4th Workshop

Awareness on Climate Change Responsible Education in Schools

16th November 2016 at India International Centre

ACCRES - 2016

PROCEEDINGS

Environment and Earth Care (EEC) Lecture Series 2016
Guest Lecture on

"Innovative Solutions to Tackle the Monumental Challenges of Climate Change – Sharing Research & Innovation Experience at Delhi College of Engineering/ Delhi Technological University, Rajiv Gandhi Proudyogiki Vishwavidyalaya and Amity University, Gurgaon"

Organized by:

Climate Change Research Institute
New Delhi

Venue:

India International Center
New Delhi

Awareness on Climate Change Responsible Education in Schools

Environment and Earth Care Lecture Series 2016
Guest Lecture On

"Innovative Solutions to Tackle the Monumental Challenges of Climate Change – Sharing Research & Innovation Experience at Delhi College of Engineering/Delhi Technological University, Rajiv Gandhi Proudyogiki Vishwavidyalaya and Amity University, Gurgaon"

Organized by

Climate Change Research Institute

On
November 16, 2016

India International Center
New Delhi

Awareness on Climate Change Responsible Education in Schools

Contents

Awareness on Climate Change Responsible Education in Schools

PREFACE

The Climate Change Research Institute (CCRI) organized the 'Awareness on Climate Change Responsible Education in Schools' Workshop at the India International Centre, New Delhi on 16th November 2016. On this day we also celebrated Children's Day. The students from class VIII to X from different Schools attended in large number. Prof. P.B. Sharma, Vice-Chancellor, Amity University, Gurgaon, delivered the third 'Environment and Earth Care' (EEC) Series Lecture on 'Innovative Solutions to Tackle the Monumental Challenges of Climate Change – Sharing Research & Innovation Experience at Delhi College of Engineering/Delhi Technological University, Rajiv Gandhi Proudyogiki Vishwavidyalaya and Amity University, Gurgaon'. Prof. D. P. Agrawal, Former Chairman, UPSC and Chairman, GC, CCRI presided over.

The procceding are presented here giving the summary highlights of the addresses and the Guest Lecture. On this a book 'The Story of Helium' published by National Book Trust (NBT) was released. The book is authored by Dr. (Mrs.) Malti Goel. She has talked about the scientific significance of Helium and its importance in human life. A copy of the book was presented to honored guests, Sh. V.S. Verma, Ex-Member CERC, Prof. G.D. Sharma, Professor, SEED, Prof. D.P. Agrawal, Ex-Chairman, UPSC and Prof. P.B. Sharma Chief Guest. Four copies of books were shared with each participating school.

On behalf of CCRI, I thank our honored guests, distinguished panelists and participants.

Dr. (Mrs.) Malti Goel
Climate Change Research Institute

WELCOME ADDRESS AND INTRODUCTION TO CLIMATE CHANGE

Dr. (Mrs.) Malti Goel, President & CEO, CCRI

Dr. (Mrs.) Malti Goel, CEO, Climate Change Research Institute extended warm welcome to all the delegates and invitees on the occasion of Children Day celebration at the India International Centre. A Lecture in the 'Environment and Earth Care' (EEC) Lecture Series will be held by distinguished speakers. The aim of the 'EEC' lecture series is to create awareness and education about the concerns which we have today from anthropogenic climate change, environmental pollution, their toxicity, their impact on our body and their impact on the global atmosphere. Global warming is happening and because of global warming climate change is happening. So, we shall start with the quote that says "*if we concur the climate, the whole world could become stronger and nobler."*

This was said 100 years ago, that climate is so important for the human beings on the earth that they have to find ways to concur the climate. We live in heated buildings, air conditioned buildings, travel in A/c cars and this is the way to concur the climate around you. But what happened, because of that the energy consumption became too high. It started polluting the atmosphere then things started becoming from bad to worse and when energy consumption increased carbon dioxide emissions increased and other pollutants also increased because of increasing fossil fuel. It caused the global warming and global warming causes the climate change.

A brief introduction about this workshop. It is to create awareness about importance of environment among the children and youth. School children from the *Universal Public school, Navyug School, Ambience Public School and Amity International School* are participating and our hearty welcome to the teachers and students from these schools.

How weather and climate are different? We always talk today is very hot, oh today is very cold, oh it is raining, so what is that today, that is day-to-day *weather*. Then we talk of seasons, in winter seasons your uniform changes. We also have summers season and rainy season. India has Southwest monsoon season. You can figure out what is a season, what is weather and then what is a climate? Weather is day-to-day weather, it is on the spot. Agglomeration of weather of few months, say 8-10 weeks, is *Season*, Same pattern persist year to year.

How climate is different from weather and season? When seasons are repeated for few years, then we say this is the climate of that place. Why do we have seasons, because Earth is tilted on its axis. When Earth is rotating around the sun, when it is closer to sun then it is hotter, when it is far then it is cooler. So we have different seasons in the Northern hemisphere and the Southern hemisphere. Climate change can occur due to cyclic variations in the rotation of Earth around sun, causes long-

term climate change over million of years. Natural climate change occurs, when there is a volcano or other disasters. Incidence of volcano results in a number of chemical elements in the air over long distances and heights causing changes in the atmosphere. The manmade climate change caused due to global warming is the concern for 21st century. Manmade activities because of high energy consumption, because of the use of crackers, because of the crop burning, because of huge waste generation are resulting in the changes in seasons & climate.

How weather affects pollution? All of us are very much concerned about pollution in the last 15 days. Delhi has pollution which was not been explained so well, why it is taking place and how it will go away. Vehicles are one of the reason but there are others. Pollution levels for different cities vary. Delhi city is 800 limit in the last one or two week ago. Why this was happening, everybody was trying to blame Diwali festival. Diwali festival created lots of pollution, which remains in the air. Pollution level became really very high because some people said there was a burning of the crops, both are harmful; burning of the crops and Diwali crackers. But, there is a third factor, which is Meteorology, the weather, the climate affects pollution dispersion. It was noted that the temperature fell suddenly two days before Diwali and this led to high pollution. There was prediction that there is going to be high pollution. When atmosphere temperature is hot, air goes up and the pollution also goes up and slowly disperses. If temperature falls and the pollution layer remains at low levels and persists in the atmosphere. The atmospheric boundary layer plays an important role. Pollution gets trapped in the boundary layer and only when the air blows the pollution gradually disperses. China is also facing the similar problems. China has constructed a high smoke tower to control the smoke in the air. A tower could absorb almost 60,000 cubic metres of the smoke, and purify the air. This is a use of technology for controlling pollution in air.

The objective of 'Environment and Earth Care' Lecture Series is, educating about the facts of the our surroundings, creating awareness about the national policies and developments, inspiring youth to take action to tackle climate change, securing an healthy environment and well-being of the society.

Earth is an interactive system, it has a solid Lithosphere, Atmosphere that is around it, which is a gaseous part, Biosphere which is plantation and Hydrosphere, which is 70% of the Earth. It also has a crysphere because certain parts are having ice. These sphere are constantly interacting, they are not in isolation. Time scales are different, like solid Earth will respond very slowly, the atmosphere is changing every second or even micro second, in water changes are taking place in between. Interactive system becomes very complex and actually causing us to take care of the planet.

What is Earth care? It is said in a Science magazine that "*one out of six species could be threatened with exclusion from climate change, unless actions are taken to reduce global warming".* So if we care for Earth we need to act.

Global climate change due to global warming and greenhouse gas pollution in the atmosphere is governed by the international bodies. First climate agreement is Kyoto Protocol introduced in 1997, which aimed to stabilize greenhouse gas concentrations in the atmosphere. Under the protocol more advanced countries were given a target of about 5.2 % cut on average over 1990 level during 2008-2012, phase-1period. The reduction targets were not given to developing countries. The second climate protocol is Paris Agreement, introduced in 2015.

Our National target in Paris Agreement is to bring down the GHG reduction intensively by 30-35% in 2030 from 2005 level. The others are commitment to have 40% from non-fossil fuels, and add carbon sinks of 2.5-3.0 billion tones per annum by 2030. The government is taking various intense actions to move forward towards the targets.

With these introductory remarks about climate and climate change I now request our honored guest Prof. D.P. Agrawal to say a few words about the welcoming you to this programme and about the activities and what we are thinking today.

CHAIRMAN'S REMARKS

Prof. D.P. Agrawal, Ex-Chairman, UPSC, and Chairman, Governing Council, CCRI

Good Morning! dear friends and the very eminent speaker of the day, Dr. P.B. Sharma, Vice-Chancellor, Amity University at Manesar, Former Vice-Chancellor at Delhi Technical University and Former Vice-Chancellor, Rajiv Gandhi Technical University, and dear young children. My very warm welcome to all of you, the Institute aims talk to you on subject of 'Earth Care' in changing climate. Dr. Malti Goel has brought out, in a brief presentation so many crucial issues. In present times it is impossible not to be affected by the climate change. Delhi has been the worse example of what could happen, visibility is poor, eye burns, skin itches and many things. Is sustainability a responsibility of government or somebody who is working in the areas of energy and climate change? My belief is that it is responsibility for all of us. Celebrating one day as Earth Day or Environment Day we may not survive for long.

The Climate Change Research Institute brings out lectures on topics on what is happening in the world, what are the challenges before us in various forms. In times it appears that actions to mitigate climate change will cut down some of our freedom, but please understand that for survival if we sacrifice something today, possibly our tomorrow is brighter. Some of the schools are doing very wonderful job about environment we can see number of activities there. Your contribution is very significant in last 2-3 years tremendous work has been done by school children in terms of whether it was managing the transport, waste curtailment etc. You are attending the awareness workshop so that even when schools are closed your mind is still working to locate this problem. We have seen the magnitude of the problem and likely solutions. Climate Change Research Institute is to make youth aware about the control measures in tackling climate change issues. We have lectures for schools 3-4 times in a year. It brings out a compendium which is published called climate *SAR*, is available on the website, which highlights some of the crucial issues. I suggest you to try to locate the website of the institute you would come across this publication and this would be very good knowledge for you. I would request, please make it one of your habits, along with twitter friends and facebook friends to locate the website. The Institute has very eminent people and some of them are here today, who are specialist in their own respected areas, whether solar energy which is currently being pursued or power as a whole. Many things appeared so simple but we actually start working on them it is difficult. There are experts in the institute to articulate these issues, they are also part of global forums, members in present and we currently having dialogue to locate a much more catastrophe changes because of climate change.

Our guest speaker, will mesmerize you into some of the areas which he has himself adapted. You all know that most of you want to go for engineering. Until now

in the engineering curriculum, there was a much lesser scope for climate awareness, climate change and climate control. This is becoming a part, as University Grants Commission has made it compulsory requirement of a course when you graduate and secondly about we are making an attempt that why you are at school lot of things are talked to you. We are looking up in future for more field work, which could be any thing and it is up to you, to plan what are the possibilities. I wish you all very best.

Thank you very much.

CHIEF GUEST ADDRESS

Prof. P.B. Sharma, Vice-Chancellor, Amity University, Gurgaon

My very dear friend distinguish Professor of IIT-Delhi and Former, Chairman of UPSC, Prof. D.P. Agrawal, Chairman of Climate Change Research Institute, very distinguish scientist of our country Dr. (Mrs) Malti Goel, who have been with Department of Science and Technology, Government of India, for several decades and I have a privilege of interacting with her on several issues, connected with the climate change management not only when I was at Rajiv Gandhi Technological Institute as Vice-Chancellor, and during the time when I was Vice-Chancellor of Delhi Technological University, but even before when I was in IIT-Delhi. I welcome Mr. V.S. Verma, who has been with the Central Electricity Authority, pioneering the cause of energy conservation and also Member, Central Electricity Regularity Commission. If you want to really tackle the monumental challenge of climate change you must submit to the cause of energy consumption which means switch off something which you don't require; which means replace your tube-lights and bulbs with LEDs, because that will save the tremendous amount of consumption of energy. We have many other distinguished guests we are delighted to have Mr. Suresh Goel, eminent Architect who built up Rajiv Gandhi Technological University Campus, and what a pleasure to have the young students coming from very many schools here in Delhi and NCR region. Highly devoted and caring teachers are also present here along the students not only that ensure to students listen but to care about the mission of contributing our share for the adaptation of climate change.

Looking at our ancient history, our fore fathers during the Vedic period mastered the Science & Technology to concur the environment. Lord Hanuman could concur the environment. When I was a little child, during my childhood I could see people's capabilities to divert the heavy rain and hillstorms which were coming to destroy our crops in my village. We had the tremendous amount of affinity with the wind, 'Vayu Devta Bhyo Namaha', is how the prayer use to start because we knew that wind is very important. Then we have rain water God Varun Devta. Our life on planet earth is primarily because of plenty of Water. They said Varun Devta Bhyo Namah. They looked at the Sky and said, *Gagan Devta Bhyo Namaha*. Let the fire of the Sky not fall on our head. They said *Prithvi Devta Bhyo Namah*, to our Mother Earth. Mother Earth please give me some shadow, prepare a hat, prepare a house. Mother Earth taught us how to cultivate and do lot of agriculture. Mother Earth educated us how to sustain a happy and healthy life. In return, we look and discovered lot of herbs, lot of herbal medicines, spices, which became medicine for us and believe it or not this was an assurance for a happy and a healthy life on the planet for our ancestors for millions of years. They could live a life of 100 years happily and healthy. In my childhood I have seen how healthy life was sustained because we cared for environment, we cared for mother earth and for our ecosystem which was all around

us at that time. We cannot go back to it now we are to move forward with the agenda that call monumental problem because of our model of life need to sustain on the strength of industrial revolution. We are passing through now the second industrial revolution, we are going to test the third one, but already the bells are ringing for the fourth industrial revolution. Through these we have to find solutions to live a healthy life for one hundred years at least.

At Amity University, Gurgaon, we had a symposium on air quality on 7th of November, 2016. When air quality index were touching almost one thousand in Delhi, peaking at 990, it was only 175 at our campus. In New York it is only 15 to 24. Munich, it was 16, in Beijing it was 175 and here in Gurgaon it was 424. So in the campus it was similar to Beijing but several times higher than the London or Munich. We are maintaining green and clean environment in our campus. We are producing no carbon dioxide or very little carbon dioxide or methane. We are also not having as much dust particles as elsewhere because we are far away from the highway and we are surrounded by Aravali hills. The campus is located in the important location while Pandavas, requested five villages from Duryodhana. The challenge before us is how do we cut down emissions and bring where the air quality from 990 to 15, 20 or 16 or 24 which is being registered on New York, Munich and London. London is a highly industrial town, Munich is a highly industrial town lot of industries are there, New York is also highly industrial town and they had high pollution in the half of twentieth century but they have brought it down to 15-16. What they did in 25-30 years we have to do in 3 years and that is monumental challenge of climate change to find innovative solutions through speed leadership.

Giving examples of current practice in coal based thermal power plants he said, we have such a high quantity of ash content in coal utilized for pulverizing firing as a method for combustion. This method was developed by the Britishers for burning coal where the ash content was no more than 1-2%. This has to change.

Prof. P.B. Sharma's presentation highlights several climate change innovations made at various institutions in last 10 years, as below.

<u>AT Delhi Technological University</u>

- Long history of Biodiesel Research
- DCE Hybrid car in 2005, which will start on a battery with a small petrol engine.
- Energy from Kitchen Waste
- Solar Car for World Solar Challenge, Australia 2011
- Solar Passenger Car, September, 2012

<u>At Rajiv Gandhi Technological University Campus</u>

- Energy Farming And Bio Diesel Production

- RTGU Solar Wind Hybrid
- Biomass Gasification
- 72 kW Wind-Solar Hybrid For Campus Lighting

At Amity University, Gurgaon

- Gyroscopically Controlled Aircraft, Patent No 3221/DEL/2014, Pavleen Bali et al.
- Thermo Electric Squad Bike
- Autonomous Underwater Vehicle: Amity Robotic Submarine
- Production of Bio-Diesel From Jatropha Plants "Renewable Source of Energy"

He also said that Carbon Capture and Storage was an important and timely initiative taken by the Department of Science & Technology, streered by Dr. Malti Goel in 2006, heading then Inter-sectoral Science & Technology Advisory Committee. Under a DST research project a CO_2 Conversion Plant was successfully demonstrated at Rajiv Gandhi Technology Institute, Bhopal. He suggested that the process to ionize carbon dioxide should be developed so that carbon and oxygen can be separated. This will be a miraculous technology. Science of Nature gives us the capabilities by which we can perform such kind of activities and processes and solve the control critical problems of environment degradation.

He introduced many innovative designs to show that all this is possible, if you have to work diligently. An Airplane was designed and developed in partnership with the Lockhid Martin and this was the next generation drone which world would have it.

The innovative initiatives of the kind which have been taken at the Delhi Technological University, Amity and RGTU, in my opinion are required to strengthen the India's mission on Climate Change. An innovative solution like capturing carbon dioxide and converting it into hydrogen biofuels and also methane from a single plant gives high hope for resisting climate change. We need industry-academy partnership, in such an initiative.

In conclusion he said 'You should dream big and act to achieve highly efficient solar cells using new materials and new technologies, so that efficiency increases from 18 to 48%, and 48 to 98%, that's the future'.

‘The Story of Helium’ BOOK RELEASE

This was followed by book release ‘The Story of Helium’ published by National Book Trust. Giving a brief introduction, its author Dr. (Mrs.) Malti Goel said it is a popular science book which you will like reading, written in a lucid way like story telling. Helium can be found on planets and stars and moon is our nearest vast resource of isotopes Helium-3, which is a source of fusion energy.

In July 2016 NASA satellite, named as Juno after the wife of God Jupiter has landed on Jupiter and is going to give vast information about Jupiter. Jupiter is still a bigger source than moon, but it is far off. We hope, there will be something very innovative in the field of energy from these discoveries, like Prof. Sharma has said, will take place in future. Another breakthrough in fusion energy in one or two or three years, may happen and then there would be no energy shortages.

Prof. P.B. Sharma noted that “This is a very good book because I find a Periodic Table is included in the book,” which we rarely find these days. As you may know Helium is second element and hydrogen is first element. The last element shown here is 103, may be some times 104 or 105 or 106 are also visible, but question is what would be the last number of element in the Periodic Table. I asked this question somewhere around 1994 when I was the Principal of Delhi College of Engineering, we discussed and Prof. P.K. Kundu, Head of Department of Electrical Engineering agreed to work on this. We found that the last number of Periodic Table will be 137. The exact number was 137.3 but since that 0.3 couldn’t be possible because atomic number should be a complete number, so 137.3 is the last number according to the theory, and it will be created and destroyed simultaneously. After some efforts the result was printed in an international Journal, where the entire secret of discovering the last

element of the Periodic Table was discussed. I recommended Prof. Kundu for Noble Prize. This was a long story.

VOTE OF THANKS

Dr. Neha G. Tripathi, Secretary, Climate Change Research Institute

The programme ended with Vote of Thanks presented by Dr. Neha Tripathi, Secretary, CCRI and Assistant Prof. School of Planning and Architecture (SPA). She said it is my privilege to give a Vote of Thanks for such a mesmerizing, thought provoking lecture which is not only raising the issues but is it also giving you a direction for finding solutions. Yes, it is possible to find solutions to the mess, we are in, provided we ask the right questions and we take the help from lord Hanuman to solve the problem.

We thank on behalf of CCRI all the dignitaries and Prof. Sharma for the guest lecture. This was one of the unique lectures in the Environment and Earth Care (EEC) Series. We thank all the Schools, participating teachers and students who are attending this event and taking back the lecture to do, for the future good of the country.

Thank you

Awareness on Climate Change Responsible Education in Schools

LIST OF PARTICIPANTS

Sr. No.	Participants	Designation & Organization
1.	Dr. (Mrs.) Malti Goel	President & CEO CCRI
2.	Prof. D.P. Agrawal	Chairman, CCRI & Ex-Chairman, UPSC
3.	Prof. P.B. Sharma	Vice-Chancellor, Amity University
4.	Shri V.S. Verma	Ex-Member CERC
5.	Prof. Sushila Singhal	Vice- President, CCRI & Professor JNU (Rtd.)
6.	Mr. Suresh Goel	Consultant, SGA
7.	Mr. L.K. Bansal	CCRI
8.	Prof. G.D. Sharma	Professor (Design), SEED
9.	Dr. A.N. Siddiqui	Principal, Govt. of NCT of Delhi
10.	Mr. Gautam Sen	Ex-Executive Director, ONGC
11.	Dr. Anjana Sen	Consultant
12.	Mr. Shiv Kumar Chowdhari	Consultant, IRTS (Retd.)
13.	Mrs. Neha Sharma Goel	Architect, SGA
14.	Mr. Sandeep Goel	Architect, SGA
15.	Dr. Neha G. Tripathi	General Secretary, CCRI & Asst. Professor, SPA
16.	Mr. Rahul Kumar	CCRI
17.	Mr. Brijmohan Maurya	CCRI
18.	Mr. Alok Kumar	Architect, SGA
	Participants from Schools	
A.	**Ambience Public School**	
1.	Ms. Aparna Khullar	Teacher
2.	Ms. Akriti	Student
3.	Ms. Ankita	Student
4.	Mr. Chandan	Student
5.	Mr. Devashish	Student
6.	Mr. Kanishk	Student
7.	Ms. Kashish	Student
8.	Ms. Megha	Student
9.	Ms. Simran	Student
10.	Ms. Sneha	Student
11.	Ms. Tanya Bora	Student
B.	**Amity International School, Saket**	
1.	Ms. Ambreen Kauser	Teacher
2.	Ms. Aasmi Bhasin	Student
3.	Mr. Abhi Chadha	Student
4.	Mr. Ayush Tiwari	Student
5.	Mr. Ishaan Mohan	Student
6.	Ms. Komal Vaswani	Student

7.	Ms. Mehak Naik	Student
8.	Ms. Priyanjana Ghosh	Student
9.	Ms. Sabriya Sharma	Student
10.	Ms. Sanchita Bhagat	Student
11.	Ms. Sanskar Soreen	Student
12.	Ms. Suhani Malik	Student
C.	**Navyug Sr. Sec. School, Moti Bagh**	
1.	Mr. Pramod	Teacher
2.	Ms. Kumkum Bansal	Teacher
3.	Mr. Abhishek	Student
4.	Mr. Aditya	Student
5.	Mr. Aman	Student
6.	Mr. Ankit	Student
7.	Mr. Ankur	Student
8.	Mr. Anshul	Student
9.	Mr. Bichitra	Student
10.	Mr. Chandan	Student
11.	Mr. Keshav	Student
12.	Ms. Manisha	Student
13.	Ms. Mehul	Student
14.	Mr. Mohit	Student
15.	Ms. Neetika	Student
16.	Ms. Neha	Student
17.	Mr. Pushkar	Student
18.	Mr. Ravi	Student
19.	Mr. Ritik	Student
20.	Mr. Sahil	Student
21.	Mr. Sayed	Student
22.	Ms. Sneha	Student
23.	Ms. Srishti	Student
D.	**Universal Public School, Laxmibai Nagar**	
1.	Ms. Ipsita Dutta	Teacher
2.	Ms. Aditi Diksha	Student
3.	Mr. Aditya	Student
4.	Mr. Aman Kaintura	Student
5.	Ms. Amisha Upadhyay	Student
6.	Ms. Bhumika Mihesheri	Student
7.	Ms. Ishika Jain	Student
8.	Ms. Kriti Aggarwal	Student
9.	Mr. Manik Tyagi	Student
10.	Mr. Nikhil Mishra	Student
11.	Ms. Pratibha Yadav	Student
12.	Mr. Swastik Gupta	Student
13.	Mr. Sudhanshu Raina	Student
14.	Mr. Udit Mishra	Student
15.	Ms. Varishtha	Student
16.	Mr. Yash Gupta	Student

Vision

Mission

To innovate and become a center of excellence for capacity building in climate change mitigation and adaptation technology.

CCRI

Climate Change Research Institute is a unit of Climate Change Research Society, founded with a mission to promote environment education, innovation and teachings. It aims to address wide strata of society about the consequences of climate change on our lives and taking control measures. Institute is taking initiative to create awareness on energy security and sustainability through lectures in schools and college, workshops and internet reach. Its future work plan would include development of educational tools on topics of scientific and societal interest; such as energy, health and water in the climate change context. Research and studies would be undertaken on science & technology measures aimed at climate change mitigation and ways of CO_2 recycling.

For further information: Executive Director, Climate Change Research Institute, a unit of Climate Change Research Society, C-85 Shivalik, New Delhi-110017, Tel.: 011-41034450, (M): 9810287736, E-mail: info.acbccs@gmail.com