



SHIVALIK

2021-22

THE COVER STORY

FOOD SECURITY AND CLIMATE CHANGE

DEPARTMENT OF GEOGRAPHY
SHIVAJI COLLEGE
UNIVERSITY OF DELHI



New Delhi, 2022

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Department of Geography
Shivaji College

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Principal's Message



Prof. Shiv Kumar Sahdev, Principal

It gives me immense pleasure to write a message for 'Shivalik-2022' an annual magazine: published by the Department of Geography, Shivaji College. "The mind is not a vessel to be filled, but a fire to be kindled," said Plutarch. Shivalik kindles the imagination of our young geographers. I congratulate the faculty members and students who used various media of expression to present their ideas. As long as our ideas are expressed and thoughts kindled, we can be sure of learning, as everything begins with an idea. I appreciate every student who contributed to the magazine and participated in extracurricular activities that helped in making learning fun.

As an academician, I can fully understand the importance of penning down ideas on a proper platform, and Shivalik provides such a platform to students. I firmly believe that the Geography Department is more than just a place to learn. It gives students a chance to grow and be equipped with everything they need to achieve excellence.

I convey my best wishes to the Department of Geography for the grand success of the Geo-Fest:

Shivalik-2022

*Prof. Shiv Kumar Sahdev
Principal*

Department of Geography



Prof. Tejbir Singh Rana, Teacher in Charge

Faculty Members



Dr. Lalita Rana



Dr. Preeti Tiwari



Dr. Rajendar Singh



Dr. Prabuddh Kumar
Mishra



Dr. Nitin Punit



Dr. Bharat Ratnu



Dr. Himanshu Mishra



Ms. Ekta Raman



Ms. Rashmi Singh

From the Desk of the Teacher in Charge



Prof. Tejbir Singh Rana, Teacher in Charge

The department of Geography Shivaji college (university of Delhi) New Delhi is organizing its annual academic festival SHIVALIK -2022 and simultaneously release its annual magazine SHIVALIK -2022 . The magazine publish and disseminate the student writing skills, subject knowledge and contemporary issues. It enhance the creativity ,objectivity and nurturing the potential talent of yours minds.

I extend my best wishes for its publication, academic progression and knowledge dissemination .

Fond Regards.

*Prof. Tejbir Singh Rana
Teacher in Charge*

Message from Student Advisor



Dr. Rajendar Singh, Student Advisor

It gives me immense pleasure to have witnessed this year's departmental fest of geography – SHIVALIK 2022 and to note that the students of geography department are bringing out a college magazine SHIVALIK 2022 on this occasion. Such activity brings out the creativity of the students and helps them learn valuable lessons of co-operation, leadership and team work.

SHIVALIK is a perfect blend of literary articles, photography, personal experiences and wonderful memories of students which reflects their creativity and Potential.

I am very happy to convey my congratulations and best wishes to all the students and faculty for their endeavours in bringing out this wonderful magazine.

Regards

Dr. Rajender Singh

From the Editor's Desk



Dr. Bharat Ratnu

It gives me immense delight to bring out the latest issue of the departmental magazine Shivalik, this magazine is well known for its academic excellence and dedicated approach towards dissemination of knowledge in the academic world. The department of Geography appreciates the role of research in education and is committed to developing an inclination towards research in both faculty and students. In this pursuit, the Department of Geography has taken the initiative to launch a annual departmental magazine named 'Shivalik' to encourage students to pursue research and pen down their thoughts.

It is an annual magazine launched to publish academic research papers and articles by the students on contemporary topics, their thoughts and issues related to the area of Geography and applied Geography with various dimensions. This latest issue of the departmental magazine is focuses on food security and climate change.

I congratulate all the students whose articles are published in this Issue of Shivalik and express my sincere thanks to their mentors.

I hope it's reading would be bliss.

Dr. Bharat Ratnu
EDITOR

Shivalik
2022

From the Co-Editor's Desk



Dr. Rashmi Singh

Geography is mother of all Sciences, the students of Geography have comprehensive knowledge on topics related to natural resources, environment and society. 'Shivalik' is the departmental magazine gives opportunity to the students and teachers to pen down their thoughts on the burning issues of the times. Be it the environment, disasters or the national and international issues of the world. The world is facing an increasing frequency and intensity of disasters both natural and man-made like COVID-19, Ukraine War. The present magazine is largely a collection of articles covering such issues. The articles touch both the side of the coin sources of the problem and the possible solutions in this direction. Besides, certain articles also represent the themes of the undergraduate syllabus. The magazine is the collective endeavour of the students and teachers alike of the department of Geography.

It gives me immense delight to bring out the latest issue of the department's annual magazine 'Shivalik 2022 1'. I hope its reading would be bliss and ecstasy to readers.

Dr Rashmi Singh
CO-EDITOR

Shivalik
2022

From Alumnus' Pen

Hello, Shivaji Buddies, this am Ajay Khosla from the Geography Batch (1990-1993), and I've been associated with my favourite academic institute since 1993. I studied a couple other renowned institutes for advanced study in professional sectors, but the compassion and respect I received here are unparalleled.

When we graduate from college, our mentors guide us in evaluating our career options within the minimal options available, and most of us can get to where we are now because of their advice and our hard work. Furthermore, as the professional dynamic shifts, a slew of new opportunities emerge, making it difficult to determine what to pursue and what to resist. People from different verticals come to chat with our young college friends to contribute a little on the role of pathfinder outside the academic domain, and that's where Vimarsh's role becomes extremely significant.

A few days ago, Shivalik, Shivaji College's Geography Society, have choose me as guest speaker to speak with my fellow students regarding career in the Logistics and Supply Chain domain, where I have been working from the past 24 years. Today, I work in one of India's top unicorn organizations in a respectable position, thanks to the mentorship of Shivaji professors, for that I will be immensely thankful, especially to Tejbir Sir, Surender Sir, and Preeti Ma'am.

When the session begins, Tejbir Sir himself took the time to breif about me to the attendees, and I owe him a huge debt of gratitude for his encouraging remarks, which have boosted my confidence and encouraged me to improve on traits that my mentors have recognised. My instructors and Harsh Lamba from my Junior team so perfectly described my career journey that I couldn't do the same for my resume. I will undoubtedly use this information to re-design my professional path on paper to take advantage of greater prospects.

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Furthermore, I was surprised before the conference call began that there would be many people on the line; almost 100 plus people were waiting to greet me and listen to my understanding of transportation and ecommerce industry. Because the class was so participatory, it went nearly 90 minutes instead of the usual 60 minutes.

I felt like I was interacting with my coworkers, not college students, since this participant was so well-prepared and aware. I'm very delighted to learn about my friends' levels of knowledge, but I'm still unsure whether I responded correctly or not. Soon, I will undoubtedly evaluate Vimarsh members' feedback and, if additional information is required, I will answer in the following session. I will take Harsh's input into consideration, and wherever he feels that greater answer is required, I will do my best to respond in the upcoming sessions.

Once again thanks to Shivaji College and Professors for making me who I am today.

MR. AJAY KHOSLA

ALUMNUS OF DEPARTMENT OF GEOGRAPHY (1990-93 BATCH),
SHIVAJI COLLEGE,
UNIVERSITY OF DELHI.

Shivalik
2022

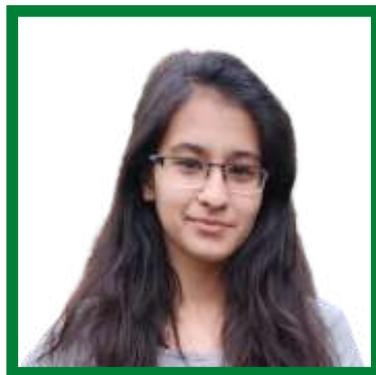
Student Editorial Board



Yuvraj Sinha



Nancy



Akshera Mehrotra

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Shivalik 2022

I feel myself fortunate enough to be associated with the editorial team of The Annual Departmental Magazine Shivalik 2021-22.

Being the students of Geography it becomes our responsibility to take care of our mother nature. This is the reason Shivalik is again coming up with the E-Magazine by reducing our carbon footprints. The theme of the annual magazine is "Food Security and Climate Change".

Our faculty, the student council as well as other students have shown their association with geography and environment through their articles. I believe that y'all will love reading our articles.

*Nancy,
Secretary,
Shivalik*

Shivalik 2022

It has not just been a great pleasure but also an honour to be a part of the planning and preparation of 'Shivalik 2022', the Annual Departmental Magazine of our beloved Department of Geography. This year we have attempted some constructive experimentation in our magazine with the introduction of cover story section being the greatest part of the experiment. As we all are aware that climate change has evolved to become the greatest existential threat to humans and has left no dimension of human life and nature untouched, we have chosen 'Food Security and Climate Change' to be the theme of the magazine and cover story this year to create awareness and pave a way forward about the emerging threat to our meal due climate change.

The faculty as well as the students have contributed and I'm thankful to all the contributions that made the magazine possible. I hope you all would find reading this magazine a bliss.

Yuvraj Sinha,
Joint Secretary,
SHIVALIK

Shivalik 2022

It has been a massive opportunity for me to be contributing as a Council Member and the Core Member in the Editorial Team of The Annual Departmental Magazine " Shivalik 2021-22 .We take immense pleasure as a member of this geographic society of Shivaji College- "Shivalik" to release our E-magazine .The theme for the magazine will be Food Security and Climate Change of this year.

The faculty as well as the student members have contributed wholeheartedly and I'm grateful for all the contributions that were made for this magazine to become possible.

I believe that you all will love reading it too..

Akshera Mehrotra,
Council Member,
SHIVALIK

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Special Mentions

12 If I have told you earthly things, and ye believe not, how shall ye believe, if I tell you of heavenly things?
13 And no man hath ascended up to heaven, but he that came down from heaven, even the Son of man which is in heaven.
14 And as Mo'-ses lifted up the serpent in the wilderness, even so must the Son of man be lifted up:
15 That whosoever believeth in him should not perish, but have eternal life.
16 For God so loved the world, that he gave his only begotten Son, that whosoever believeth in him should not perish, but have everlasting life.
17 For God sent not his Son into the world to condemn the world; but that the world through him might be saved.
18 He that believeth on him is not condemned: but he that believeth not is condemned already, because he hath not believed in the name of the only begotten Son of God.
19 And this is the condemnation, that light is come into the world, and men loved darkness rather than light, because their deeds were evil.
20 For every one that doeth evil hateth the light, neither cometh to the light, lest his deeds should be reproved.
21 But he that doeth right is come to the light, that his deeds may be made manifest, that they are wrought in God.

The Woman at Jacob's Well

4 When therefore the Lord knew he was to die for the world, and that he himself should be baptized, and baptized more disciples than John, (Though Je'-sus himself baptized not his disciples,)
3 He left Ju-dae'-a, and departed again to Gal'-i-lee.
4 And he must needs go through Sa-ri-a.
5 Then cometh he to a city of Sa-ma'-ri-a, which is called Sy'-char, near to the parcel of ground that Ja'-cob gave to his son Jo'-saph, therefore, being wearied with his journey, thus on the well, and it was about the sixth hour.
6 There cometh a woman of Sa-ma'-ri-a, who was married to a husband that was dead.

7 The big disciples were gone away into a village to buy bread.
8 Then cometh the woman of Sa-ma'-ri-a, and saith unto him, Sir, I have no water. How canst thou say, Sir, I have no water, when thou art a Jew?
9 Jesus answered and said unto her, My hour is not yet come. But thou sayest, Sir, I have no water. How canst thou say, Sir, I have no water, when thou art a Jew?
10 Jesus answered and said unto her, My hour is not yet come. But thou sayest, Sir, I have no water. How canst thou say, Sir, I have no water, when thou art a Jew?
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12 Jesus answered and said unto her, My hour is not yet come. But thou sayest, Sir, I have no water. How canst thou say, Sir, I have no water, when thou art a Jew?

India on the Move: Saga of Success

By Prof. Tejbir Singh Rana
Shivaji College, University of Delhi.

India is bestowed with diverse natural and human resources. The geographical multiplicity of loftiest Himalayan mountains, fertile riverine plains, monsoonal climate suitable for crop biodiversity and rich forest covers offers opportunities for higher carrying capacity in the region. Withdrawal of world wars and colonial power from India in 1940s leads to the diffusion of technology and mechanization with increased literacy rate steered the development process in India. Rich natural resources of minerals, fossil fuel, fertile soils, perennial rivers, and climatic suitability for growing the crops became the threshold of

development. After the independence, the visionary formation of five-year plans and problem area specific plans as flood area development plans, tribal area development plans and drought area development plans etc. resulted growth in three sectors as:

1. **Formation of infrastructure as roads, canals, dams, and buildings etc.**
2. **Overcoming the natural adversaries as disasters and hazards.**
3. **Raising the living standard of masses through equal opportunities in social welfare sector.**

India is located in monsoonal climatic conditions which is prone to seasonal endemic and pandemic diseases such as technology, India became able to completely eradicate small-pox and plague epidemics which leads to control of the death rate and

malaria, filaria, dengue, acute encephalitis syndrome and sickle cell etc. With the diffusion of medical

increased the absolute population size. Following table highlighted the various demographic indicators of India.

Table 1: Trends of Demographic Indicators of India.

S. No.	Census Year	Population size (in crores)	Decadal growth rate (in %)	Birth rate per 1000 population	Death rate per 1000 population	Population density. (Persons per sq. km. area)
1.	1901	23.83 Crore	-----	-----	-----	71
2.	1941	31.86 Crore	14.22 %	45	31	103
3.	1951	36.10 Crore	13.31 %	40	27	117

4.	1971	54.81 Crore	24.80 %	42	23	177
5.	1991	84.43 Crore	23.50 %	26	09	267
6.	2011	121.08 Crore	17.64 %	23.5	7.5	382
7.	2021 Projecte d	139 Crore	14.87 %	-----	-----	464

Social parameters of India registered tremendous progress after independence. Breaking the barriers of casteism, feudalism, gender-based division of labour, rudimentary lifestyle as dowry and preference of male child-birth transition period is diminishing with increased

literacy rate and diffusion of information technology. Female literacy brought phenomenal change in demography and social indicators of development in India. Increase in female literacy rate significantly brought down the population fertility rate and

enhanced the women empowerment parameters.

The involvement of women in the formal workforce sector empowered them economically, shifted their dependency from

males and became decision makers of family institution. It improved the health parameters of children and the gender-neutral approach of society.

Table 2. Trends of Social Parameters of India.

Census	Total Literacy Rate (%)	Male Literacy Rate (%)	Female Literacy Rate (%)	Sex Ratio No. of females per 1000 males.	Average Life Expectancy (years)
1901	5.35 %	9.83 %	0.60 %	972	25
1951	18.33 %	27.16 %	8.86 %	946	32.1
1971	34.45 %	45.95 %	21.97 %	930	45.6
1991	52.21 %	64.13 %	39.29 %	927	59.4

2011	74.04 %	82.14 %	65.46 %	943	67.5
2021 Projected	77.7 %	-----	-----	948	70

Infrastructural Development

Vast geographical extent of more than 32.87 million sq. km. and more than 7 lakh dispersed villages in the country initially finds a series of stumbling blocks in the development process. Construction of all weather roads to connect the habitations in rugged terrains remained the herculean task for the planners and engineers. Subsequently, developing the school

infrastructure, medical logistics and electrification networks registered significant progress in raising the living standard of the society. The infrastructural development become instrumental in economic growth through mass production in the agricultural and industrial sectors. The exchange of goods increased the trade at local to global level.

Table 3. Indicators of Infrastructural Development in India.

Year	Length of all-weather Roads	No. of electrified villages	No. of primary schools	No. of Primary	Railways Running Track
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	(Lakh Km.)	(in Lakhs)	(in Lakh)	Health Centers	Length (Km.)
1951	3.99	0.07	2.09	725	59315
1971	9.14	0.75	4.10	5131	71669
1991	23.27	4.81	5.58	22243	78607
2011	46.76	5.08	7.48	24049	87040
2021	62.15	5.97 (100%)	8.47	30045	99235

A phenomenal increase in infrastructural development across all sectors was registered since independence in India. The initial Five Years Plans (FYPs) were targeting the high economic growth rate which gradually

changed to sustainable development of society. To include each and every section of society in the development process, after 2000 all government schemes shifted towards 'Inclusive Sustainable Development'.

Food and Nutrition Security

Increasing population of India from 36.10 crore in 1951 to almost

139 crores in 2021 required assured supply of nutritious food

to its population. The expansion of cropped area, expanding the irrigated net sown area, application of high yielding variety (HYV) of seeds, diffusion of mechanization in farm sector and institutional support of fertilizers and marketing system (APMC) remained instrumental in increasing the food grain production. Since independence, population size increased almost

3.7 times whereas food grain production increased more than 6 times. The natural conditions as suitable crop growing weather conditions which includes temperature, rainfall, moisture; fertile alluvial and deltaic soils, availability of water for irrigation and vast plain topography provided base for mass production in farm sector.

Table 4. Trends of Development in Agricultural Sector in India.

Year	Net Sown Area (Mn. Ha)	Total Irrigated Area (Mn. Ha.)	Food Grain Production (Million Tons.)	Wheat Production (Mn. Tn.)
1951	118.75	20.8	50.8	6.46
1971	140.86	31.1	108.4	23.83
1991	142.87	48.0	176.4	55.13

2001	141.34	55.13	208.8	69.68
2021	140	64.7	307	107.9

The government policies as Integrated Rural Development Programme and Small Farmers Development Agency brought significant improvement in farm products. In India, farmers revolutionize the various farm sectors with mass production as:

1. **Green Revolution:** Food grains such as wheat and rice.
2. **White Revolution:** Milk production (Operation Flood).
3. **Blue Revolution:** Fish production mainly freshwater.
4. **Yellow Revolution:** Oilseed production.
5. **Round Revolution:** Potato production.
6. **Golden Revolution:** Fruit/Honey production.
7. **Silver Fiber Revolution:** Cotton Production.
8. **Golden Fiber Revolution:** Jute Production.
9. **Silver Revolution:** Poultry/Egg production.
10. **Pink Revolution:** Onion production

Economic Indicators

After independence, the role of public sector undertakings (PSU's) remained instrumental in strengthening the economy. Industrial framework of PSU's utilized the natural resources of the nation for its value addition, multiplied the export and trade and offered mass employment for the multiplication of production of human resource. After the formation of WTO (World Trade Organization) and Globalization in the 1990s , the private sector and FDI (Foreign Direct Investment) further boosted the super

specialized industries such as software, automobiles, and electronics etc. Apart from human resource progression and agricultural development in India, the industrial sector opened a plethora of economic opportunities in the tertiary/service sector. Altogether it increased the carrying capacity of India with improved living standard, assured food supply, mitigating the natural disaster and hazards and registered phenomenal increase in per capita income.

Table 5. Economic Indicators of Development in India.

Year	Per Capita Income (Rs./year)	Electricity Generation (Billion KWH)	Petroleum Consumption (Million Tn.)	Steel Production. (Mn. Tn.)
1951	255	5	0.31	1

1971	742	56	18.37	4.6
1991	5440	264	51.77	13.5
2001	16688	499	103.44	31.2
2021	135050	1356	214.00	94

Social welfare schemes of the Government of India under inclusive sustainable economic development brought significant improvement in the livelihood of the poorest of the poor. Food for all, housing for the homeless, assured employment under MG-NAREGA and Ayushman Bharat and parity in education through SWAYAM schemes are the epitome of socio-economic

development of India. Diffusion of information technology and use of mobile phones by the remotely inhabited people is the runway of the take-off stage of society. Ease of Doing Business, Start Up India, Stand Up India, Gati-Shakti, Make in India and Atamnirbhar Bharat schemes have opened the multiple options for industrial production, export and employment in India.

Hug a Tree with Me: Women Forest Fighters

By Dr. Rashmi Singh, assisted by Sapna, Rajat Saini, Rashmi and Prashant Kumar (BA Hons. Geography 2020-23)

Abstract

“Emotional geography is a subtopic within human geography dealing with the relationship between emotions and geographic places and their contextual environments.” The Chipko movement which originated in the Himalayan region of Uttarakhand in 1973 and spread through the Indian Himalayas was the strongest movement to conserve the forest, also an ‘eco-feminism’ movement in which women formed the nucleus of the movement, as they are the ones

who directly affected by the lack of firewood and other forest products which caused by deforestation. The act of hugging tree intensity at which this movement spread, and teeing of threads to trees by women reflects the strong emotional bond toward their trees. It shows that women liberation is not only about liberation from the operation of patriarchal societies that dominate the world, but also about the liberation of all men and women (irresponsive of class and caste) colonised by the economic logic of domination and unlimited irrational

exploitation of nature by capital. They were thinking of 'Mother Nature' which expresses the feeling of bond towards the land, forest, and of nature and desire to take care and not destroy. We have chosen this topic to research how emotions help to bring a drastic change in society and how emotionally attached people can interfere in government decisions that are not in favour of local people. The objective of this research is to find out the emotions of people while saving our Mother Earth. The methodology which we are going to use in our research is qualitative research with primary and secondary sources. We used articles, research papers, and powerpoint

Though saving trees by hugging them –under the canopy of the Hindi term 'Chipko', 'to hug'– may not be an old idea, the movement against environmental despoliation

presentations for wider knowledge of the topic. India needs a Chipko movement again! The rate at which 'urbanisation' is taking place, trees are being felled, widespread encroachment, etc. are the factors contributing the 'climate change and the increase in population. The speed of rapid deforestation is at its peak. The demand of people eating the forest. Defence projects, dams, and mining projects get most of the forest land.

Keywords

Chipko Movement, Mother Earth, Emotions, Urbanisation, Climate Change.

Introduction

began in the middle of the 20th century. Emotions are the main tool of the movement which provides them a successful path. After their long struggle, this movement forced the

government to rethink their priorities in the use of forest produce and include the local people in forest management as well as local people could now continue depending on the forest for meeting their basic needs. Dasholi gram Swarajya Mandal is an organization founded by Bhatt to generate local employment. It set up a mahila mangal dal or women welfare group in the village. These groups provide women a platform to meet and talk about their issues and give a united voice in a male-dominated society. First, the forest conservation movement was initiated in the 18th century in Jodhpur after which the Chipko movement is originated in Chamoli district in 1973 was a non-violence act that was aimed to protect and conserve forest trees. Emotions are their main tool of the movement which provided them a successful path. After their long struggle, this

movement forced the government to rethink their priorities in the use of forest produce and include the local people in forest management as well as local people could continue depending on the forest for meeting their basic needs. The Chipko movement of 1973 soon inspired many such agitations ecological projection. In the immediate aftermath, it soon spread to other sub-feminist movements, and this movement was awarded the right livelihood award in 1987. The movement encourages many environmental programs like water, management, afforestation, energy conservation, and others. The Chipko movement is the livelihood movement rather than the forest conservation movement. It also generates a new way to protect the environment. It is also an eco-feminist movement.

Methods

We have used qualitative research methodology. We had made a questionnaire to gather the information in the form of Google forms and circulated it in the groups of Ph.D. scholars, professors, college students, and school students etc. and got 119 responses. We also referred to different news articles, research papers, and videos available on the internet.

Observations and Findings

Through our research, we found out that people having a strong will to protect the environment is in a very high percentage which is 40% whereas the contribution of women in large

The Chipko movement was a more emotional movement to

numbers, by sacrificing life and women's emotions with any geographic place can be more sensitive than others is agreed by 72% of respondents. If we see emotions and economic developments both parameters in the form of the emotions of women by protecting the environment came across the agenda of economic development and cause the loss of infrastructural development, around 43.7% of respondents disagree with it. We found that in today's scenario we need this kind of movement to protect our environment and nature as 78% of respondents agreed that due to degradation of the environment the climatic condition is going to change day by day.

Result

protect the trees rather than a movement demanding compensation in terms of money

and land. It also generates a new way to protect the environment. The move encourages many environmental progresses like water management, afforestation, energy conservation, and others. and women have a strong emotional bond with nature and they protect the forest like a family member. Women who participated in the movement are successful in conserving the forest. This can be done in the future and there is a need for the Chipko movement again. Only we have to make a particular platform where the people unite and take the form of movement as ultimately "ecology is the permanent economy". If we continue our business as usual, then we will see accelerated climate changes, loss of habitat and biodiversity etc. We should shift over the renewable source of energy. We should consider sustainable development. Resources should be conserved

to maintain ecological balance and save them for the future generation. Adaptation of afforestation, more and more nature protection acts. The balance between infrastructural development and the environment. Reform in forest department administration and their way of work, coordination, programs implementation.

THE COVER STORY:

Food Security and Climate Change

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The Safe Space

By Prachi and Masum (BA Hons. Geography 2021-24)

Edited by Tammana (BA Hons. Geography 2019-22)

We are living in a world where more than 1 billion people are not getting food . Many people do not get proper nutrition and are not able to quench hunger. In the pandemic, many have lost their jobs, due to which the condition is becoming more and more worse. Food insecurity is the world's greatest pandemic. More than 9 million people die every year due to hunger . It is reported that in every 10 seconds a child dies due to hunger. The world is undergoing major physical, social and economic transitions from earlier periods.

Five major global transitions that make historically-based outdated thinking:-

1. Urban population transition
2. Nutrition transition
3. Climate transition
4. Energy transition
5. Agriculture transition.

It is a very difficult period of concern about the future sustainability of food supplies. The causes of this concern are based on

many establishments: the population is still growing at a very fast rate; with increasing wealth, the diet is shifting to consumption of higher value products; the yield in major grains is levelling off; available land suitable for food production is limited . There is not a good system for irrigation. Population size by itself is not the whole problem. The current total world food production is capable of providing everyone with an adequate low quality diet.

According to the report global food security is constrained by three factors:-

1. The quantity of food that can be produced in a given climate;
2. The quality of food needed by a growing global population;
3. The effect of food security in the coming years.

Current trends in population growth, changing diets, crop yields and climate change if left unchecked will place the global community outside of the safe space. Maximum food production, global food needs and climate change due to the food

system are these three limits. This is the 'safe space'.

Maximum amount of food represents the maximum amount of food we can grow under a given climate. Climate change is bringing us towards a critical security threshold in many regions. Areas currently suffering from food insecurity will be hit worst.

Global food needs represent how much food we need to feed everyone on earth has got adequate nutrition. We need to grow more food to make up for greater crop losses due to climate variability and pest outbreak.

Climate change due to the food system represents the effect of increasing food production on climate change. If we use more land for crop production, apply more artificial fertilizer, and have larger livestock herds, the climate impact already nearly one third of current climate change increases.

One third of all food is lost or wasted. Food waste in industrialized countries is almost as high as total net food production in sub-Saharan Africa. We are not in a safe space.

We can take actions to enlarge the safe space and move the planet within its boundaries. First, by eliminating waste in the food chain, increasing equity and access to food, and shifting to vegetable rich diets that demand fewer resources. We can reduce the amount of food we need. We

can increase the amount of food we increase by investing in agricultural research and development, we can also increase the safe space by adapting the cropping system to hotter climates through innovation such as improved crop genetics and careful matching of crops to environments.

Impact of Climate Change on Agricultural Production across the Globe

**By Kulvinder Dahiya (BA Hons. Geography 2021-24)
and Harshit Pandey (BA Hons. Geography 2020-23)**

Due to a worldwide temperature change, the environment has changed in a way that has had unpredictable effects on people and plants equally. All of us comprehend how they cause ocean level to rise, the worldwide temperature to rise, incessant events in the regular catastrophes around the globe, as well as changes to trimming patterns. There will certainly be progressions in plant hereditary qualities. Plant hereditary qualities deal with changes in plant properties and hereditary variety. As plants struggle to adapt to environmental changes, geological elements like CO₂, water level, and temperature play a major role. Many researchers, environmentalists, and

agriculturists have found that plant qualities can change as the environment changes, especially in wild plants. Different soil tests have shown that assuming the circumstances decline, 50-90% of developed regions that currently practice consecutive trimming should return to single-editing, changing the quality of the crop, the demand, and the estimate of the yield. In the Bay of Bengal, rising ocean levels and typhoons have damaged the Mangrove biome. Marine life is similarly threatened. As ocean temperatures have risen, corals have pushed out green growth (also known as fading). For instance, Australia's Great Barrier Reef is being obstructed

incomparably. Fading has multiple causes, such as contamination and incredibly low tides. The impacts of advance in plant hereditary qualities on human well-being commence first with decreasing dietary values, later on with the expansion of the use of composts for developing harvests, thirdly, with reduced access to fish as reef-dependent marine life disappears, and lastly with the collapse of the agrarian of the economy of horticulture-based nations.

The idea of horticulture and cultivating practices in a specific area is greatly affected by the drawn-out mean environment, because nearby horticultural networks are by and largely tailored to a specific type of cultivation and a specific collection of harvests, all of which are known to be productive under the current environment.

According to current data, the worldwide economic output from agriculture, forestry, and fishing grew by 73% between 2000 and 2019, reaching \$3.5 trillion in 2018. This addresses an expansion of \$1.5 trillion contrasted with the

year 2000. Given its size, Asia was the primary donor with 64% of the world absolute in 2019: the landmass has shown an increment of 84% since the year 2000. The nations with the biggest agribusiness, ranger service, and fishing area as far as worth added in 2019 were China and India. Although there has been a ruin altogether farming area region by 3%, efficiency has expanded on normal by 0.1% every year over the 1961–2019 period with a huge extension up to the 1990s. The expansion underway is for the most part ascribed to a blend of elements like expanded utilisation of water systems, pesticides, and manures and to a lesser degree, a bigger developed region; different factors, for example, better cultivating rehearses and the utilisation of high return crops likewise assume a part. There were only four individual harvests that represented half of the production of primary yields in 2019: Sugarcane (21%), Maize (12%), Rice (8%), and Wheat (8%).

Agricultural production contributes significantly to the release of greenhouse gases and

environmental change. The total emissions from agrarian land in 2019 equaled 10.7 billion tons of carbon dioxide, equivalent to greenhouse gases released into the atmosphere in 2019. In 2019, Asia had 38% of the global farming production, followed by the Americas.

Temperature increases in developing countries can have major effects on agrarian efficiency, ranch earnings, and food security. At mid- and high latitudes, the reasonableness and efficiency of harvests will improve and expand northward, especially for grains and cool-season seed crops. Further north and at higher elevations, crops like maize, sunflower, and soybean, which are prevalent in Southern Europe, could also become viable. In this case, yields could increase by 30% by the 2050s depending on the harvest. When temperatures rise by 2 degrees Celsius in the mid-latitudes, wheat production could increase by 10%, but when latitudes are low, yields might fall by almost the same amount. Different crops respond differently to warming.

By fitting measurable connections between developing season temperature, precipitation and worldwide normal yield for 6 significant harvests, Lobell and Field (2007) assessed that warming beginning around 1981 has brought about yearly consolidated misfortunes of 40 million tones or \$5 Billion. Several periods of extreme temperatures (more than 32 °C) during the blooming phase of many harvests can drastically decrease yields. Changes in conditions can cause nonlinear crop reactions. These reactions display limited reactions and are affected by a combination of pressure factors that influence their development, advancement, and inevitable yield.

In addition to expanding temperature, aphid overwintering mortality was reduced, enabling an earlier and potentially more varied spread. In sub-Saharan Africa, there is a possibility that locusts' relocation may be affected by rainfall, and environmental changes may shape the effects of this staggering bug. An evolving environment may also have an impact on microorganisms and

illnesses. By changing the extent of snow cover, such frameworks are changed in how they store and transport water. Runoff volume changes with changes in precipitation, especially at the furthest limit of the colder season at the beginning of the snowmelt. It is mostly temperature changes that influence the circumstance of escaping before the top stream in the spring. While extra stream can be viewed as beneficial to horticulture this is possible as long as there is a way to store run-off during periods of abundance to use in subsequent seasons.

There are a variety of ramifications of human-caused greenhouse gas emissions and environmental change for rural usefulness, although their total impact is not known. To be sure, most of these effects and their partnerships have yet to be reliably measured, particularly at the global level. The expansion of mean temperatures is certainly to be expected, but its effects on efficiency might depend more on the magnitude and timing of outrageous temperatures. Similarly, the ascent of the mean

ocean level is inevitable, and could ultimately lead to a shortage of rural land through long-term immersion. However, the impacts of brief flooding caused by storm floods may also be significant, albeit less predictable.

The question is: Is this a warning sign after so much turmoil? Yes, it is! The main party in question here is the People. Although people have created stuff around them, it has been at the expense of Mother Earth. Although we have received admonition signals before, the main difference today is that the frequency of these advance notice signals has grown drastically. Already in the 1940s, environmental change signs were apparent. Seaside districts were negatively affected by the rising ocean level. Just 15% of the world's seaside district is currently salvageable, degraded from human movement. As a result of environmental change, hereditary changes in plants may increase vulnerability and hazards in farming. Recent researches show that the previous decade has seen more Dry seasons, Desertification, Expansion in crop failure, Evaporation of

groundwater assets, high utilisation of manures, and so on than ever before. An unmistakable warning sign can be observed here. If we do not react quickly enough, we may need to prepare for the worst.

Impact of Climate Change on Agricultural Production in Asia

By Deepali Pateriya (BA Hons. Geography 2020-23)
and Gauri Arora (BA Hons. Geography 2021-24)

Asia recorded its warmest year in 2020, with the mean temperature 1.4 degrees Celsius above the 1981–2010 average. Notable heat extremes were also experienced in this region. To mention how unpredictable and unusually active the monsoons were, this combined with tropical cyclones caused floods. While many regions of the continent experienced excess water, some experienced extremes of heat and no rain at all, leading to difficulties in agricultural practices. Unstable climate changes in India led to having less period for crops to grow in both Kharif and Rabi seasons.

The major staple crops (wheat, rice, pulses) grown in South Asian countries like India require heavy

rainfall to grow which means the farmers in these regions are very much dependent on the monsoon rains. Furthermore, the onset date and the retreat date of the monsoon have vital importance for these farmers. Reports suggest that increasing the amount of water vapor in the atmosphere under global warming may lead to an increase in global monsoon precipitation, keeping in mind the regional differences in the rainfall intensity. According to a recent study, Asian and Indian monsoons will be the most affected regions in this respect, using CMIP6

simulations. Hence, every year we need to amend the policies of climate change according to the precipitation in the monsoon regions.

Climate change affects the start and length of growing seasons and the duration and size of heat and water stress in agricultural production systems because above best temperatures directly harm crop production. Besides its impact on crop yields and production, climate change will also affect the natural resources, primarily land and water, which are fundamental to agricultural production. It is expected that water availability can decline due to climate change. With its impact on agricultural production and natural resources, climate change will bring great fluctuation in crop production, food supplies, and market prices and will aggravate the situation of food security and poverty in South Asian countries, adversely affecting the livelihood of millions of people in the region.

As per a recent report, it is estimated that about 15 million people and 1829 square kilometers

of land in seven Asian countries could be affected by extreme sea-level rise and coastal flooding by 2030. An estimated \$724 billion in Gross Domestic Product (GDP) could be affected due to this. It is very clearly mentioned that most of the area that will be affected is going to be mostly agricultural land which will create a noticeably big problem for us for obvious reasons like low food security, shortage of food supplies, increased prices of goods, etc.

Groundwater plays a crucial role as one of the major sources of freshwater for human beings. In present times, it is exploited at a faster rate while less time is given for its recharging. In countries like China and India where the population is soaring heights, water scarcity is becoming a widespread problem among the masses. About 80% of India's total population depends on groundwater for drinking and irrigation. India uses 230 cubic kilometers of groundwater annually, becoming the largest user of groundwater in the world, and surprisingly, 90% of this

groundwater is used for irrigation only.

Research led by the University of Maine said that the highest glacier of Mount Everest, namely the South Carol, has lost 180 feet of thickness in the past 25 years due to climate change. Not only this, but many other glaciers are also melting at an accelerating rate resulting in the formation of hundreds of lakes on the foothills of the Himalayas, which can cause flooding in the region. These glaciers hold a significant position in supplying food and energy to the people living near mountains and river valleys.

As per the reasons said above, there is an urgent need to control the rising prospects of the changing environment or else we'll have to face the consequences. Climate change is a growing threat to not only agriculture but also sustainable development. Climate change is seriously going to harm us in several ways, but agriculture will be one of the first to be affected, leading to hunger, malnutrition, and poverty. Already, more than half of all the undernourished

people (418 million) live in Asia, as said in a report by the UN. So, we must act now and contribute in every way we can, as together our bits count a lot.

Impact of Climate Change on Aquaculture

By Ashish Kumar and Gunjan Sharma (BA Hons. Geography 2021-24)

Aquaculture is the farming of aquatic organisms like fish, algae, aquatic plants in controlled aquatic conditions. Aquaculture is undoubtedly one of the fastest-growing food production sectors. It is practiced both by creating artificial environments for fishing in some isolated locations as well as in a portion of ocean close to the shore.

"According to FAO (2020), aquaculture's contribution to global fish production has continued to rise, reaching 82.1 million tons out of the estimated 179 million tons of global production". However, the problem is whether the sector is growing fast enough to meet the future demand of the rapidly growing human population and a

changing climate. Climate change is now considered a risk to global food production and a major threat to the quality and quantity of production.

Climate change is a major threat to all food production sectors and aquaculture is no exception. Humans have been the major contributor to climate change by fossil fuels for energy supplies, releasing the greenhouse gases into the atmosphere which led to a rise in global temperature, sea-level rise, and other effects. In aquaculture, some changes in climate, such as rising temperatures, changing precipitation patterns, and

increased frequency of some extreme events are now clear on water resources.

Let us now see various impacts of climate change on aquaculture,

- Due to the increase of greenhouse gases in the atmosphere, the amount of CO₂ is increasing in oceans. The oceans are estimated to store about 50 times more CO₂ than the atmosphere. It leads to Ocean Acidification, due to which the pH levels of ocean water are declining. Increased accumulation of CO₂ in water threatens the environmental sustainability of aquaculture production systems through water quality deterioration leading to poor productivity.

- Sea level rise is also a great threat to aquaculture culture. The rise in sea level may destroy several coastal ecosystems, such as mangroves and salt marshes, which are considered crucial for keeping wild fish stocks, as well as supplying seed for aquaculture production. This will negatively affect aquaculture breeding

programs and the economic sustainability of the sector.

- Temperature plays a critical role in the growth and development of aquatic organisms. The increase in average temperature every year affects many species of fisheries. Prolonged temperature stress may affect aquaculture productivity by lowering it. These effects may lead to increased management costs and low productivity that threaten the economic and social sustainability of aquaculture production.

- Changes in rainfall patterns will affect aquaculture production and sustainability. If at a time rainfall is low it may lead to drought which leads to water stress, such as shortages and quality deterioration that have negative effects on aquaculture production. Excessive rainfall increases the threat of flood which leads to loss of fisheries from ponds.

Generally, the projected impact of climate change on agriculture and capture fisheries is expected to lower the availability and increase the cost of the inputs, such as fish seed and feed ingredients needed

for aquaculture production. The climate change effects on aquaculture may vary depending on geographical areas, economy, climatic zones, production systems, and cultured species.

Climate change majorly affects the production of aquaculture. Despite the reduction in the production of aquaculture, the global demand is still rising. These effects on aquaculture are expected to be both positive and negative, although the negative outweighs the positive ones. To meet the global demand for aquatic products the aquaculture producers must adapt to necessary changes. Producers must invest in technological advancements. Many farmers have less land to cultivate aquaculture so much public or private land can be given to them to counter the demands.

Enlargement of the Gulf in the Terms of Access to Healthy Food

By Abhay Soni and Pooja Ranvir (BA Hons. Geography 2021-24)

We are dependent on the natural world for every breath of air we inhale and every bite of food we eat. But more than that, we are also dependent on it for our sanity and sense of proportion.

Climate change has become a profoundly genuine issue all over the world, its effects can be experienced even today. We all know that the mean temperature of our beloved planet is increasing year by year, and we humans handle this. We use fossil fuels, chlorofluorocarbons (CFCs), and even transportation, oil drilling, and even farming are also among the causes of global warming. Agriculture contributes a lot towards global warming through anthropogenic greenhouse gas emissions and due to the conversion of forests into

agricultural lands. In 2010, agriculture, forestry, and land-use changes were estimated to contribute 20-25% to the global annual emissions.

Along with global warming, we also must be familiar with how the emissions of greenhouse gases generated from burning fossil fuels are reducing the nutritional quality of our food. We need to accelerate our progress in agricultural productivity to feed the estimated 9 to 10 billion population who will inhabit the earth by 2050. Everybody around is discussing huge things like the melting of glaciers, deforestation, etc. but we are here to talk about more important but smaller things, day-to-day things, which

are going to have an enormous impact if we don't take appropriate measures starting from today. Food prices will be sky high and the main reason would be climate change.

How climate change affects food security?

- Climate change causes a significant increase in inter-annual and intra-seasonal variability of monsoon rainfall, due to this, there is a reduction in the agricultural produce, and the farmers may need to change their cropping pattern shortly. According to the World Bank estimates, based on the International Energy Agency's current policy scenario and other energy sector economic models, for global mean warming of 4°C, there will be a 10% increase in the annual mean monsoon intensity and a whopping 15% increase in the year-to-year variability of monsoon precipitation.
- Climate change also has a massive impact on freshwater availability, which in turn affects food security. At present times, many regions in the world are

suffering from water scarcity. Especially in India, a large part suffers from water scarcity. Reasons for this being: -

- Farmers in our country are largely dependent on groundwater for irrigation, thus, groundwater levels are depleting at a fast rate.
- In about 54% of India's groundwater wells, the groundwater level is declining, with more than 16% of them declining at a rate of more than a meter in one year.

The mismatch between demand and supply of water is likely to have far-reaching implications on food grain production and food security.

- In regions with high food insecurity and inequality, increased no. of droughts and floods will affect the children more, due to their vulnerability to undernourishment. Yet the impact of climate change on food access is not limited to rural areas. Urban food security is also a critical issue as increased people from rural areas are migrating towards urban areas in

search of better living conditions, livelihood, educational facilities, etc. Thus, India's urban food security is alarming.

- Change in climatic conditions could also lead to a reduction in the nutritional quality of foods (reduced concentration of important proteins and minerals like zinc and iron), due to the elevated CO₂ levels. When plants have excessive CO₂, it increases the synthesis of carbohydrates, sugar, and starch and thus, there is a decrease in the concentrations of proteins and critical nutrients.

- In upcoming decades, maximum food will be: -

- Less nutritious
- Expensive
- Less healthy

Because we'll not have enough water and have an unpredictable climate which will directly affect the food production and its pattern.

- Few crops will be protected in agro-walls.

- Eating patterns will be changed completely and pills will become the supplement of food.

- Lack of attention to livestock, fisheries, and the nuisance of pests, diseases, and interaction also affects food security directly. More attention to these components is needed. Pest and disease management have also played a significant role in increasing the production in the last few decades. Yet pests and diseases reduce the global harvest by 10-16% and are particularly problematic in developing countries.

The Way Ahead

As we have discussed, food security is the need of the hour, let us discuss what steps can be taken to curb this menace.

- We should adopt sustainable agricultural practices, which will not include the needs of future generations.

- Farm practices need to be reoriented to supply better resilience to climate change.

- Government needs to invest more in climate-resistant crop varieties.
- Policies should be made on improvising food productivity and developing safety nets to cope with the risk of climate change.
- Water should be used appropriately.
- Innovative technologies should be developed to meet the scarcity of water by the treatment of wastewater.
- The technique of 3 Rs of conservation i.e., reduce, reuse and recycle should also be applied in the case of water by all of us in our daily lives.
- Holistic management and planned grazing should be given huge attention as the climatologists and scientists have said that there is only one choice left for us, that is to use livestock to mimic nature. There is no other alternative left to humankind. When a large group of livestock mimics nature, their dung, urine,

etc. make the soil ready to absorb and hold the rain, store carbon, and break down methane. And many biologists and ecologists say that holistic management can address all the natural, social, environmental, and economic complexity.

"Innovations that are guided by small-hold farmers adapted to the local circumstances, and sustainable development is necessary to ensure food security in the future", as once remarked by the great philanthropist and co-founder of Microsoft Inc., Bill Gates.

The Social and Political Implications of the Looming Food Crisis

By Ritika and Ayush Yadav (BA Hons. Geography 2021-24)

Food security can be defined as "access by all to sufficient food for an active, healthy life". The worst food crisis since 1974 broke out in 2007-08. Higher world market prices of food commodities (especially wheat, rice, soya, and maize) sparked an unprecedented increase in the number of hungry people. Despite moderately lower prices since the summer of 2008, the number of hungry people continued to rise in 2009. This food crisis has placed the fight against hunger on the international agenda. Since March 2008 governments, UN agencies and many social movements have adopted positions on the causes of the crisis and the means to address it.

The cause of sudden famines is extremely complicated, but evidence suggests a correlation

between famine and nondemocratic political systems. In democratic societies, there is more accountability and powerful interest groups (which lessens the chance for famine). This explains why many democratic countries, even after experiencing successive periods of poor harvests, rarely have experienced famines

Food security and political stability are often linked, although the relationship is complicated and not necessarily direct or causal. However, evidence suggests that food security can be upset by a lack of political or social stability. Similarly, the lack of food security resulting from a sudden jolt (i.e., international embargo, poor climate) can lead to political instability. "Food riots", when they occur, are often

instigated by urban residents; poorer rural residents rarely have a political voice.

In early 2011, the world saw an unprecedented wave of political uprisings in the Middle East known as the Arab Spring, protesters marched from Tunisia to Egypt to Yemen demanding the toppling of their regimes along with freedom, equality, and bread.

Some were successful in taking down their dictators to, later, prove democratic states with free elections for the first time in decades. Other's countries or most of them plunged into an all-out civil war that still plagues the area to this day.

The obvious reasons that ignited the uprisings across the Middle East include prominent levels of corruption, police brutality, no political freedoms, low levels of income along with high-income inequality, prominent levels of youth unemployment, and the last and least authoritarian regimes.

However, there was one factor unnoticed that had a global impact but affected the Middle East the most. Food Prices, more

specifically the rising price of grain,

One of the driving forces behind the Arab Spring, some contend, is the inflated cost of food. A combination of shrinking farmlands, weather, and poor water allocation is helping contribute to higher prices and, in turn, anti-government sentiment, according to analysts.

People in Arab countries have always relied on bread as a low-cost source of sustenance. In Yemen alone there are more than twenty distinct kinds of bread, each made and baked differently. In Egypt, bread is known as meaning "life". It is the inseparable companion of all dishes, even some desserts. The Fertile Crescent, stretching from the Egyptian Nile to the mouth of the Tigris and Euphrates, is where agriculture began, where wheat, lentils, chickpeas, sheep and goats, and olives were first cultivated. Today, that same region is the largest importer of food in the world.

When grain prices spiked in 2007-2008, Egypt's bread prices

rose 37%. With unemployment rising as well, more people depended on subsidized bread – but the government did not make any more

available. Egypt's annual food price inflation continued and had hit 18.9% before the fall of President Mubarak the first protests of the Arab Spring in Tunisia in December 2010 were quickly dismissed as another bout of bread riots. Arab regimes responded by adjusting food prices and offering more subsidies. Increasing the subsidy slightly relieves the popular pressure but also increases the profit margins for importers and manufacturers. But this time around, truckloads of flour did not do the trick

They have tasted the bread of liberty and we want more of it.

Emerging Solutions

By Dhuv Chandra (BA Hons. Geography 2021-24)
and Harshit Choubey (BA Hons. Geography 2020-23)

With the global population to reach a staggering figure of 9.8 billion by 2050 requiring about a 50 percent increase in the production of food. There is no new landmass available to continue the production and consumption of food at the current rate. Indeed, the extra landmass needed to meet this production level is estimated to be an area twice that of India. Food security is by far the most critical BIG problem of this century. Problems of climate change and water shortage are critically important as well as they directly affect issues of food security. Fortunately, both developed and developing countries now recognize the multifarious issues affecting food security. There is no multidimensional, multiband trans-disciplinary problem that matches the complexity of food security issues.

Technology

More technological innovation is needed in agriculture to help combat climate change and ensure the sustainability of world food production. The introduction of technology and innovation is reducing the impact of agriculture on the environment already, but more needs to be done, Science writer Rameez Naam said, noting that yield per acre for corn and other crops has nearly tripled over the last 70 years. "It's happening with every crop. And that means we are sparing land. Because worldwide, the land uses to feed each person has dropped by about half since the 1960s. We are doing more with less or the same."

World food production needs to increase by 60 to 80 percent by 2050 to feed a population that is expected to increase from 7 billion

to almost 10 billion during that time. Naam, a professional future technologist, said fresh ideas are needed to ensure future food security and a healthy planet. "Our planet is finite, but our ability to innovate is infinite," he said. To increase self-production of food and enhance its food security, Singapore has employed the use of technologies such as vertical farming and aquaponics in urban farming, nutrient recovery from food waste, biodegradable food packaging from durian rinds, natural preservatives, insect farming, microalgae, and cultivated meat as alternative protein sources. These technologies work around Singapore's land and natural resource constraints, which many countries around the world can adopt.

Adaptation

Adaptation to climate change can constitute a range of interventions across all levels from individuals to communities to regional and national levels. As seen by Bier Baum et al. Adaptation is a sequence of modifications to actual or

expected climate and the impacts of the modification. Adaptation is aimed at mitigating or preventing harm or manipulating beneficial possibilities within human systems.

This requires intentional efforts in the human-environmental system to adapt behavioral patterns, lifestyles, and beliefs that can lower the risk to human lives and livelihoods, while mitigation involves coordinated actions to reduce long-term emissions of greenhouse gases. Incentives are needed to encourage producers, agribusinesses, and managers of biodiversity to follow good practices to mitigate climate change.

Change in diets

Changing what we eat can significantly help reach climate targets without requiring innovation. While we cannot expect everyone to adopt a vegetarian lifestyle, broadly transitioning to more plant-based diets would meaningfully reduce emissions while saving important resources like water and energy.

There are some simple things people can consider at their next meal:

making them green and sustainable.

- Eat food that is grown using inputs that have a low climate impact. When synthetic nitrogen-based fertilizers are used to grow crops, this results in N₂O emissions – so consider eating food that is grown organically without the application of synthetic fertilizers.
- Eat fruits and vegetables that are in season and grown locally.

Technological change on a massive scale will be needed over the coming decades to achieve the international goal of stabilizing atmospheric levels of greenhouse gases (GHGs) at levels that avoid dangerous impacts. Reimagining food systems requires looking at food systems through the prism of climate change adaptation and mitigation, which must also entail making them resilient to climate change and pandemics while

The OPED

Environmental Impacts of the Russia-Ukraine Conflict

By Bipashana Sharma (BA Hons. Geography 2020-23)

On 22nd February 2022, Vladimir Putin declared two separatist Ukrainian regions: Donetsk and Luhansk as independent after years of conflict. The 1,50,000 troops that are lined along the Ukrainian border could result in the greatest war that Europe has seen in the past couple of decades. It could lead to thousands of civilian deaths, potential refugee crisis and global economic downfall and, this could also create irreversible damage to the regional as well as the global environment.

Ukraine encompasses 6% of the European Landmass but 35% of its biodiversity. There are over 70,000 species of rare and

endemic flora and fauna. It is crossed by large rivers like the Dnipro, Dniester, Pivdenny Buh and Danube whose produce is an essential contributor to the food security of the country. About 16% of the land is also covered by forests since the sale of timber is one of the main economic activities of the country. As the tanks, rocket launchers and ballistic missile systems begin operating, wetlands, 33 of which have a status of international importance like the Eastern Syvash Wetlands, for instance, are going to get damaged first. Explosions from the artillery will also increase the risk of forest fires which have already burnt

20,000 hectares of the Luhansk region in 2020.

Since the annexation of Crimea, Donetsk coal basin or Donbas has faced significant damages. It contains active and inactive landmines which are pumped regularly so that the groundwater does not flood them. Amidst the strike, if the pumping stops, the flood water could dissolve mercury, arsenic and lead contaminating the groundwater permanently.

Ukraine's Ministry of Ecology and Natural Resources had identified 35 sites where the pumping had stopped after 2014. Some of the sites were originally mined via nuclear detonations and the floodwater could potentially carry debris with radiation to different regions. While attacking, if the forces move across the Ukraine-Belarus border, it could disperse radioactive particles from the soil at Chernobyl which would become a point of no return. If one of the fifteen

Ukrainian nuclear reactors are struck during the war, the radiation could reach thousands of miles, even in some parts of Russia itself.

The impacts of the Chernobyl disaster of 1986 can be observed in Ukraine even now. Previously, the war had damaged the waste removal and sewage treatment infrastructure, some of which started flowing into the Donetsk River surging *faecal coliform* infections.

Any damage to infrastructure, begins a series of events like a domino effect. This will spread infections in addition to impacting the food security of the country. In addition to all of these, the weapons and armor used during a conflict will also shoot up the carbon footprint of a region, locking in more greenhouse gases into the atmosphere.

This puts the country and the globe as a whole at a higher risk of

climate change related disasters. Moreover, wars take a toll on economic activities, for example, a forest fire will stop the sale of timber and collection of all produce from there; it also locks borders which puts a grinding halt to all kinds of trade.

A potential refugee crisis also puts the surrounding countries under threat who want to protect their own citizens. While the humanitarian impact of war is devastating enough, the ecological impact will affect people for decades to come.

Rejuvenating Nature

By Pallavi Panjiyar (BA Hons. Geography 2019-21)

Rejuvenating nature means making nature youthful again.

Everytime when we come across terms like nature, environmental, ecosystem we hear lots of unpleasant news from across the world whether it's Australian Bushfire of 2020, Amazon forest fire of 2019, rise in earth's temperature, extinction of birds and animals, increase in sea level or recently occurred Mizoram forest fire(April 2021). In the pile of destructive news regarding nature, still there is hope, hope of rejuvenation we can revive nature by taking simple steps. The article is consistent of few among many true stories from different parts of the world where individuals, group of individuals or an entire community came together to make nature lively again. Because they find the need for it.

Restoring forest in a city

First story is about the restoration of the Aravalli ranges. Aravalli ranges once stretched from Delhi to Gujarat, but were destroyed in the name of urbanization and mining. With a collective initiative of people Aravalli Biodiversity Park in Delhi NCR came into existence which is now the lungs of Delhi. The Park was restored in the time span of 10 years. Now 8 kinds of amphibians are living in the park because the water stored in the mining pits was very clean. More than 200 varieties of birds are surviving here. The trees planted in the area are natives of the region like Salai, Amaltas, Babool etc. The soil present in the area actually complements the survival of these trees. The

biodiversity park is an excellent example, that restoration is possible. The park is not only providing oxygen but is also absorbing pollution, recharging groundwater table and promoting rainfall.

Plates from Waste

Second story is from Thailand where a young entrepreneur named Jaruan Khammuang is running a factory where paddy straws are turned into biodegradable plates and packages. When paddy straws are left in the field it releases methane which produces 28 times more heat than carbon dioxide. In order to get rid of them farmers usually used to burn them which causes emission of carbon dioxide and minute particulate matter which is harmful not only for the environment but also for humans. But after this experimental entrepreneur farmers are now generating

income from waste and providing an alternative to plastic.

A private sanctuary

Next story is about a 55 acre private sanctuary owned by a couple named Anil and Pamela Malhotra. The sanctuary is present in the forest of South India. The land was once used to be an agricultural fellow land but now it is turned into a forest where 200 endangered species are living. They named the sanctuary 'Save Animal Initiative'.

Conclusion and suggestion

We have many such true stories around us. As Rabindranath Tagore said we are the citizens of earth first it is our duty to promote and restore nature. Think if Afroz Shah would have not taken the responsibility of cleaning Juhu beach or the environmentalists of Uttarakhand who would have not taken the initiative to save forest. The

younger generation would have been able to enjoy these resources.

We are not suppose to leave a whole set of filthy basic necessities for the upcoming generation filthy air, filthy food, filthy soil, filthy oceans and atmosphere full of filthy things. Everyone who is understanding the value of nature and spending a penny extra to switch biodegradable stuffs over non-biodegradable stuffs, organic over inorganic food, public transport instead of personal, creating less waste, using resources rationally, not wasting

food, using reusable or sanitary napkins made of banana fiber are actually playing their parts to save the nature.

We don't need to leave worldly things or lots of property for our next generation, rather we need to pass on a healthy biosphere where they can open the windows of their house without dreading of pollution, kids can play without carrying oxygen cylinders. Earth can breathe again and it can become a better place for living than it is now. And this is only possible by stepping ahead to rejuvenate nature.

People and Environment

By Anamika Yadav (BA Hons. Geography 2021-24)

People and Environment both are closely related terms. People are nothing without the environment and the environment is also incomplete without people. In other words, both are complementary to each other.

The natural environment commonly referred to as simply as the environment is a term that encompasses all living and nonliving things occurring naturally on earth or for some reason thereof. In simple words, the environment is the place, people, things, and nature that surrounds any living organisms. It is our basic life-supporting system. The air we breathe, the water we consume, the food we eat, and the land where we live, everything is provided to us by the environment. It is a combination of natural and human-made phenomena. On the

other hand, a person lives in the environment and uses the resources dispensed by the environment for his life support, and the collective form of person is called a people.

Our environment has given us many opportunities and resources from eras to live and to develop on earth. With the help of these resources, life on earth has covered an exceptionally long journey (beginning from a cell to bacteria, bacteria to paramecium to hydra, hydra to distinct species of fishes, fishes to amphibians, amphibians to reptiles, to reptile mammals, mammals to the monkey, monkey to apes, and finally apes to us) till now.

Humans always depend on environmental resources. But now - a - days, humans have come up with harming their environment for their sake, ease, and comfort. Humans are destroying the forest

for wood and place for their shelter. Overusing resources such as water, coal, petroleum, and wood cause warming which is a major problem for the environment and themselves too. Global warming, the sudden and disastrous change in climate and the environment can be seen. The polar ice caps are melting due to global warming which provokes the sudden rise in water level of the ocean and greenhouse gases are defacing the ozone layer, which is allowing the UV rays and other deleterious rays from the sun to enter in earth's atmosphere which increases the rate of skin cancer, eye cataracts, and genetic and immune system damage.

Air, water, and another kind of pollution is also a major problem created by humans. In metro cities like *Delhi, Bangalore, Kolkata*, and other cities of the world, the Quality of air is very bad to respire, and the water is very unhealthy and saline to guzzle. It is affecting human health in major ways. It is engendering many diseases like *Asthma, lung cancer, threat to pregnant women* and newborns, *Cholera, Typhoid Dysentery*, etc.

We think that we are developing day-by-day but the development which causes harm to its environment is not admirable. We must develop in such a way that our environment does not harm our environment because we are nothing without this holy creation of God 'Our Environment and Nature'.

We must use our scientific development in such a way that it also helps in developing our environment. According to Barry Commoner, "*the proper use of science is not to conquer nature but to live in it*". Our nature has enough resources for us. According to Mahatma Gandhi, "Nature is sufficient for man's need not for man's greed. We must try to reuse things as much as possible. In the words of Mother Teresa, "I feel angry when I see people throwing away the things we could use." And lastly, we must support plantations because time spent among trees is time never wasted. We must protect our environment and support *sustainable* development because' It is the duty and responsibility of us humans to protect our environment.

Thus, it is correctly quoted, *'The Earth does not belong to us: we belong to the Earth'* – *Marilee Matlin*.

"Climate change does not respect borders, it does not respect who you are – rich and poor, small and big. Therefore, this is what we call global challenges, which require global solidarity" – *Ban Ki-moon*.

Sustainable Development

By Utkarsh Mishra (BA Hons. Geography 2021-24)

'There is enough for everyone's need,

But not for anyone's greed'

Sustainable development can be defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

It is the practice of supporting productivity by replacing used resources with resources of equal or greater value without degrading or endangering natural biotic systems.

There is great emphasis on the present generation to regenerate, support, and improve planetary resources for use by future generations.

Sustainable development has its roots in ideas about sustainable forest management, which were developed in Europe during the 17th and 18th centuries. In response to growing awareness of the depletion of timber in England, John Evelyn argued that "sowing and planting of trees had to be regarded as a national duty of every

landowner", to stop the destructive over-exploitation of natural resources.

In 1980, the International Union for Conservation published a world conservation strategy that included one of the first references to sustainable development as a global priority and introduced the term "sustainable development", while the modern concept of sustainable development is derived mostly from the report *Our Common Future*, also called *Brandatland Report* released by World Commission on Environment and Development in 1987.

DIMENSIONS

Sustainable development can be thought of in terms of three spheres or dimensions: - "the environment, the economy, and society". The three spheres framework has also been phrased as "ecology, economy, and, equity". This has been expanded by some authors to include a fourth pillar of culture, institutions, or governance,

or reconfigured as four domains of the social- ecology, economics, politics, and culture.

1. **Economic Growth:** For creating an economy that is sustainable and growing in the right direction.
2. **Protecting the Environment:** This aim focuses on the contribution of humans towards protecting and enhancing the natural environment, by minimizing pollution and waste, also working towards reducing the global carbon footprint.
3. **Social Inclusion:** This goal focuses on supplying the facility of housing for future generations and aiding in creating healthy, strong, and vibrant global communities.

WHY SUSTAINABLE DEVELOPMENT?

Our ancestors have left a lot of resources for us. They used their resources sensibly and not for their greed. But we are exploiting limited resources. Instead of using it for our needs, we are exploiting it for our greed. Development means growth in different sectors. It is a positive change that leads to a better world and easier life. Development is different for different people. It can happen that a thing that is development for one person might not be the development

for another. There are chances that the development of one can be another's regression. Development is not always materialistic in nature.

Unsustainable development is one in which we forget our responsibility towards the environment. In unsustainable development, we degrade the available resources by not thinking about the needs of future generations. Unsystematic planning can lead to damage to natural as well as human-made resources. It can cause extreme degradation of the environment as well as the living organism.

SOME CAUSES OF UNSUSTAINABLE DEVELOPMENT

We as a human society do a lot of unsustainable things. Our activities can cause huge damage to the environment. By our irresponsible activities, we have ruined the natural balance of the environment. Humans have built so many buildings, roads, and dams for a luxurious lifestyle and our comfort. While building these apartments, we neglected the needs of animals. We gave our best to destroy their habitats. Not only animals, but we have also done great harm to the flora of our environment. There are a few root causes that have led to unsustainable

development. There is no order of organizing the most harmful one. These all causes are equally responsible for the degradation of the environment.

MINING FOR MINERALS

The lithosphere is the outermost layer of the earth's surface. We extract a lot of things from this such as oil and natural gas. It would be okay if we would have used it for our basic needs. But we focused more on extracting much more than what we needed. We extract heavy metals, things that are rare in the biosphere and that we find in less quantity. This over-extraction has reduced the presence of resources in the environment.

- **RELEASE OF SUBSTANCES AND HARMFUL GASES IN NATURE**

Due to the increase of industrialization, we create a lot of chemical compounds. These take a lot of years to break down in the environment. But we also create substances that already exist in nature like- carbon-dioxide. We create it in such a quantity that it accumulates and becomes problematic.

- **CHOPPING TREES**

By chopping trees at a faster rate than they can grow, we are ruining the environment's ability to heal itself. For

making houses, buildings, roads, and dams, we cut a lot of trees in a year. This also affects the natural cycle and leads to global warming. Global warming means the increase of greenhouse gases in the environment.

- **POLLUTION**

Burning polythene, high usage of petrol and vehicles, practicing slash and burn agriculture, etc by such a large population contribute hugely to deteriorating the environment.

- **Increase in population**

With the increase in population, the demand for people also increases. To meet these demands people extract resources from the environment, but the resources are limited. Thus, the resources decrease and increase starvation.

SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations general assembly in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.

The 17 SDGs are integrated—they recognize that action in one area will affect outcomes in others— and that development must balance social, economic, and environmental sustainability.

Countries have committed to prioritizing progress for those who're furthest behind. The SDGs are designed to end poverty, hunger, AIDS, and discrimination against women and girls.

The creativity, technology, and financial resources from all of society are necessary to achieve the SDGs in every context.

1. NO POVERTY
2. ZERO HUNGER
3. GOOD HEALTH AND WELL-BEING
4. QUALITY EDUCATION
5. GENDER EQUALITY
6. CLEAN WATER AND SANITATION
7. AFFORDABLE AND CLEAN ENERGY
8. DECENT WORK AND ECONOMIC GROWTH
9. INDUSTRY, INNOVATION, AND

INFRASTRUCTURE

10. REDUCED INEQUALITIES
11. SUSTAINABLE CITIES AND COMMUNITIES
12. RESPONSIBLE CONSUMPTION AND PRODUCTION
13. CLIMATE ACTION
14. LIFE BELOW WATER
15. LIFE ON LAND
16. PEACE, JUSTICE, AND STRONG INSTITUTIONS

SDG INDEX

The SDG index is an assessment of each country's overall performance on the 17 SDGs, giving equal weight to each goal. The score signifies a country's position between 0 to 100.

Finland topped the SDG index of 2021 with a score of 85.9, and the Central African Republic ranked last (165) with a score of 38.3, while India ranked 120 with a score of 60.1. In 2020, for the first time since the adoption of SDGs in 2015, the global average SDG index has decreased due to Covid-19. The countries are making efforts to create a sustainable world but it is not

short-term labor, it requires better policies, laws, active participation, and consistency.

The Study of Social Issues Over the World

By **Mrittika Mondal (BA Hons. Geography 2021-24)**

The term "social problem" is usually taken to refer to social conditions that disrupt or damage society—crime, racism, and the like. In contrast, the sociology of social problems defines social problems differently and adopts a different analytic approach. This approach defines social problems in terms of a process, rather than a type of condition. It focuses on how and why people come to understand that few conditions ought to be verified as a social problem, that is, how they socially construct social problems. Typically, the social problems process begins with claims makers who make claims that some condition ought to be considered a problem, that this problem should be understood in particular ways, Other people respond to those claims and rework them, so that the social problem is constructed and reconstructed by the media, the general public, policymakers, the social-problems workers who implement policy, and critics that assess the policy's effectiveness. The process is complex.

A social issue or problem is an issue that has been recognized by society as a problem that is preventing society from functioning at an optimal level. Four factors have been outlined that seem to characterize a social issue or problem. These include:

1. The public must recognize the situation as a problem.
2. The situation is against the general values accepted by society.
3. A large segment of the population recognizes the problem as a valid concern.
4. The problem can be rectified or alleviated through the joint action of citizens and/or community resources.

Functionalism

Functionalists will view social problems as a societal function. This school of thought will see social issues as serving a purpose for society, and that it can lead to something positive or create a change that society needs.

Conflict Theory

Conflict theorists view all inequalities in society as a conflict between the powerful and the oppressed. With that in mind, they believe that social problems are caused by the powerful taking advantage of the weak or the rich exploiting the poor.

Symbolic Interaction

Symbolic interactionists would view social problems as issues that are created via people interacting and communicating with one another and spreading awareness of a problem.

Few recent common social problems that people are facing worldwide:

Animal Experimentation: Animal experimentation, also called animal testing, has contributed to many important scientific and medical discoveries; because animals do not get their freedom and often suffer injury, others identify certain practices as cruel while still recognizing the benefits.

Child Bullying: The definition of bullying has expanded beyond traditional notions of a bigger, stronger child picking on a smaller, weaker victim. The issue is primarily considered in contexts involving school-aged children and adolescents.

Depression: Depression is a mood disorder that causes persistent sadness, hopelessness, and decreased energy. It can be severe enough to interfere with work, school, and other daily activities.

Global warming: The term global warming; scientists began studying the effect of greenhouse gases on Earth's climate.

Women's Rights: Movements for the equal rights of women have been shaped in response to a system of patriarchal social Norms and laws that, according to historians and social scientists, formed the basis of cultural, political, and economic life.

Fish Harvesting and its Impact on Marine Life

By Ritika (BA Hons. Geography 2021-24)

Fish harvesting encompasses various processes of catching aquatic organisms. By Using various fishing methods , depending on the types of fisheries, and can range from a simple process as gathering of aquatic organisms by hand picking to highly sophisticated fish harvesting systems, viz.

Meaning of fish harvest

The number or weight of fish caught and retained from a given area over a given period of time.

Before starting the impact of fish harvest on marine life has to know why fish are important to marine ecosystems?

Fish play an important role in nutrient cycles because they store a large proportion of ecosystem nutrients in their tissues, transport nutrients farther than other aquatic animals and excrete nutrients in dissolved forms that are readily available to primary producers

Now the question arises how the fish harvest affects the ocean or the whole environment? So the answer will be: fish farming uses a lot of chemicals in the production process. The combination of fertilizers, chemicals added fishmeal and water, antibiotics, and pesticides can make the water runoff from fish farms toxic. This water will find its way into local waterways and eventually back into the ocean.

What are the benefits of fish farming?

Wherever you stand on that debate, one of the big advantages of fish farming is that it's a fine entrepreneurial opportunity.

What are the problems and challenges of fish and aquatic resources?

Some of the environmental issues facing the fisheries sector are resource depletion, overfishing, destructive fishing, siltation and pollution. Moreover, there are socio economic issues of poverty in the coastal areas and policy issues including the need for strong fisheries regulation and enforcement.

What are some problems with marine fisheries management?

Here are the five most detrimental fishing practices affecting the underwater world today, and some thoughts on what we can do to stop it.

- Overfishing. This term refers to the practice of catching fish faster than they are able to reproduce.
- Bycatch.

- Damage to the ocean floor.
- Illegal Fishing.

What are the Effects of Fish Farming on the Marine Environment?

The most common negative environmental impacts that have been associated with aquaculture include: waters eutrophication, water quality, alteration or destruction of natural habitats; introduction and transmission of aquatic animal diseases .

How to Prevent the Impacts and to Improve the Quality of the Environment?

Aquaculture needs an enabling policy environment in order to grow in a sustainable manner and to be integrated into the coastal zone. Moreover the interactions between aquaculture and the larger system in which it occurs, in particular, the influence of the surrounding natural and social environment on aquaculture, must be taken into consideration.

More than one-third of all sharks, rays, and chimaeras (fish related to sharks and rays) are now at risk of extinction because of overfishing, according to a

new study re-assessing their IUCN Red List of Threatened Species extinction risk status. Governments and regional fisheries bodies must act now to stop overfishing and prevent a global extinction crisis.

The alarm bells could not be ringing louder for sharks and rays,” said Dr. Andy Cornish, leader of WWF’s global shark and ray conservation program. “We are on the cusp of starting to lose this ancient group of creatures, species by species right here, right now.

Starting now, we need far greater action by governments to limit fishing and bring these functionally important animals back from the brink.”

For those species that can still sustain fishing, well-enforced science-based catch limits can prevent declines and even lead to recoveries. Where catch limits are not feasible, protecting critical habitats for sharks and rays and reducing accidental death or entanglement in fishing gear can curb overfishing.

Urban Heat Island: Delhi NCR

By Shuhana Dutta Gupta (BA Hons. Geography 20210-24)

Urban Heat Island is considered as one of the major problems in the 21st Century posed to Human beings as a result of Urbanization and Industrialization. An urban heat island is where the temperature in a densely populated city is as much as 2 degrees higher than in sub-urban or rural areas. This happens because of the materials used for pavements, roads and roofs, such as concrete, asphalt (tar) and bricks, which are opaque, do not transmit light, but have higher heat capacity and thermal conductivity than rural areas, which have more open space, trees and grass. The large amount of heat generated from urban structures, they consume and reradiate the solar radiations from the heat sources are the

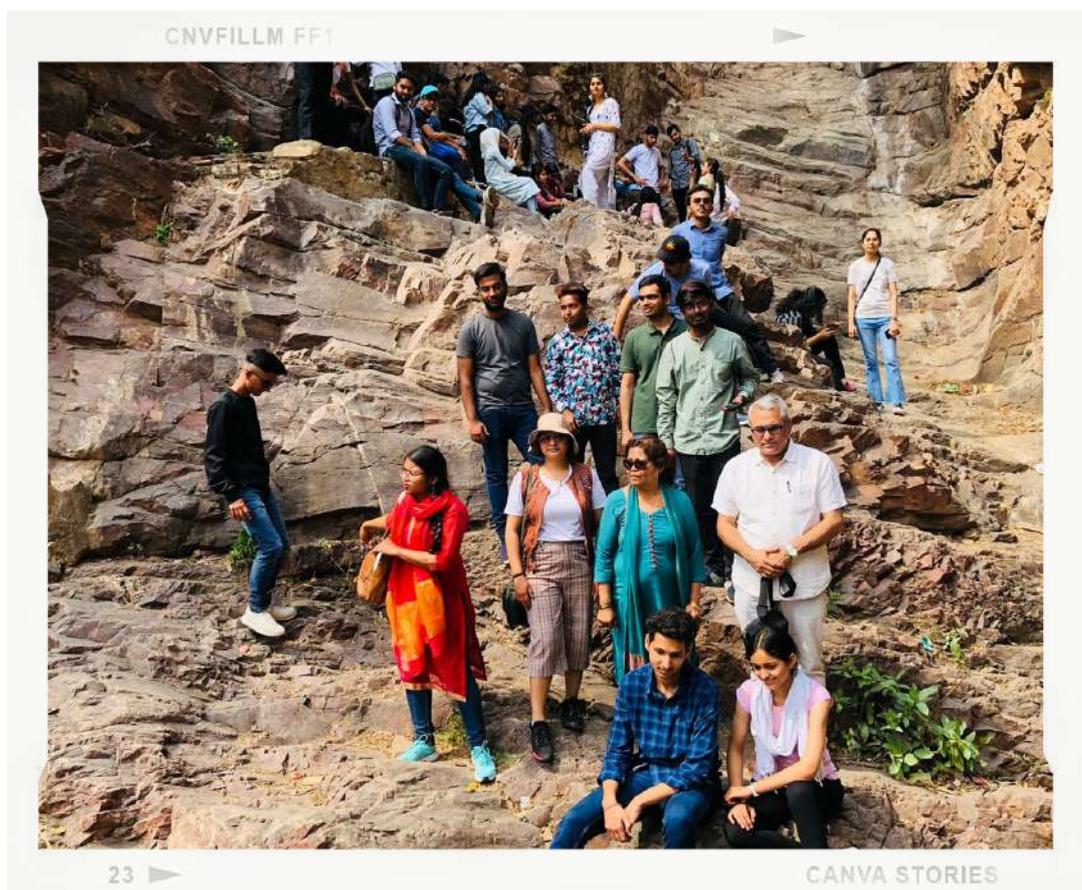
main cause. There is no doubt that industrialization and urbanisation has improved the comfort in our lives but side by side it has also affected the climate. Due to Urban Heat Islands, cities tend to experience heat waves which affect human and animal health, leading to heat cramps, sleep deprivation and increased mortality rates. UHIs also impact nearby water bodies, as warmer water is transferred from the city to drains in sewers, and released into nearby lakes and creeks, thus impairing their water quality.

Delhi's climate has also witnessed extreme trends over the past decade. Delhi, capital city of India located in the northern part of the country (with semi-arid climatic

conditions) has experienced a rapid urbanisation, especially in the past two decades i.e. 1990–2010. On average Delhi's near-surface temperature has also increased by 1.02 degrees Celsius due to an increase in the urban-land use from 1970 to 2010s. In July 2020, Delhi's temperature broke a record of 90 years and touched 43.6°C. February and September 2020 were the warmest within respective month calendars in several decades.

To limit the Urban Heat Island phenomena, the government can order to paint the rooftops of every building white or using light-coloured concrete as it will reduce the heat. Making the road surface greyish as it absorbs less heat than black roads and reflects more sunlight. Plant as many trees and plants as possible.

Highlights 2021-22



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CANVA STORIES

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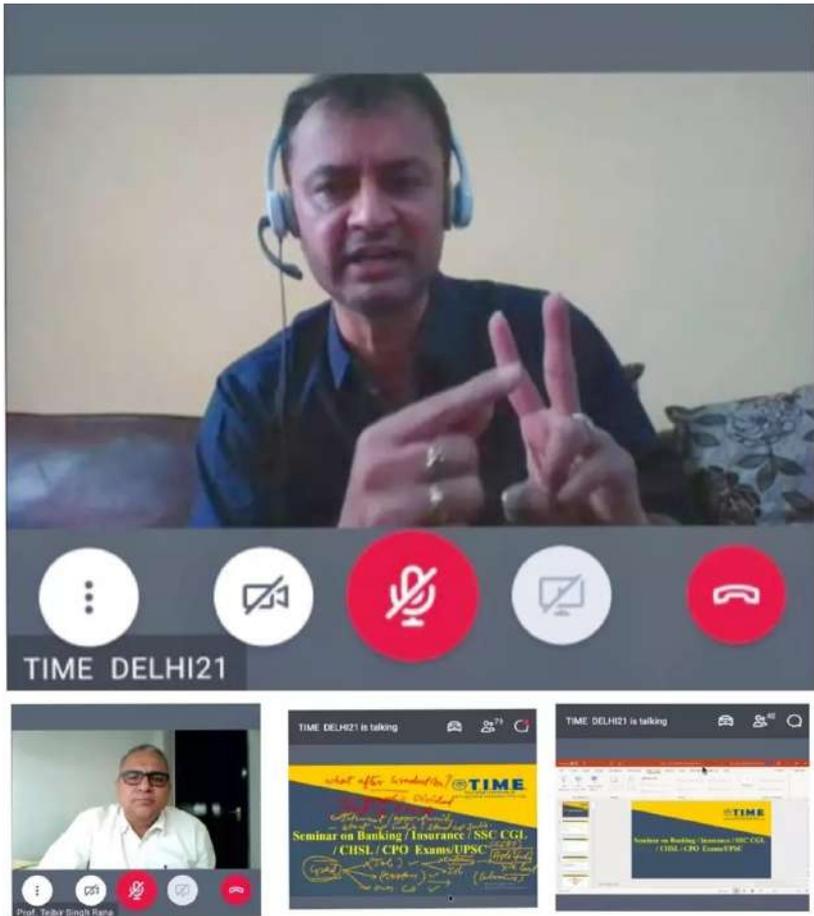


Photo Block

This section consists the beauty of nature captured by the students of our department to enable us to embrace and epitomise mother nature and stand true to our commitment to protect our surroundings so that our forthcoming generations could experience the same beauty as we do.

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