultivating coffee plants while fighting deforestation. The Naandi Foundation in Andhra Pradesh started a cooperative set-up for the tribal communities of Andhra Pradesh. The Foundation established an organic farming model to benefit the farmers of the region, this helps them to work towards the betterment of educational institutions, healthcare facilities and other infrastructure.

The tribal people in the Araku Valley of Southern Andhra Pradesh have been countering a dual challenge- one of providing shade to coffee plants and two, the consistently decreasing forest cover in the Araku Valley by intercropping coffee plants with trees of papaya, mango and orange.

http://www.livemint.com/rf/Image-621x414/LiveMint/Period2/2017/07/29/Photos/Processed/Araku3-k6sD--621x414@LiveMint.jpg

The concept of biodynamic farming was also introduced to the indigenous community of that region. The concept was warmly welcomed by them as just like biodynamic farming, their customs and tradition work towards the protection and holistic development of the ecosystem.

While India is aiming at keeping one third of its land area under forest cover, a growing population keeps on increasing the demand of land for mining and other industrial activities. Tribal people have hence been playing a crucial role in protecting indigenous forests.

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Climate Crisis from Outer Space: Space Debris encircling Earth

Ananya
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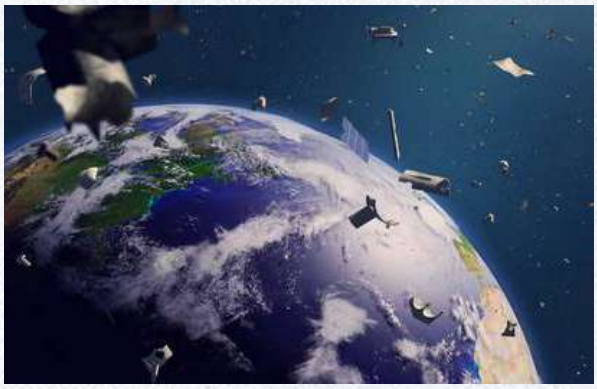
The concept of environment is a term loaded with varied implications. In recent research and space, it has been assumed to be an inextricable part of the environment. It is important to note that outer space isn't as empty as one might think, as potentially catastrophic space debris encircles the earth's orbit. The statistics estimate that nearly 6000 satellites are now encircling our planet and half of them are dead, thereby transforming the space above into a junkyard.

We must track space debris and address this emerging problem head-on as it poses a significant risk not only to the satellite dependent digital world but also to the humans as well as flora and fauna which flourishes on the Earth. Do you know that even a loose screw or a speck of paint can turn out to be dangerous in space? The devastating fallouts of the space junk can be understood in the light of the fact that such tiny debris can travel up to the speed of 17,500mph which is equivalent to the energy of an SUV going up to the speed of 70 miles/hr and has potential to damage any object that bumps into it, be it a satellite, spacecraft, etc.

However, the point to be noted here is the ramifications of space debris aren't just confined to space exploration but also exacerbate the climatic crisis on the Earth. Any object that doesn't burn up and disintegrate upon atmosphere, re-entry is likely to fall either in the ocean or worst-case scenario in the populated land area.

For instance, debris from Russian Proton rockets launched from Kazakhstan has littered the Altai region of Saudi Arabia. On 9th May 2021, the remains of a China rocket namely the long March - 5B Y2 splashed down into the Indian Ocean nearby Maldives. This incident drew scathing criticism from the US amid fears that it could have posed a risk to the life and property of humankind. Besides, it aggravated the already existing environmental problem of waste management. These objects are monitored primarily by the US space surveillance system which is a network of telescopes and radar systems that continuously monitors Earth's orbit

On top of it, NASA scientist, Donald Kessler has warned about the Kessler Syndrome i.e. the collision of objects in the Earth's low orbit can cause a chain reaction that increases the likelihood of further collisions thereby adding to the existing space junk in the process (Domino Effect).Of late, the countries across borders have displayed concerted efforts by taking mitigating measures to forestall such massive build-up in debris.



https://medium.com/life-on-the-other-planets-whats-new/on-a-collision-course-when-space-debris-becomes-a-real-threat-924c531ae37f

The Indian Space Research Organisation (ISRO) has commenced a project namely, "NETRA" or network for space object tracking and analysis, which aims to safeguard the country's low earth orbit satellite from space debris. Its key objective is to monitor, track, and protect the national space assets and function as a hub of all SPACE SITUATIONAL AWARENESS (SSA). Hence it is an early warning system in space to detect debris and other hazards to Indian satellites. Given the gravity of the problem, improved tracking facilities can help us survive this game of cosmic dodgeball but only a little longer. Some of the key mitigating measures which can be practised are - developing reusable spacecraft, releasing stored energy and fuel so that defunct spacecraft don't explode and most importantly accelerating the natural decay of space objects to reduce the time that they remain in orbit (DESIGN FOR DEMISE). Moreover, large pieces of space junk can be tracked using ground-based radar and more precise optical and lidar methods and their future trajectories can be calculated to predict possible future collisions.

What if the 'Kessler Syndrome' accelerates? What if the space debris turns the earth's low orbit into a highly unstable zone? Well, such mind-boggling questions continue to prevail with unsatisfactory answers. Hence, if left unchecked, space debris can have catastrophic consequences and pose grave problems for future generations.

Needless to say, it is not only potent enough to puncture an astronaut's spacesuit, crack a window on the space station or blast a hole in a spaceship but it also has detrimental effects on the Earth's environment. Today the entire world is closely intertwined and largely dependent on the satellite communication system. However, the growing space debris might become problematic for this system to work smoothly shortly.

Hence it's high time that the multilateral efforts must kick in to draw a comprehensive plan to tackle this emerging issue and ensure a sustainable future for posterity.

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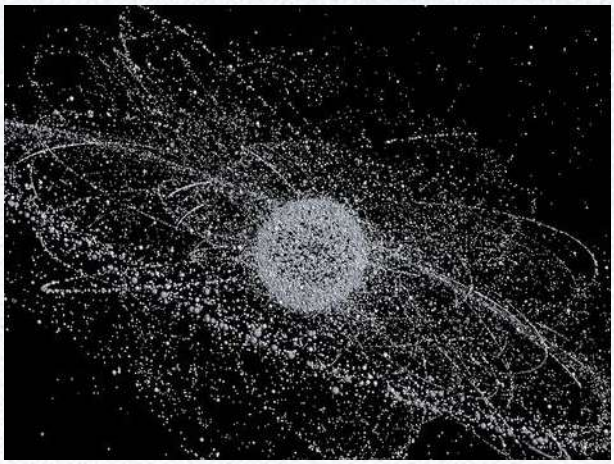

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Modest Solutions to Whopping Problems

Ananta Pareek
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"***May your choices reflect your hopes, not your fears.***" **-Nelson Mandela**

As Elon Musk and other billionaires are house hunting on other planets, the optimistic lot of us on Earth talk about a better future here. Though the thought of sunset from your balcony on Mars sounds really interesting, is it really for us?, or is it a far-fetched dream for people who will write essays on us for their family history assignments? Let's start a new conversation about sustainability, we have all heard about the Holy Trinity of reducing, reusing, and recycling but it's time to broaden our horizons. With the onset of the 21st century, brands and labels became a huge part of our everyday lives. Whether it is huge brands like Lewis making denim from recycled plastic, the classic case study of Ahmed Khan using the same for constructing roads in Bangalore, or new brands like 'Hexpressions' creating water, fire, and termite resistant walls from recycled paper, we are taking steps towards a sustainable future. Being in an all-women's institution, makeup is something that is discussed often, but how much do we discuss about green cosmetics? The multi-billion-dollar makeup industry is taking tiny but significant steps toward a better future, the emphasis on the boycott of petrochemical products that are non renewable and the use of more environmentally safer compositions is a visible change in the industry, tags like vegan, cruelty-free, and reef safe (sunscreen) are becoming increasingly important to consumers.

I am a strong believer in "where there is a will, there is a way" ,to assure a future on earth, there are a lot of habits we need to unlearn. Our beloved, over-used, earth-hating plastic bags, straws, bottles, etc. that are 'artistically' scattered from Mt. Everest to ocean beds need to go. Great news we do have alternatives!

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Brands like Biogreen and Naturepac have come out with biodegradable plastic alternatives that function exactly the same, a bit fancy don't you think? When we can just learn to carry our own cloth bags to the supermarket. Paper straws and reusable glass and metal straws have gained a bit of popularity lately too with big brands adopting them with open arms.

Enough with what brands are doing, let's talk about what me and you can do to make this earth a better place.

Apart from being mindful of what brands we endorse, we need to brush up our environmental responsibilities, With more and more people diving into veganism, we have an increasing number of young people mindful of how they impact the biotic and abiotic aspects of environment.

But this is not enough. The damage we have caused is far too much to be repaired by half-hearted lazy attempts of one generation and the ever decreasing ozone density is the proof. But we have to start somewhere, try harder and strive for more, Where everything from population control, carbon footprint reduction, pollution control and reforestation will have to speak louder in action than in our textbooks. Often, over exploit the available resources.

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Better steps for controlling this and making sure industrial, agricultural and nuclear wastes are properly managed will bring about faster, more apparent changes in our environment. To conclude, I would like to say, a sustainable future is one where people are making conscious environment-friendly choices in their day to day life, everything from what waste we generate to how we dispose of it, what source of electricity we use to how many trees we plant in our surroundings will ensure the continuity of life on this planet. Because as of today and foreseeable future, this is our only home, there is still one Earth.

Rice Intensification: Conquering the Hunger Quest Sustainably

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Rice is one of the most important basic food grains and ranks third in production among food-grain crops in the world. It is also the most irrigation-intensive crop in the world i.e., more than two-thirds of irrigated area is under rice cultivation. In irrigated rice, it is a tradition of keeping standing water in the fields. But in the coming years, water availability would be a serious problem because of the higher demand for water for drinking purposes, agriculture, and industry. To overcome these challenges, the system of Rice Intensification is one such emerging alternative.

The system of rice intensification (S.R.I) was developed by French Priest Father Henri de Laulanié in Madagascar in the 1980s to find sustainable agricultural practices which lead to higher productivity, optimum use of capital, and labor, and less input cost. Many case studies show how hunger and poverty were overcome by using rice intensification methods.

CASE STUDY OF MADAGASCAR

When Henri de Laulanié moved from France to Madagascar in 1961, the first thing he saw around was the great poverty and hunger of the people. He concluded that raising the yields of rice was the greatest contribution he could make to the people around him. Laulanié found some farmers not transplanting rice seedlings in clumps instead they were planting individual seedlings. These farmers in the minority found that single seedlings produced well and this way it could reduce seed costs, a consideration for very poor farmers.

In another area, he observed farmers not keeping their paddy fields continuously flooded throughout the season. It is believed that rice plants fare best in saturated soil. But Laulanié found out that they can grow even better if raised in moist soil but not continuously flooded.

Having started to grow single seedlings in unflooded soil during the period of vegetative growth, Laulanié introduced a practice of his own. He decided to try planting seedlings in a square pattern, rather than in rows so that he could use the weeding tool in two directions, i.e., perpendicularly. He tried this with 25×25 cm spacing just to see what would happen. To his surprise, widely spaced rice plants were growing singly in moist but not flooded soil and did better than other rice plants are grown using common practices.

https://foodtank.com/news/2016/06/new-developments-in-the-system-of-rice-intensification-norman-uphoff/

In 1990, Laulanié and his close Malagasy friends established an NGO, named Tefy Saina, to promote SRI and rural development. In some parts as SRI was not seen and was treated narrowly, it was rejected by Malagasy and international scientists who heard about it, though a few European NGOs gave Tefy Saina some small grants for training in the early 1990s. The Cornell International Institute for Food, Agriculture, and Development (CIIFAD) in 1994, began working with Tefy Saina for introducing SRI to farmers around Ranomafana National Park in the peripheral zone. It was one of the last remaining large blocks of the rain forest, under severe threat from the slash-and-burn cultivation of upland rice.

Farmers around Ranomafana were getting lowland rice yields of only 2 tonnes/hectare from their small areas having irrigation. But as farmers started using SRI in 1994-95, yield averaged over 8 tonnes/hectare, more than four times their previous yield, and some farmers reached 12 tonnes/hectare and one even got 14 tonnes/hectare. Using SRI methods, one could see that after the first month, they have a much greater number of tillers i.e., 30-50 per plant, with some having even 80-100 tillers. If one of the SRI plants is taken, one could see that they had much larger and deeper roots. SRI method contributes to a lower percentage of unfilled grains and also more production of grains.

The System of Rice Intensification has demonstrated that it can raise rice production by 25–50% while lowering production costs and raising farmer incomes. Higher yield is achieved by using 25–50% less water, and SRI practices reduce the emission of greenhouse gases from paddy fields while reducing crops' vulnerability to the hazards of climatic change. The advantages of SRI methods are being extended to crops beyond rice, like millet, wheat, and sugarcane. SRI practices contribute to achieving other sustainable development goals beyond reducing hunger and poverty.

In a conclusion, they have now been reported from countries ranging from China, through Philippines, Indonesia, Cambodia, Thailand, and Myanmar, to Sri Lanka, Bangladesh, Nepal and India, to Benin, Gambia, Guinea, and Sierra Leone, and now to Peru and Cuba.

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Minichromosome Technology

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"***Agriculture is the most healthful, most useful, and most noble employment of man.***"
- George Washington

Throughout the history of humankind, humans have spent an indefinite amount of time to ensure there's enough supply of food, clothes, and shelter. Agriculture has been a significant contributor to serve that purpose. And we have used technology to push us towards the future of agriculture now and then. For the older generations, this included breeding the different varieties to come across something that was edible and gave them a high yield. However, it wasn't long before the later 1900s knocked on the door, and we resorted to the "Green Revolution" to make up for the lack of produce.

At every step, a new series of problems awaited us. Whether it was the disproportionate distribution of produce, harmful effects of chemicals, or natural occurrences, the solutions that came forward were ingenious. When the "Green Revolution" pushed the edge and caused the independent farmers to fall under the pressure of investment of resources, scientists further realized a need for another revolution.

As mentioned, technology was taking over, and there was a new revolution ahead of us: genetic modification of crops. As scientists discovered the ways to eliminate or add genes in the cells, the scope for growing more disease-resistant crops, giving better yield, and requiring fewer resources opened a new world of opportunities for everybody.

https://www.openaccessgovernment.org/artificial-chromosome-technology-in-the-modification-of-plants/39931/

The latest stimulating aspect of the research showed that the most exciting part of the crop yield came in a tiny packet. That is a “minichromosome,” The best thing about this minichromosome technology is that it does not alter the genes in any way. Therefore, geneticists can leverage this new development to add new characters to the crops.

Decoding the process

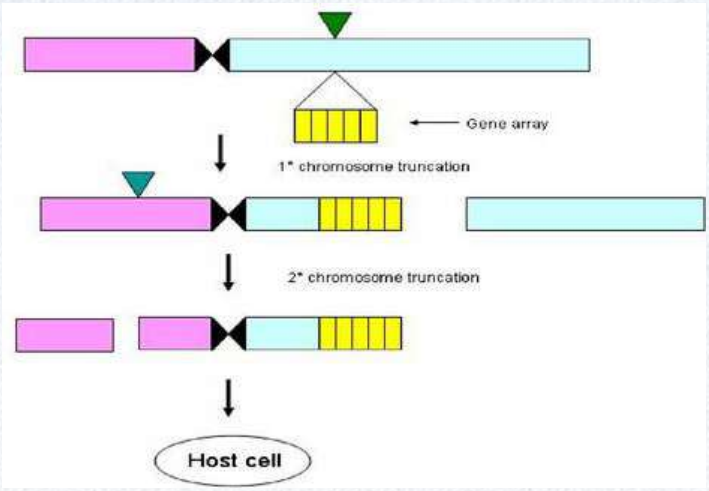
Minichromosomes are microscopic structures present within the cell. A transgene and selectable marker usually accompany these engineered small packets. The ability to separate the minichromosomes from endogenous ones makes it possible to use them to produce “transgenic” plants. We can bring those mentioned above into effect by cutting short the telomere along with site-specific recombination. For better understanding, it’s like picking the golden pieces of DNA and sewing them together to create the produce that will benefit the most.

One might wonder about the application of this novel technology. But, then, the answer would probably lie along with the terms of “food security.” It will definitely be one of the prime concerns in the upcoming years. As climate change is accelerating, weather patterns have been disturbed, soil quality has degraded, rainfalls have been inconsistent, and forest fires have been the new norm, we can say that Earth has been shifting towards a more unstable state.

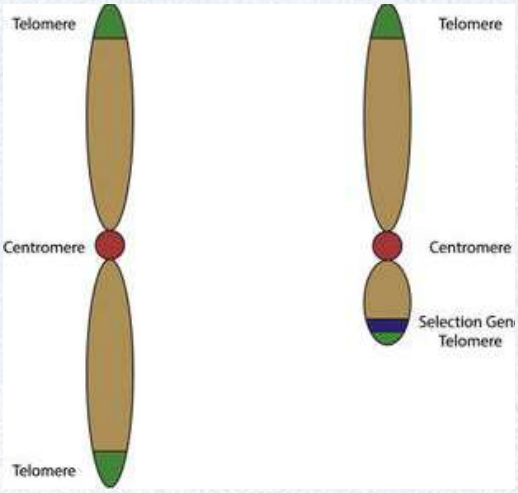
Digital farming: A new pursuit

A rather unexpected development that’s worth pondering over is the digitization of farming. In India, Cisco has produced a new online solution that creates a data pool accessible for better farming practices. This is an initiative to create an Agricultural Digital Infrastructure (ADI) that will further become the backbone of the National Agri Stack.

Such advancements are bringing us closer to a future where technology can provide a complete end-to-end solution to ensure that there are no gaps between the demand & supply when it comes to agriculture. One can read further about these topics and comprehend the future that anticipates us. And as Malcolm X said, education is a passport to the future, for tomorrow belongs to those who prepare for it today. Therefore, hoping that as humans progress further, our generations educate and employ the unexpected methods to create something that’s bright, like we’re flying closer to the sun but ensure that we don’t get burned by it as Icarus did.



https://www.semanticscholar.org/paper/Minichromosomes%3A-The-second-generation-genetic-tool-Goyal-howmik/70ccb33ed9550cba6e7bc49acc0b1cfa8b9bd2ad



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Biodynamic Farming

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When the idea of green revolution was introduced to solve the hunger problems all over the world, it fulfilled its aim. But little did we know that this angel, armed with all sorts of chemical fertilisers and exploitative irrigation methods, would turn into a devil for our environment in less than a few decades. Green Revolution surely served its purpose, but it also led to some serious problems, adversely affecting our ecosystem at present. As a result, many of the technologies that were used to achieve it are being criticized, for example, forests, grassland, and wetlands have turned into agricultural lands posing a serious threat to our ecosystem, our fish resources are exhausted due to over exploitation, etc. We need to understand that this world, dealing with the aftermath of the first green revolution, will soon need a second ecological revolution to meet our future demands of resources based on a new system of land and water management that ensures sustainable development. Thus, the phenomenon of biodynamic farming needs to be introduced widely at rural as well as urban level.

Biodynamic farming is referred to as the progenitor of organic agriculture as it was the first modern organic agriculture technique. In the summer of 1924, Rudolf Steiner presented his agriculture course, starting with 8 lectures (held because of the request of farmers who noticed the ill effects of chemical fertilizers) to a group of 111 farmers, and others, in the village of Koberwitz, near Breslau, Germany (now Kobierzyce, near Wroclaw, Poland).

https://blog.hocking.edu/the-growing-impact-of-biodynamic-farming

Biodynamic farming not only emphasizes on the use of manures and composts in the place of chemical fertilizers but also includes treatment of plants, animals and land as a single, combined system using traditional ways with development of local breeds and varieties. Its methods include astrological sowing, planting calendar, etc.

It has been labelled as pseudoscience by scientists as it lacks strong scientific evidence, and it relies on esoteric knowledge and mystical beliefs. Its purpose is "to restore, maintain and enhance ecological harmony". Its main features include- diversification of crop, decentralisation of production and distribution and the need to consider terrestrial and celestial effects on biological organisms.

Due to superficial similarities between biodynamic and organic farming, sometimes, they are mistaken to be the same concept. Few key differences between them are:

Feature	Biodynamic Farming	Organic Farming
Imported Material	Reduces utilization of imported materials by fulfilling its needs from within the farming system	Permits imported organic fertilizers
Livestock feed source	50% of livestock feed should be grown on farm.	Allows imported organic feed
Biodiversity requirements	Demands a biodiversity set-aside of 10% of the total farm acreage	Nothing specific
Farm certification -	Whole farm is certified	Designated part of crop is certified -

Moreover, Biodynamic farming talks about the flow of cosmic energy in all components of farming which is not a concept in organic farming. Biodynamics affects the microbes present in soil directly through inoculation and indirectly through changing habitat, stimulating the growth of microbes. As of 2020, biodynamics was practiced on 2,51,842 hectares of land in 55 countries. Biodynamics has turned out to be effectively responsive to changing circumstances and agro technologies, excluding the use of synthetic fertilisers, synthetic pesticides, genetically modified organisms (GMOs), irradiation, and nanotechnology, at present. It benefits the most after a significant period of time. As goes the saying 'As you sow, so shall you reap', biodynamic farming is most worthy of the time and efforts that are put into agriculture.

Rudolf Steiner's wanted his agriculture course to reach 'all farmers'. Even if that is a distant goal, the legacy of biodynamics, introduced by an Austrian philosopher about a century ago, in a village of Silesia, projects the power of an idea whose time has arrived.

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Circular Economy for a Sustainable Future

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Sustainability is an umbrella term that almost every person of this generation is aware of today. Any kind of program, initiative or action aimed at the preservation of resources while meeting our needs without compromising the chance of future generations to meet with their needs is termed as sustainability. But is it just limited to the facts of science, or does it touch various other aspects required for our and the planet's survival?

As once stated by the UK government in their Annual report, "Maintaining high and stable levels of economic growth is one of the key objectives of sustainable development. Abandoning economic growth is not an option.", let us touch upon why the circular economy is an extremely important factor for a sustainable future!

A circular economy refers to an economic model to produce goods and services sustainably by various factors such as limiting the consumption and waste of resources such as water, raw materials, and energy as well as reducing the production of waste.

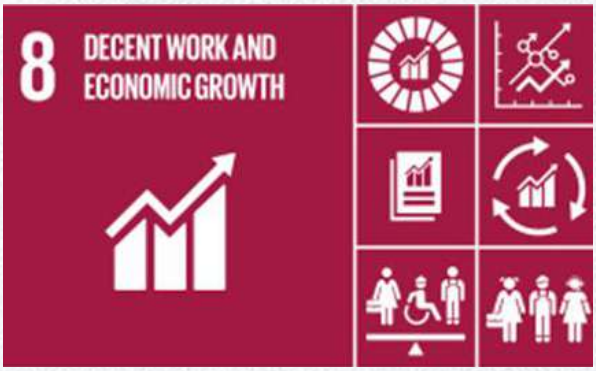
The circular economic model opposes the model of linear economy. It is based on the taking, making, consuming, throw pattern by proposing to transform waste into a raw material which can be recycled for product design and other purposes.

https://www.researchgate.net/figure/Circular-Economy-33_fig4_355924827

The circular economy also uses principles of green economy, eco-design, industrial ecology, and economics of functionality.

The ultimate goal is to form the economy as circular as possible by using the new processes and solutions for the optimization of resources and transforming our economy into something regenerative. Various industries, including textile, construction, automotive, agriculture, furniture industry, have adopted the model of a circular economy.

A lot of emphasis is laid on the circular economy in the Sustainable Development Goals set by the United Nations particularly in the following-



https://www.globalgoals.org/8-decent-work-and-economic-growth

- Sustainable Development Goal 8: Decent work and economic growth that focuses on promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
- Sustainable Development Goal 12: Responsible consumption and production that aims at ensuring sustainable consumption and production patterns.

The circular economy plays an important role in the protection of the environment which is the need of the hour for a sustainable future. It helps in reducing waste and emissions of greenhouse gases. It boosts economic growth by stimulating innovation and creating job opportunities. It is an economic system that aims at zero waste and pollution throughout a material's life, from its extraction till it reaches the consumer, applying to all ecosystems.

Every country around the globe should start adopting the circular economic model as the journey on the road to a sustainable future should begin as soon as possible!

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Permaculture: People care, fair share, earth care

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"**The natural world is built upon common motifs and patterns. Recognizing patterns in nature creates a map for locating yourself in change, and anticipation what is yet to come.**"
— Sharon Weil

Permaculture is an innovative framework that helps us to live in 'peace with nature' i.e., sustainably. The word 'permaculture' is a contraction of two words, permanent agriculture. The basic principles of permaculture are resilience, sustainability, and natural productivity. Bill Mollison, an Australian scientist, is known as the father of permaculture. He was concerned that conventional agriculture was affecting the natural ecosystem in many adverse ways. He observed that modern agriculture was eroding soils and was heavily dependent on pesticides, insecticides, and fertilizers. So, he thought of a way that would make agriculture more sustainable and ultimately gave rise to permaculture.

However, the point to be noted here is the ramifications of space debris aren't just confined to space exploration but also exacerbate the climatic crisis on the Earth. Any object that doesn't burn up and disintegrate upon atmosphere, re-entry is likely to fall either in the ocean or worst-case scenario in the populated land area.

At it's heart are three very simple ethics. The ethics mentioned below are the pillars on which the fundamental of permaculture stands.

- People care: This ethic is self-explanatory, meaning ' the care of people. It shadows the idea that people grow more self-reliant and become more responsible towards the greater community. This requires the people to get their basic needs like clean water, a balanced diet, and a reliable shelter fulfilled.
- Earth care: This translates to care for the living soil. It includes all living and non-living things, such as plants and animals as well as water, land, and air. This includes active conservation of biodiversity, ethical and minimal usage of resources.
- Fair share: This ethic advises us to govern our own needs and live within limits. This way we can create surplus resources to further the other key permaculture ethics. This includes returning waste products into the system (recycling) so they can be made useful again.

https://www.storey.com/article/beyond-sustainability-permaculture/

https://www.downtoearth.org.in

While the term 'permaculture' was coined in 1970, the ideas of permaculture have been around for many years. Ancient civilizations practiced crop rotation, multiple crop strategy, forest farming etc. long before environmentalism came into being. Its philosophy is engraved in many different cultures and religions. Bill Mollison took inspiration from them and started a movement which encouraged modern day farmers and scientists to take it into practice and help in sustainable development in these calamitous times.

Permaculture is said to be the ultimate agricultural method to resolve farming obstacles and even climate change. It employs systems of thinking, looking at patterns, linking solutions together into synergistic strategies that work with nature and fit local conditions, terrain, and cultures.

Permaculture can be practiced by implementing alternative farming and gardening techniques which in no way harm the nature. One such example of permaculture can be seen in the farm of an Indonesian farmer, Misbah Dwiyanto. He grows an edible forest garden using the layer system. On his permaculture farm, he has planted tall trees such as cherry and mahogany which work as windbreakers. He grows many leguminous plants such as long beans, soybeans, and green beans near vegetable crops, which helps in providing them with nitrogen. The dry leaves are not thrown away; instead he lets the weed grow on the ground in order to be useful as mulch. He uses different plant species to deal with pest control, like planting Allium genus plants near the solanum crops (tomatoes, potatoes) to get rid of pests such as snails or aphids. He spreads mint leaves to control birds for attacking vegetables and fruits. This is a perfect example to describe a permaculture farm.

Despite its applications in agriculture, permaculture can be used in many different areas like, urban setting, gardening, grazing, domestication of animals etc. Hence, permaculture is a really good way to tackle global warming and climate change because it is a system that is environment friendly and supports the balance of ecosystem.

https://agrodite.com/permaculture-practices/

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Sustainable Development

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"**We have not inherited this earth from our forefathers; we have borrowed it from our children.**"
-Mr. Lester R. Brown.

The world commission on Environmental & Development popularized the notion of sustainable development in 1987. Its report defined the idea of sustainable development as "Development that meets the needs of the present, without compromising the availability of future generations to meet their needs." Furthermore, it underlines the need to stop the depletion of Earth's natural resources. The principle behind the development is to continuously address the need of the present without considering the long-term consequences for the future generation. However, the selfish concept of focusing solely on "oneself" will lead to serious difficulties soon. Unsustainable growth has already had a dramatic impact. Climatic change, which is caused by the loss of the ozone layer due to pollution of air and land, is one of the most prominent issues. Our fossil fuel supply is likewise non-renewable and is gradually dwindling due to rising demand and wastage. The longer we wait to confront the problem of unsustainability and its implications, the more severe consequences will be. It is essential to understand what sustainable development is, to put the notion into reality.

The primary premise underlying sustainable development is that any type of development, whether economic, environmental, or social, can be accomplished without depleting the Earth's resources and by just utilizing the resources we currently have. The idea of taking more than we require should be abandoned and eliminated from all our routines. Because our environment does not have an infinite capacity, we must keep our expansion in control and sustained to leave sufficient resources for future generations.

We, botanists, call it the "***carrying capacity***" of the environment. It helps us outline the maximum number of people or living organisms Earth can support.

One of the critical causes of unsustainable development trends is the abrupt development of the human population. Keeping the population under control is vital, especially in developing countries like India and Africa. Unfortunately, the populations of these countries are increasing and will continue to do so in the future unless prompt action is taken. With more people, there is an increase in poverty. The number of individuals living below the poverty line and getting two meals per day for survival is also on the rise. The more people there are, the less there is for everyone.

The fundamental goal of sustainable development is to provide stability to our social, economic, and environmental needs and increase welfare and resource availability for the future generation. Adjusting our attitude to the usage and development is an excellent method to protect our natural resources. We should not cease exploiting these resources; instead, we should continue to do so in order to prevent them from becoming extinct.

SEGMENT FINALE

JOURNEY OF SALONGA

HOW THE WORLD'S SECOND LARGEST RAIN FOREST MADE IT OUT OF THE ENDANGERED LIST

ANTHESIS | 2021-2022
Volume 17

Salonga: Not Endangered Anymore

https://whc.unesco.org/en/list/280/gallery

Brief Introduction

Salonga National Park of Democratic Republic of Congo, which is Africa's largest protected rainforest, was removed from the UNESCO's list of World Heritage in Danger list in July 2021 after successful attempts of conserving and nurturing the flora and fauna of the 36000 sq. kms Park by Congolese environment ministry, WWF and environmental enthusiasts across the globe for two decades.

What Put Salonga Under Threat?

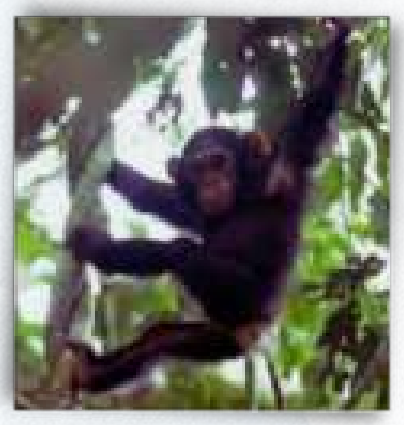
Had been on the in-danger list since 1999 due to impacts from political conflict, poaching and illegal occupation

Civil war in 1996 and from 1998 onward, lead to an increased reliance on bushmeat for sale, especially by the militia, endangering several endemic species

It has also faced potential threats from oil concessions granted in areas overlapping with the site

https://www.africanjungleadventures.com/salonga-national-park-tourist-attractions.php

Importance of the Park



https://www.fanpop.com/clubs/chimpanzees-and-bonobos/images/[illegible]0/title/baby-hangs-from-tree-limb-wallpaper

It is the world's second largest tropical rainforest national park and is home to 40% of the world's Bonobo apes (the dwarf chimpanzee), which are classified as Endangered in the IUCN Red List. The park is also home to the Congo Peacock, the African slender-snouted or 'false' crocodiles, the forest elephants and some other endangered species. The Park is also covered in peat bogs, which serve as important carbon sinks

Measures taken to protect biodiversity of Salonga

Biomonitoring
Several Biomonitoring Missions were taken up by Proficient Environmentalists and scientists to keep track of the distribution and population of the species in the park

Ammunitions were seized
Snares, arms and ammunition were seized from poachers to prevent illegal hunting for bushmeat

Maintaining Territorial Integrity
The boundaries and size of the Park and the continuity of the canopy was ensured. Through e-maintenance of ecological corridors of genetic exchange between the two blocks of the park

Joining hands with Locals
In 2005, WWF launched a program to support the Congolese Institute for Nature Conservation (ICCN), to reduce the deprivation of natural resources. Many teams were launched to tackle the challenges to make sure a stronger work relationship with the locals is established

Regulation of Oil Drill
Executing the decision to stop oil drilling in the Park was possible due to the balanced mix of generalised conservation efforts and the strategic planning of the Governmental organizations

https://salonga.org/our-work/

www.karineaigner.com

Current Status

https://www.centralafricanforests.org/protection-practice-salonga-national-park/

The WWF, said in 2019, that they are continuously improving the management, by increasing their wildlife knowledge through biomonitoring and data gathering. The number of rangers has increased with the efficiency of patrols. The Government with organizations are now working jointly on a new strategic plan to maintain the number of species in the park and promote their conservation.

Way forward

Sustainable Tourism Project Preparation

Sustainable Tourism will help a local economy and increase local people's awareness of the treasures they live in. Travel opportunities that will allow travellers to experience this unique natural destination while creating employment and local pride for the community

Sustainable Agriculture

Local Communities are being empowered to improve their livelihoods and food security by applying better farming techniques and planting a variety of seeds. The aim of these activities is to provide alternatives to poaching and lower people's dependence on the park's natural resources for income generation while altogether raising socio-economic benefits

The Bonobo's Tale

Tales exist about people in danger in the vast forests of Salonga being rescued with the help of a Bonobo. Some even say Bonobos were humans in ancestral times but left the villages because and needed to save themselves from the lenders who had lended them money. Today, it is difficult to catch sight of wild Bonobos in the Salonga National Park

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Must Reads

RECENT STUDIES IN PLANT SCIENCES

ANTHESIS | 2021-2022
Volume 17

What's new in Botany?

A step forward in wheat research: New leaf rust resistance gene Lr80 identified in wheat

https://www.tribuneindia.com/news/haryana/gene-to-fight-leaf-rust-in-wheat-identified-199930

Associate professor Hisayoshi Nozaki from University of Tokyo for the first time has identified 3 sexes in a freshwater algae.

https://scitechdaily.com/species-of-algae-with-three-sexes-identified-in-japanese-river/

The mystery of an untreatable plant epidemic called "Black Rot" that causes cabbage to wilt severely has now been solved. Scientists in Singapore have deciphered the molecular mechanism that cripples the immunity of plants due to infection by lethal bacteria called Xanthomonas

https://www.straitstimes.com/singapore/environment/singapore-scientists-uncover-secret-of-the-black-rot-in-vegetable-crops

Pseudoflower formation- a rare plant fungal interaction has been observed in Guyana due to infection of Fusarium xyrophilum, it exhibits a novel flower mimicry system.

https://www.sciencedirect.com/science/article/abs/pii/S1087184520301572

New finding points towards the low rate of transpiration of plants as a cause of temperature rise in the Arctic. But why are plants transpiring less?

https://www.sciencedaily.com/releases/2020/05/200514115756.htm

Cantil: A new 'plant organ' discovered by scientists

https://www.smithsonianmag.com/science-nature/scientists-discover-new-plant-organ-180977995/

First evidence of biologically produced Graphite-like elemental carbon shown by Deep Sea Microbes.

https://www.the-scientist.com/news-opinion/deep-sea-microbes-first-organisms-known-to-generate-pure-carbon-69405

Indian scientists have successfully sequenced the genome of Giloy.

https://www.news18.com/news/buzz/indian-scientists-sequence-the-genome-of-ayurvedic-medicinal-plant-giloy-4178423.html

An intricate one celled algae has been discovered, it interestingly resembles the shape of a mermaid's umbrella

https://www.snopes.com/news/2021/09/04/algae-plant-mermaid/

Researchers reveal how the first roots evolved in nature through studies of 400-million-year old Fossils.

https://scitechdaily.com/400-million-year-old-fossils-reveal-how-the-first-roots-evolved/

Indian biologist Shailendra Singh awarded a major international award for bringing three critically endangered turtle conservation species back from the brink of extinction.

https://www.thehindu.com/sci-tech/energy-and-environment/indian-biologist-wins-global-award-in-turtle-conservation/article36250625.ece

In a bid to mitigate the impacts of global climate change, Maharashtra government decides to set up a 'State Council for Climate Change'

https://www.thehindu.com/news/cities/mumbai/maharashtra-to-form-state-council-for-climate-change/article36228371.ece

India Plastic Pact: India becomes the first Asian country to promote a circular system for plastics

https://www.thehindubusinessline.com/news/india-to-be-the-first-asian-country-to-launch-a-plastics-pact/article36270409.ece

State of World Trees, report 2021 reveals that out of 60,000 tree species 30% (17, 500) are currently at risk of extinction. These include well known species like Magnolias and Dipterocarps, Oaks, Maple and Ebonies too.

https://www.indiatimes.com/technology/science-and-future/30-percent-wild-trees-facing-extinction-548503.html

Five new species of the genus 'Jacquemontia' have been identified in Bolivia, South America.

https://www.sciencedaily.com/releases/2021/07/210723105236.htm

According to Journal Science Advances- Tree species in evergreens are migrating to poles to escape heat, while Maples and Oaks are now headed to the West in search of rain! The reason? Climate change.

https://www.science.org/doi/10.1126/sciadv.1603055

State of World Trees, report 2021 reveals that out of 60,000 tree species 30% (17, 500) are currently at risk of extinction. These include well known species like Magnolias and Dipterocarps, Oaks, Maple and Ebonies too.

https://www.indiatimes.com/technology/science-and-future/30-percent-wild-trees-facing-extinction-548503.html

Ladakh named as the first carbon-neutral zone of India

https://www.ndtv.com/india-news/just-like-sikkim-became-100-organic-ladakh-to-become-carbon-neutral-pm-narendra-modi-2279900

KHUSHI, JAYATI PANDEY
TEAM ANTHESIS

Brief of IPCC Report-2021

Ananya Chamola, Yashasvi Saini

The Intergovernmental Panel on Climate Change was created by the United Nations Environment Program and the World Meteorological Organisation in 1988 to determine the state of knowledge on climate change. The sixth assessment report of IPCC addresses the latest physical understanding of the climate system and climate change, bringing together the most up-to-date advances in climate science while combining multiple evidences from various observations, process understanding, and global and regional climate simulations.

The role of the Intergovernmental Panel on Climate Change (IPCC) is to critically assess the scientific, technical, and socio-economic information relevant to understanding the physical science and impacts of anthropogenic climate change and natural variations, including the risks, opportunities and options for adaptation and mitigation.

The *physical science basis* of Climate Change as explained in the IPCC Report for the Year 2021 has been summarized as follows.

The Global Surface Temperatures

Global Surface Tempratures increased by about 0.1°C between the period around 1750 and 1900 and at the current level of global warming, an observed signal of temperature change relative to the 1900 baseline has emerged above the levels of background variability over virtually all land regions.

Warming of the climate system is most apparent through the observed increase in global mean surface temperature (GMST). Taking a baseline of 1850–1900, GMST change until present is 1.09°C. With each Assessment Report, the observation of total global temperature change keeps getting higher. The atmospheric concentrations of a range of greenhouse gases are increasing. The concentration of carbon dioxide has increased from 285.5 ± 2.1 ppm in 1850 to 409.9 ± 0.4 ppm in 2019; concentrations of methane and nitrous oxide have increased as well.

The Hydrological (or water) Cycle

The hydrological cycle is also changing and is assessed to be intensifying, through a higher exchange of water between the surface and the atmosphere. Annual land area mean precipitation in the Northern Hemisphere temperate regions has increased, while the sub-tropical dry regions have experienced a decrease in precipitation in recent decades.

Image source: https://ane4bf-datap1.s3-eu-west-1.amazonaws.com/wmocms/s3fs-public/styles/featured_media_detail/public/news/featured_media/Screen_Shot_2021-08-09_at_10.30.10_0.png?fjFXSVj.JrEmA4L3xdjpxdMREcLbyPmD&itok=ivPKXBiy

CO2 Concentration

By the first decade of the 20th century, atmospheric CO2 concentrations had already moved outside the reconstructed range of natural variation over the past 800,000 years. Present-day global concentrations of atmospheric carbon dioxide are at a higher level than at any time in at least the past two million years.

As the global climate temperature is rising every year, it, in turn, is leaving drastic after effects.

- The sea-level rise has tripled over the decade. About 50 per cent of this rise is due to thermal expansion.
- The Arctic Sea ice has been reported to be the lowest since 1900. With a continued rise in sea levels throughout the 21st century, the low-lying coastal areas are at constant risk of facing erosion and flooding.

With every 0.5°C of warming, there is an expected increase in temperature, precipitation and drought. It will also result in the weakening of the Earth's carbon sinks.

Asian countries have observed increased heat extremes and decreased cold extremes and, the trends are going to continue for decades. Alarming global warming levels will impact the mountain ranges in the world (including the Himalayas). The change in freezing levels of mountains, the retreat of snowlines and the melting of glaciers will cause changes in the water cycle and precipitation patterns. All this, in turn, will result in heavy flooding and scarcity of water in future in the neighboring states of the Himalayas.

The Indian Sub continental findings suggest intense heat waves and humid heat stress. Monsoon precipitation is also likely to be increased. The reason for the decline of the South West Monsoon is aerosols. The sea temperature of the Indian Ocean (which includes the Arabia Sea and Bay of Bengal) is increasing beyond the global average. With an increase of 1.5°C to 2°C in global warming, the sea surface temperature is likely to increase by 1 to 2°C.

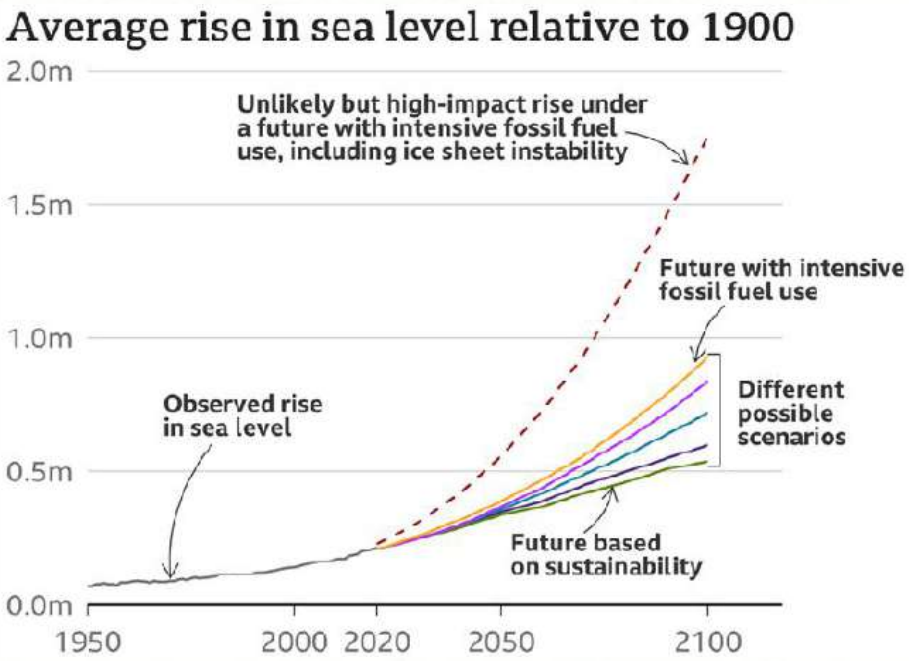

Image source:
https://ichef.bbci.co.uk/news/2048/cpsprodpb/120C4/production/_119842937_spm8_d-nc.png

Many environmental problems and development are addressed in the United Nations 2030 Agenda for Sustainable Development and its 10 Sustainable Development Goals. The 2030 Agenda recognizes that 'climate change is one of the greatest challenges of our time and its adverse impacts undermine the ability of all 14 countries to achieve sustainable development.'

Despite various agreements like The Paris Convention, Kyoto Protocol, UNFCCC etc., signed by more than 100 countries, the global climate temperature is ascending every year. The continued increase of CFCs, aerosols and other greenhouse gases increases the Earth's temperature. It is high time for all nations to adopt sustainable measures. Many countries have announced to achieve net-zero emissions. Net-zero emission means the removal of anthropogenic greenhouse gases from the atmosphere by a reduction in their use. It will create a stable bond between carbon and global temperature. The Intergovernmental Panel on Climate Change has also informed that net zero emission by 2050 is the minimum required to keep the planet's temperature rise to 1.5°C. Climate change is irreversible, and thus immediate carbon cut down is the need of the hour.

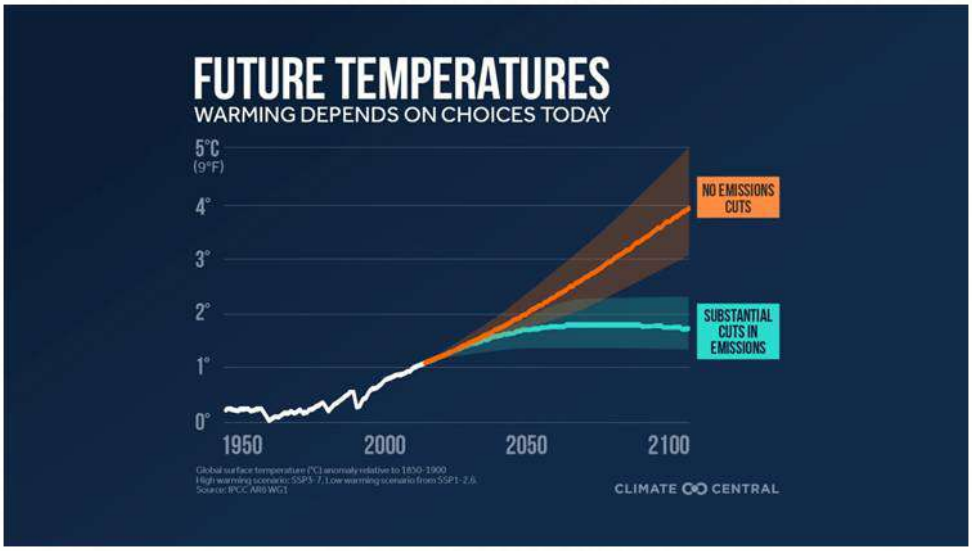

Image source: https://www.climatecentral.org/uploads/general/2021IPCC_TempPathways_en_title_lg.jpg

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1. https://www.ipcc.ch/report/ar6/wg1/
2. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report_smaller.pdf

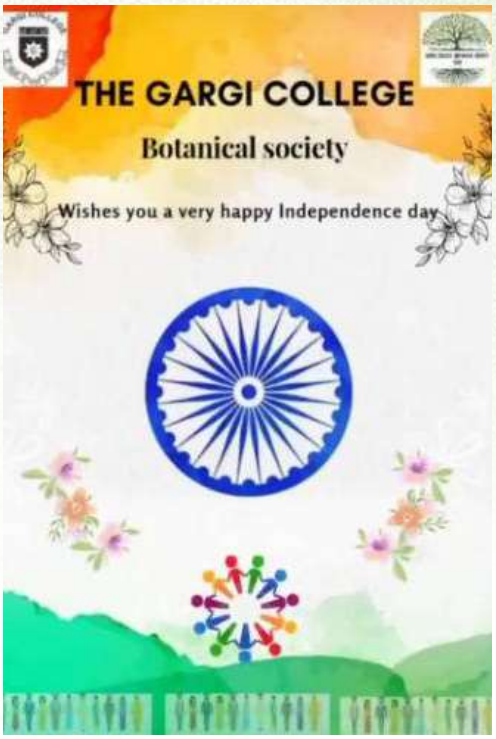
Highlights of the Session

ANNUAL HAPPENINGS IN THE BOTANY DEPARTMENT 2021-22

ANTHESIS | 2021-2022
Volume 17

INDEPENDENCE DAY

August 15



Gargi college botanical society with great respect celebrated the Independence day as we are a country of brave men who gave their lives for the freedom of our nation and brought glory to us with their sacrifices.

TEACHER'S DAY

SEPTEMBER 5

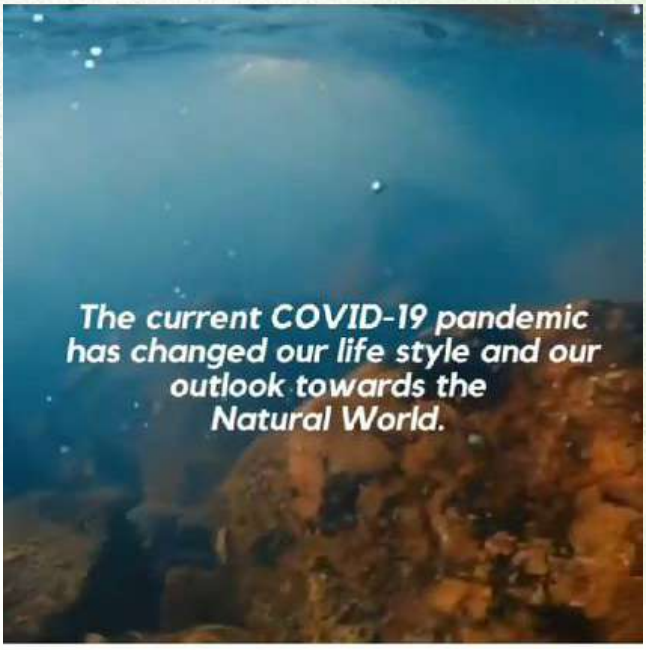
The prestigious occasion of Teacher's Day was celebrated on September 5th, 2021 through the social media platform by sending beautiful personalized messages and digital greeting cards made by the team members of the Gargi College Botanical Society-TARU to all the teachers of the Botany Department. The message conveyed a big thanks to all the amazing teachers for always guiding and helping the students in all fields of life. Along with it, a heartfelt video was attached that had special video messages from the students of the Botany Department thanking and appreciating teachers for what they have done for them. Their perseverance and dedication is what inspires all students and it was shown through the lovely videos and placards how much it means to them. The greeting cards wished them all a very happy teacher's day on behalf of all the students.

It was heartwarming and the teachers were deeply touched by the cheerful gesture. They wished all the best to students for future endeavors and thanked them for making their day special. Along with numerous blessings and best wishes, the joy was shared with all the students and the day was celebrated at its best keeping in mind the online mode of education.

The students realize the role of teachers when their teachings help them in their life, and what teachers do for them needs something beyond words. They have the power to shape our lives and how we live it. Their selfless nature and never ending love is something students can't thank them enough for. It can never be forgotten and will always remain an integral part of our lives.

WORLD RIVER DAY

26th September



Today is a special day since this year, World River's Day falling on the same day as World Environmental Health Day. These mighty rivers are a vital part of our ecosphere. Therefore, every 4th Sunday of every September is celebrated as Worlds River Day.

The current COVID-19 pandemic has changed our lifestyle and our outlook towards the Natural World. It has made us realize the significance of the relationship between the Environment and Humans. Industrialization, ever-increasing population, anthropogenic activities, burgeoning urbanization, and pollution had severely affected the health of our green Planet.

The deteriorating health of the environment has put human health at substantial risk. Rivers are one of the most treasured bio-resources as they are a source of freshwater for the earthlings and rejuvenate everything.

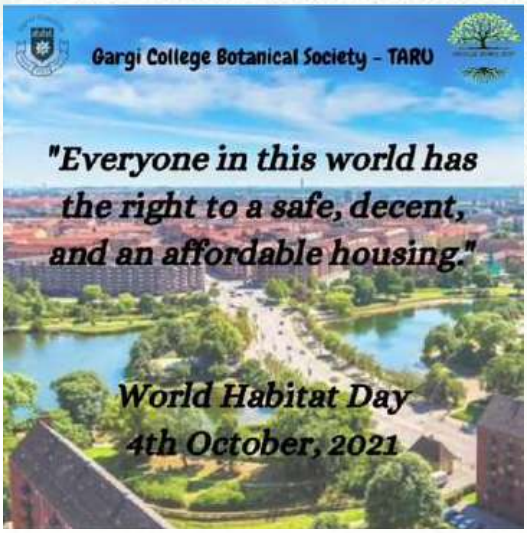
Unfortunately, these lifelines of our planet are reeling under water pollution as a result of sewage waste, industrial effluents, plastics, and oil discharge. We must ensure a just and sustainable future for the people and the planet. We need to remember that there is a direct correlation between human health and planetary health.

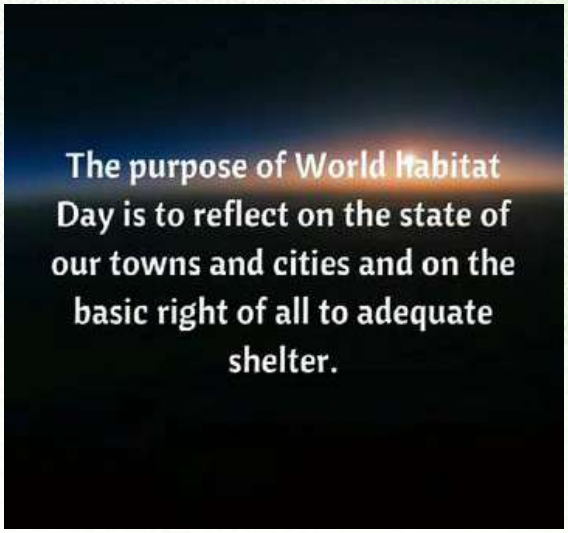
Today, let's come together and pledge on this auspicious day to keep our rivers and environment clean and healthy and make this Earth a better place to live.

Watch the video by GCBS - TARU here.

WORLD HABITAT DAY

4th October





"***Everyone in this world has the right to a safe, decent and affordable housing***"

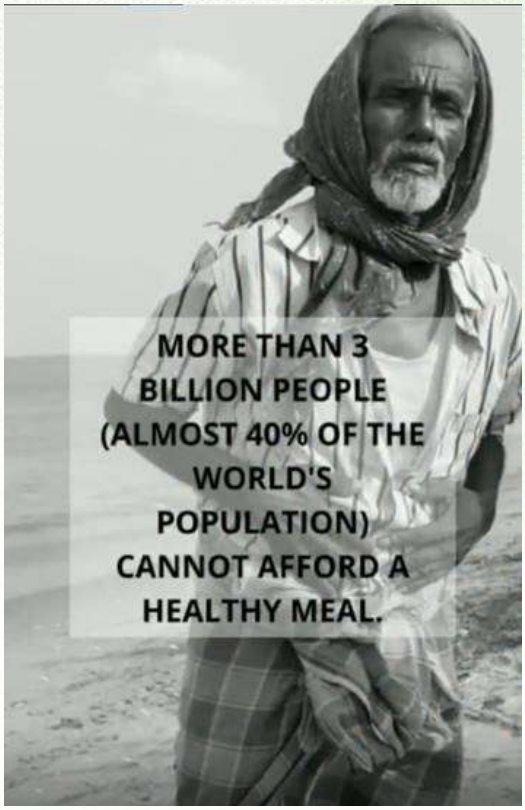
Every October, UN-Habitat, and partners organize a month of activities, events, and discussions on urban sustainability. This year, Urban October opens with World Habitat Day on 4th October. It was established in 1985 by the UN General Assembly through Resolution 40/202 and was first celebrated in 1986. The purpose of World Habitat Day is to reflect on the state of our towns and cities and on the basic right of all to adequate shelter. On this day, people address the problems of rapid urbanization and its impact on the environment and human poverty Homelessness is a global challenge. Currently, the total world population is estimated to be 7.9 Billion according to the United Nations demographics compilation. Today, 1.6 Billion people live in inadequate shelters around the World,1 billion of those live in informal settlements. It is estimated around 2%(150 million)of the global population is homeless. The Theme for this year's World Habitat Day is Accelerating urban action for a carbon-free World".

Cities are responsible for 70% of global carbon dioxide Emissions with transport, buildings, energy, and waste management accounting for the bulk of urban greenhouse gas emissions. The aim is to amplify the global race to zero campaign and UN-Habitat's climate Action 4 cities and encourage local governments to develop actionable zero-carbon plans The day is meant to remind people about their rights and responsibilities to create a livable planet and power to shape the future of our cities and strive for a brighter future for humankind. The future of our planet depends on all the nations working together for the betterment of the human race and for mother earth. World Habitat Day also highlights the same fact and the need to maintain the delicate balance between nature and all the living creatures present on our planet. We need to make cities and human settlements inclusive, safe, resilient, sustainable, and potential for scale-up.

Watch the video by GCBS - TARU here.

WORLD FOOD DAY

16th October



World Food Day is an Internationally celebrated day on 16th October every year. World food day adopts a different theme each year in order to highlight areas needed for action and provide a common focus.

This year the theme iS "Safe food now for a healthy tomorrow". This theme is adopted by the United Nations to celebrate the creation of the food and agriculture organization (FAO). 150 countries around the world observe this day to generate more awareness about food security.

According to the global hunger index (ghi), about 60% of the hungry people in the world are women and about 50% of all deaths in children are under 5 years due to under-nutrition. Food safety, nutrition, and food security are inextricably linked. Unsafe food creates a vicious cycle of disease and malnutrition, particularly affecting infants, young children, the elderly, and the sick.

More than 3 billion people (almost 40% of the world's population) cannot afford a healthy meal. Covid-19 has exacerbated hunger and poverty worldwide, especially in India to help those who do not have access to meals or are unable to anymore, free meals - twice a day - at all the night shelters had been instituted in many states in India. "Food is symbolic of love when words are inadequate." - Alan D Wolfelt ZERO HUNGER WORLD IS POSSIBLE BY 2030.

Watch the video by GCBS - TARU here.

WORLD SCIENCE DAY

10th November

From the indivisible atom that makes up all the matter to the ever-expanding Universe, Science is everywhere. It has been the source of our curiosities and the solution to it.

Science is everything around us, whether visible or invisible. All animate, inanimate, or man-made objects are either born out of science or created with its help. Therefore, in order to bring the Society close and candid with Science and Technology for understanding its relevance in the present and its utmost importance for the future,

"World Science Day for Peace and Development is celebrated every year. With climate change becoming a serious threat to the lives of billions of people and diverse species that inhabit Earth, the theme for this year is: "BUILDING CLIMATE- READY COMMUNITIES". World Science Day highlights the link between science and society and aims to ensure that citizens are kept informed of developments in science.

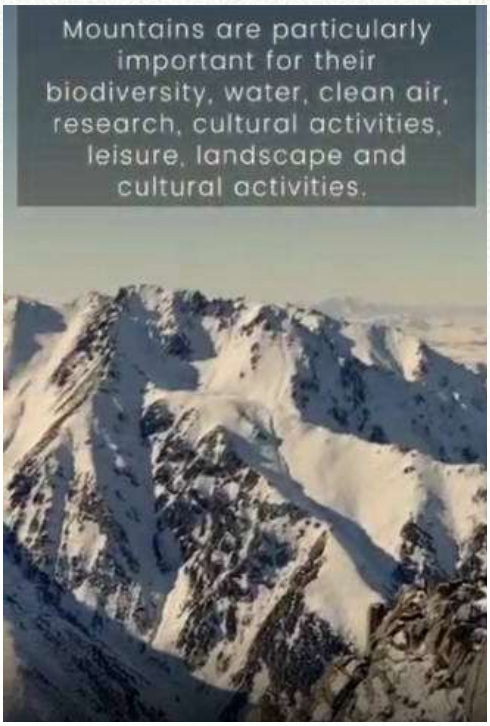
It emphasizes that science has no fences. Thus, it is accessible to all to participate in and benefit from it by promoting national and international solidarity for shared science between countries.

This day provides a scope to renew national and international commitment for the use of science for the benefit of societies and aims to draw attention to the challenges faced by Science in raising support for the scientific endeavor.

Watch the video by GCBS - TARU here.

WORLD MOUNTAIN DAY

11th December



"***Never measure the height of a mountain until you reach the top. Then you will see how low it was.***"

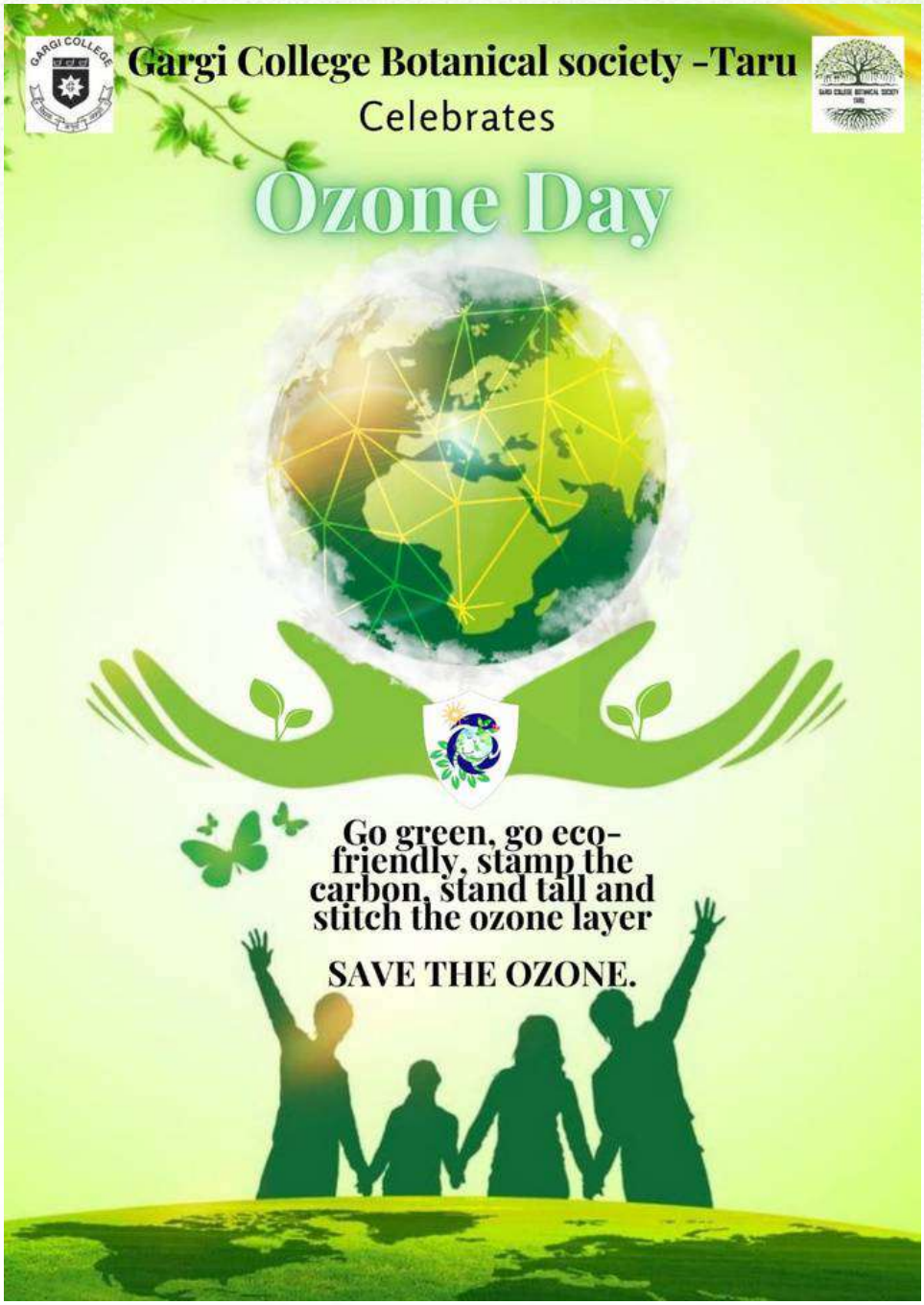
This day was started to encourage the international community to organize events at all levels to highlight the importance of Sustainable Mountain Development. International Mountain Day has been celebrated every year since 2003. This day is celebrated to highlight the opportunities and constraints in mountain development and to build alliances that will bring positive changes to mountain people and the environment. The theme for this year's International Mountain Day is SUSTAINABLE MOUNTAIN TOURISM. Sustainable Mountain Tourism aims to attract around 15-20% of global tourism, to create an additional and alternative source of livelihood, poverty alleviation, social inclusion, and landscape and biodiversity conservation. Mountains are particularly important for their biodiversity, water, clean air, research, cultural activities, leisure, landscape, and cultural activities.

Mountains make up about one-fifth of the world's landscape and provide a home to at least one-tenth of the world's population. About 80% of our planet's fresh water originates in the mountains. Mountains occur more often in oceans than on land; Some islands are the peaks of mountains coming out of the water. The highest 14 mountains in the world are all found in the Himalayas. But mountains are in great crisis- global warming, forest fires and biodiversity, extreme pollution, etc. So, let's join our hands for a better tomorrow!

Watch the video by GCBS - TARU here.

OZONE DAY

September 16



Ozone is like the “MOTHER” of Earth, who protect her child from harmful radiations.

TAXONOMIST APPRECIATION DAY

March 19

The 19th March is Taxonomist Appreciation Day, a day when we say “thank you” for all of the hard work done by taxonomists around the world. Wondering? What is taxonomy? It is the science of naming, describing, and classifying every organism. AP De Candolle was the Swiss Botanist who coined this term "Taxonomy". Taxonomists are those professionals who specialize in the science of taxonomy. Now, let's look at some of the most notable taxonomists whose works have upheld the pillars of taxonomy are: Carl Linnaeus is widely acknowledged as the Father of Taxonomy as His system of botanical nomenclature is still used even today.

(i)The term species was coined by John Ray and he successfully described 1800 plants and animals

(ii) Aristotle who was undeniably an exceptionally Talented person classified organisms on basis of external morphology.

\iii) Theophrastus is rightly known as the father of botany who successfully classified 480 plants on the basis of habit and habitat.

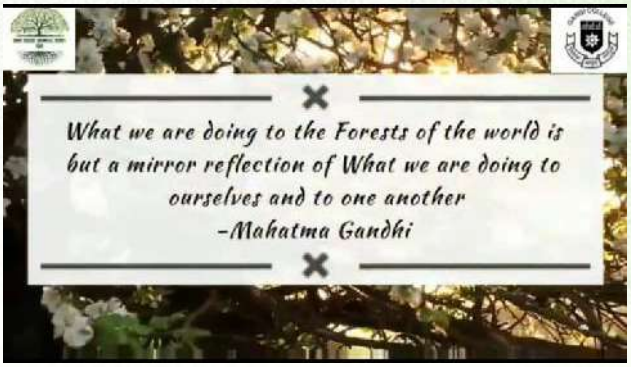
(iv) Lamarck: He was the first to discard the idea of "fixity of species" and " Static species concept".

Taxonomy uses hierarchical classification as a way to help scientists understand and organize the diversity of life on our planet. Hence, their work couldn't be neglected in mainstream talks and had to be appreciated wholeheartedly with due credits. So, let's appreciate the Taxonomists' hard work wholeheartedly.

Watch the video by GCBS - TARU here.

WORLD FORESTRY DAY

March 21



From the food, we eat to the clothes we wear forests provide us with the plethora of resources that are crucial for the human survival and sustenance of mankind. Thus, to celebrate and raise awareness for all kinds of forest the united general assembly proclaimed the 21st March as the International Day of Forest in 2012. on this day countries are encouraged to indulge in local, National, and International events. The theme for this year's forestry day was "forest and sustainable production and consumption".

So, what is the importance of Forestry Day?
By promoting Forests' sustained survival, we ensure our economy, ecosystem, and species also continue to thrive. The day promotes Sustainable Development Goals (SDGs) where forest-dependent communities can continue to grow and come out of poverty.
So on this forestry day let's join our hand, to save the forest, to save the earth, to save our only home.

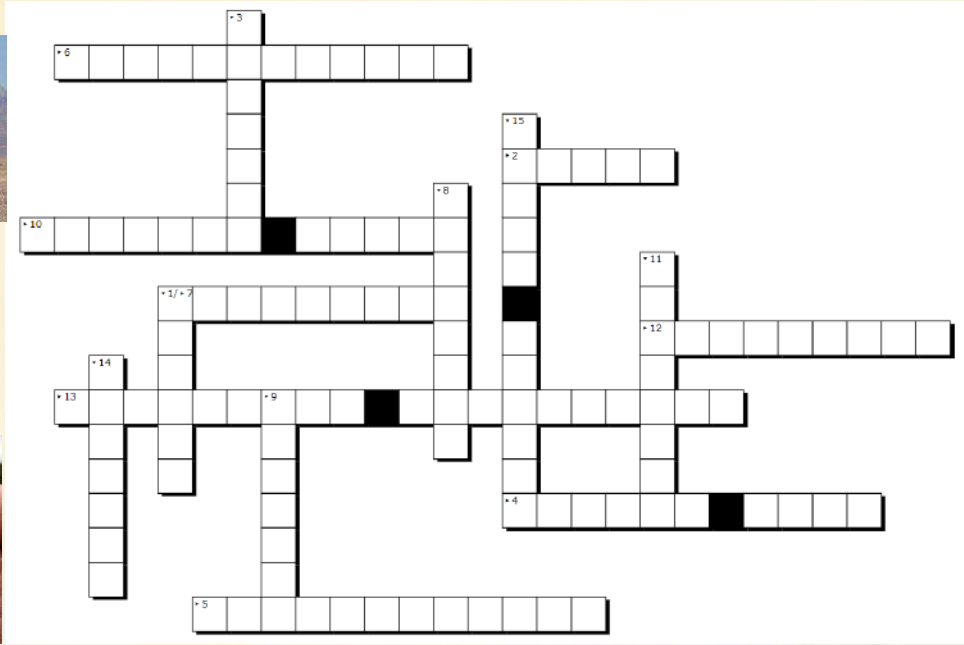
"What we are doing to the earth is but a mirror of reflection of what we are doing to ourselves and to one another."

Watch the video by GCBS - TARU here.

Strain Your Brains

Bewildering Adaptations

11.



9.

10.

14.

Across:

2. *Victoria amazonic* has the strongest leaves capable of holding even a _____.

4.A parasitic plant that locates it's prey by scent is_____.

5. The genus of the listener plant which is also found to be able to differentiate between caterpillar chewing sounds and wind vibrations is .

6.The genus of the plant whose members are commonly known as Dutchman's pipe,birthwort,pipeline is _____.

7. The plant with parasol like leaves arranged in such a way that precious rainwater will spill to it's own roots instead of getting dispersed has generic name.

10. The center of this exotic flower looks strikingly like our simian relatives. The plant's aroma suggests oranges when it blooms, which can occur during any season. The appearance and scent help to attract pollinators.

12. A special type of fungi that produces blood or juice-like fluid on its surface, also known as 'bleeding tooth fungus' is

13. The Guinness Book of World Records calls this nature horror show tree as the most dangerous tree in the world. It discharges a burning sap that can cause serious injury. Eating its fruit can bring death. Good luck burning down a stand of them — the smoke from the fire could cause blindness. The scientific name of the plant is _____.

Down:

1. Commonly called '_____ flower', this plant smells like a rotting corpse which prevents it from being eaten.

.3. *Dischidia major* has modified it's leaves as _____ where ants can live.

8. A sacred tree belonging to family _____, also known as "Flame of the Forest".

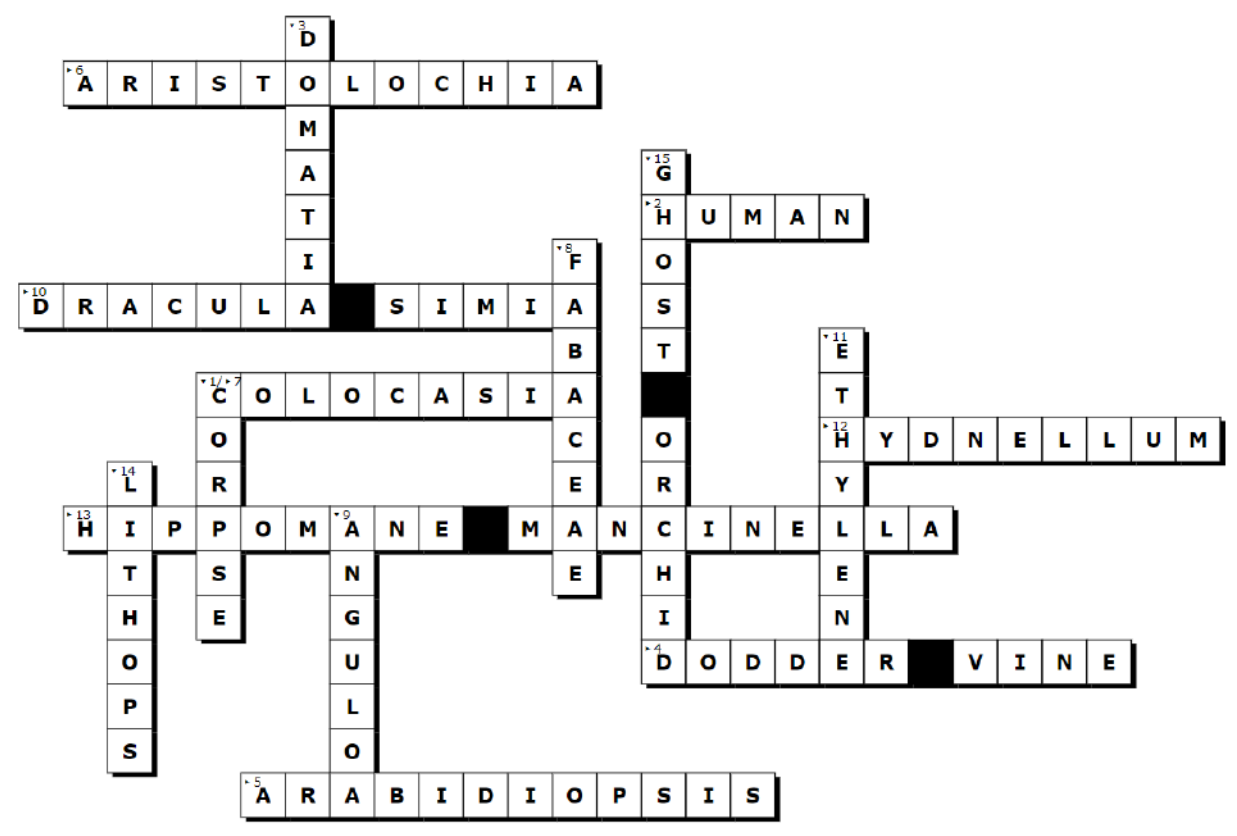
9. This plant resembles infants wrapped in blankets inside of the plant when the flower blooms. The flower with creamy white petals, grows to about 2 feet in height and gives off a cinnamon scent.The genus of the plant is _____.

11. When under attack by a grazing animal, this plant releases a cloud of _____ gas, thus warning trees up to 50 yards downwind to produce extra tannin in their leaves, making them toxic.

14. This plant survives by pretending to be a 'rock'. In a drought they tend to shrink below the ground surface, using their translucent top coating to collect any light that filters through the gravel. The genus of the plant is:

15. The roots of this orchid are so well camouflaged on the tree that the flower may seem to float in mid-air, hence its name of "_____", the scientific name being *Dendrophylax lindenii.*

Answers



Across:

2. Human
4. Dodder vine
5. *Arabidiopsis*
6. *Aristolochia*
7. *Colocasia*
10. *Dracula simia*
12. *Hydnellum*
13. *Hippomane*

Down:

1.Corpse
3. Domatia
8. Fabaceae
9. *Anguloa*
11. Ethylene
14. *Lithops*
15. Ghost orchid

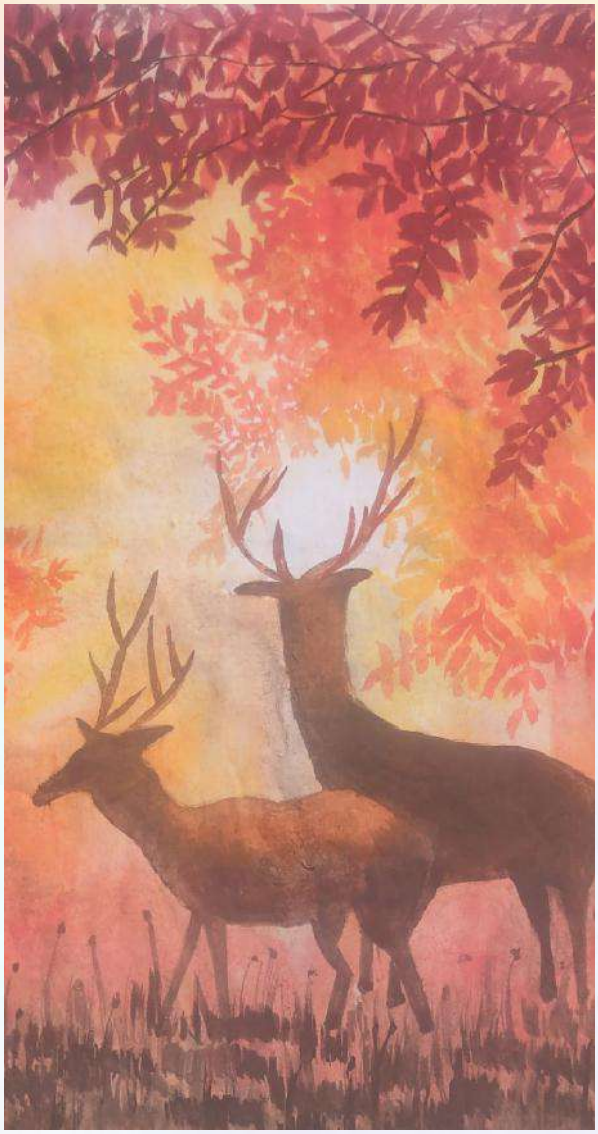
Crossword by: Anshita Bhatnagar, Janvi, Ananya Tomer

Creative Corner

ArtWork- Sucheta Barman BSc. (Hons.) Botany, 1st Year

Rishika Tripathi BSc.(Hons.) Bot. 1st Year

Tamnna Sharma BSc(Hons.)Bot. 1st Year



Alsa Mohsin BSc.(Hons.) Bot. 1st Year

Egalitarianism

The global warming levels are alarmingly rising resulting in melting of the glaciers and breaking of the ozone layer. Wildlife in 'catastrophic decline' due to human destruction, scientists warn. The frequency of such headlines has increased many folds.

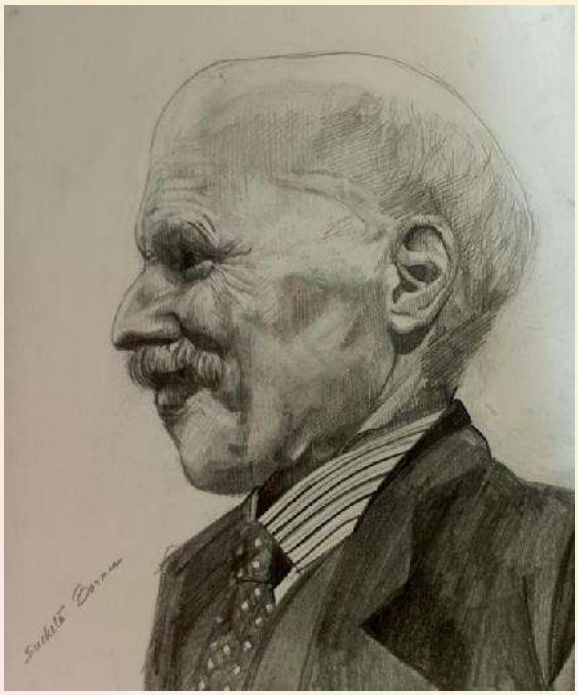
The greed of humans is making them blind of their needs. The never ending race of being the best in everything had made us oblivious of our necessities. For instance, if we do not have the ozone layer we will become the victim of sun's ultraviolet wrath and will be extinct within few years. We will lose all that we have spent years building because of us only.

Egalitarianism is the doctrine that all people are equal and deserve equal rights and opportunities. If it is engrained in our memories that everyone is equal then everyone's need would be our need. Their struggles would be ours and we will come forward to satisfy their need. It is rightly said by Mahatma Gandhi that there is enough for everyone's need but not everyone's greed. It's the contentment of greed that will lead to the end our existence whereas satisfaction of need will lead us to a brighter future.

"Greed is a bottomless pit which exhausts the person in an endless effort to satisfy the need without ever reaching the satisfaction."

Yashasvi Saini BSc.(Hons.) Bot. 2nd Year

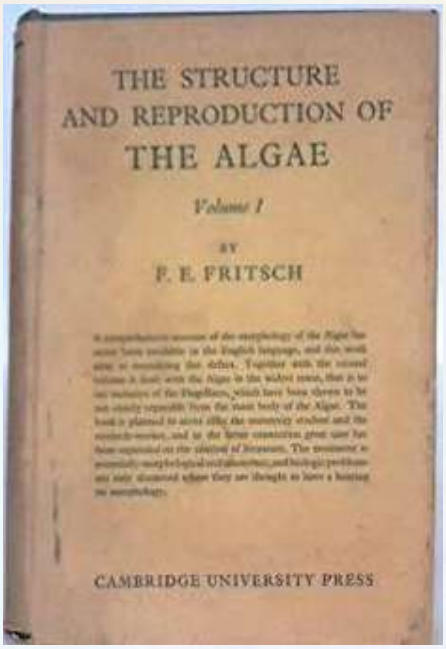
Dr. F.E Fritsch
an Exemplary Inspiration

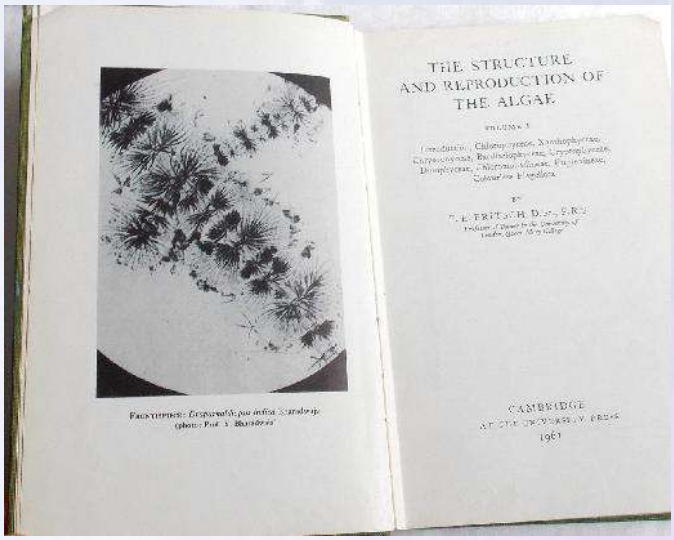


Sketch of Dr. Fritsch by
Sucheta Barman Bsc.(Hons.)Bot. 1st year

Fritsch began his career at the University of Munich before going on to University College London and the Royal Botanic Gardens in Kew to conduct research. From 1911 until 1948, he was Professor and Head of the Botanical Department at the University of London's Queen Mary College . In May 1932, he was elected a Fellow of the Royal Society, and in 1950, he was awarded the Royal Society's Darwin Medal. From 1949 to 1952, he was President of the Linnean Society, and in 1954, he received the Linnean Medal.

His two-volume The Structure and Reproduction of the Algae is his most well-known work, but his A Treatise on the British Freshwater Algae was equally influential. . Through his own study and encouragement to students, he made a significant impact. Fritsch gathered published pictures under the names of the species as a supplement to his own research on algae taxonomy and morphology. Dr. J.W.G.Lund of the Freshwater Biological Association maintained it after his death, and it became The Fritsch Collection of Illustrations of Freshwater Algae.





गुरु- ज्ञानदाता

सूरज के सामान,

वे बिखेरे प्रकाश ज्ञान व उन्नति का।

चाँद के सामान,

अंधकार को प्रकाश मे परिवर्तित कर,

दे सभी के जीवन को एक नवीन दिशा।

बादल के सामान,

अपने ज्ञान रूपी जल से धोए,

प्रत्येक विद्यार्थी की उलझने व गम।

धरा के समान,

समस्त विद्यार्थियों को अपने,

ममता भरे आँचल मे छाव देकर,

सदैव करें उनका निर्देशन।

जिनकी अनुपस्थिति मे,

प्रगति के सभी कपाट हो जाए बंद।

वे निश्छल भाव से करते,

सभी का मार्गदर्शन।

जो अपने कर्त्तव्यो का, सदैव करे पालन।

ऐसे देव रूपी गुरु को,

कोटि कोटि नमन हैं।

पल्लवी भट्ट

Pallavi Bhatt BSc.(Hons.) Bot. 1st Year

Roots of change: the strife against Climate change

A village of Lytton in the state of British Columbia in Canada registered a record-breaking temperature of almost 50°C on June 30th; this comes as a big surprise because Canada is one of the coldest countries on the planet. Cyclones in India and Kenneth, Australian wildfires, East Africa droughts, South Asia floods, Dry Corridor in Central America, and melting of Polar ice caps beg for strife against Climate change.

According to National Geographic, Climate change is a long-term shift in global or regional climate patterns. The main driver of Climate change is the Greenhouse effect, which occurs when gasses in Earth's atmosphere trap the Sun's heat. The greenhouse effect is one of the things that makes Earth a comfortable place to live. The primary greenhouse gasses are Carbon Dioxide, Methane, Nitrous Oxide, and Fluorinated Gases. Still, anthropogenic activities like Burning fossil fuels, Deforestation, Increasing livestock farming, Fertilizers containing nitrogen, Fluorinated gasses, etc., cause unusual production of these gasses, which in turn increases the temperature of Earth's atmosphere, commonly known as Global warming. As a result, there has been a global increase in temperature by 2 degrees Fahrenheit within the last two decades. The main threats it proposes are rising sea levels, ecosystem collapse, and more frequent and severe weather conditions.

India was the seventh most affected by the devastating impact of climate change globally in 2019, according to the Global Climate Risk Index 2021. However, there are many ways to reduce drivers of Climate change: put a price on carbon, end fossil fuel subsidies, build low-carbon resilient cities, increase energy efficiency and use of renewable energy, implement climate-smart agriculture and nurture forest landscapes, and invest in more sustainable forms of energy.

Alsa Mohsin BSc.(Hons.) Bot. 1st Year

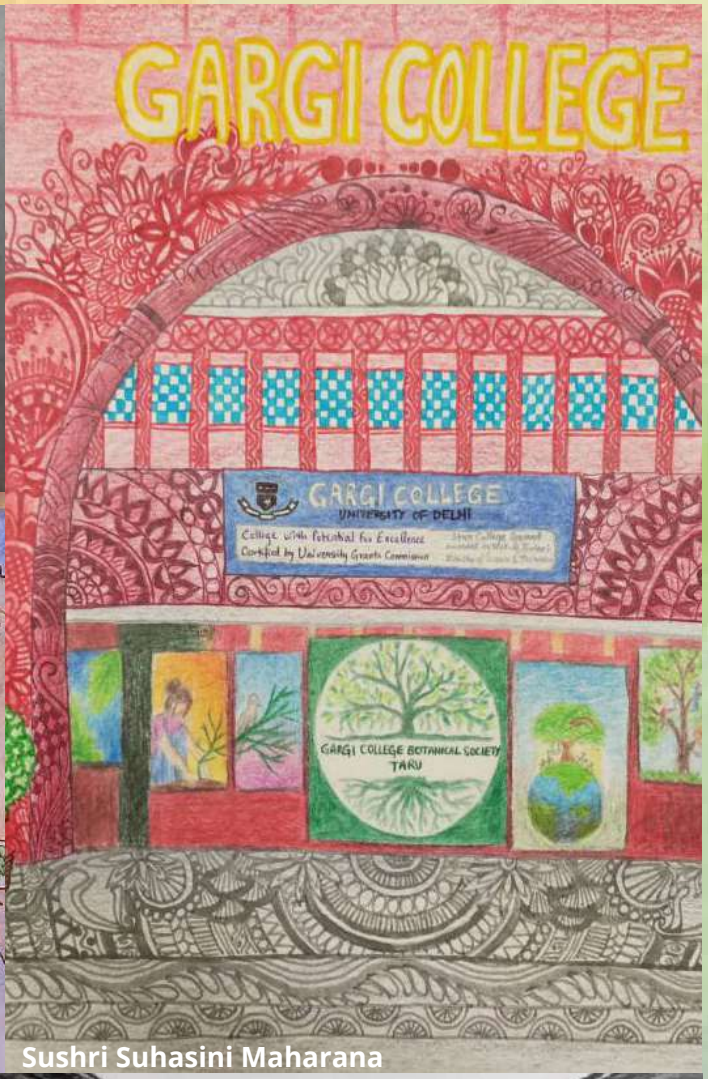
Ananya Tomer BSc.(Hons.)Bot. 1st Year

Ending Notes

Every year Team Anthesis tries to put forward current and informative themes for the annual magazine. It is a platform for everyone to showcase their talents, weaving together in a mesmerizing experience. From selecting the articles for the magazine to giving it a final go-through, every step has been a learning venture. The hurdles that came in the way became lessons of our lives and, working together as a team enhanced our understanding of team spirit. Again, this all would not have been possible without the support and guidance of our faculty advisors, Dr. Garvita, Dr. Preeti, Dr. Pritam and Dr. Akanksha.

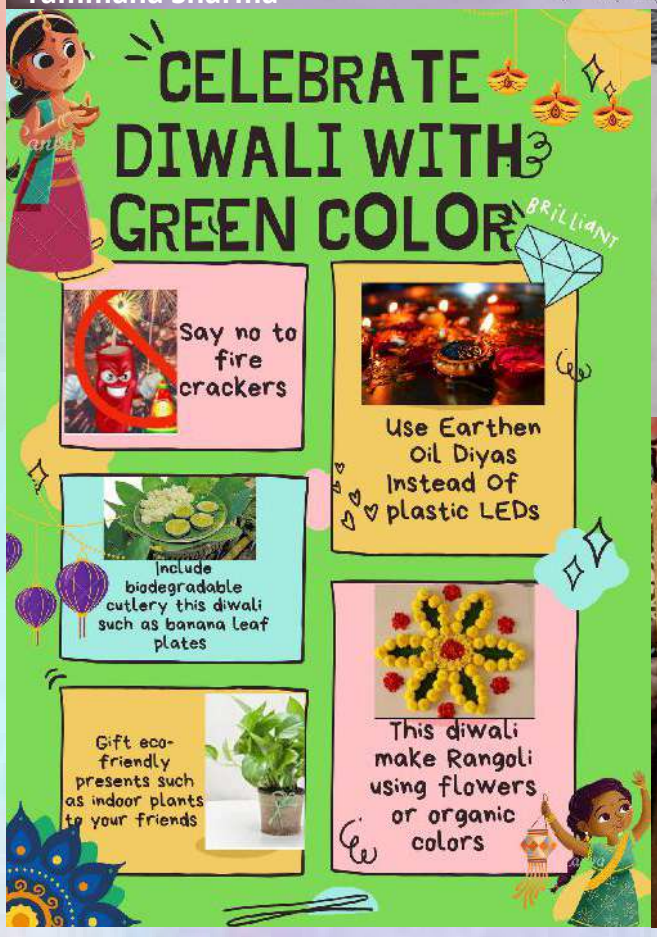
Team Anthesis 2021-2022

Shubhi Srivastava



Sushri Suhasini Maharana

Tammana Sharma




Shefali Gupta