CGES Newsletter

CLEAN AND GREEN ENVIRONMENTAL SOCIETY

Lucknow (India) Vol. 8 No. 2 July 2023

VISION

Clean and Green Environment for Healthy Life

MISSION

To Strive for A Clean and Healthy World

In This Issue

Clean and Green Environmental Society

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PRESIDENT'S MESSAGE

Dear CGES Friends,

Warm and cordial Season's Greetings to you and your family members on behalf of Clean and Green Environmental Society (CGES) on the occasion of 8th Foundation day Celebrations to be held on July 8 2023 at CSIR-NBRI, Auditorium.

CGES is a vibrant body of Professionals which includes Scientists, Engineers, Doctors and eminent people from different walks of life; and has been working actively for creating awareness about the environment and its effect on individuals, plants and their different species in the world.

The previous year had been quite fruitful for CGES after getting free from Covid 19, and organized the Third National Conference on Ecological Restoration and Biodiversity Conservation (ERBC – 2022) on Sept, 17-18, 2022 in collaboration with CSIR–NBRI, Lucknow. The organizing secretaries were Dr. Priyanka Agnihotri, Prof. Yogesh K Sharma and Prof. Naveen Arora. There were 242 Delegates who attended the conference and participated in the deliberation. Shri Durga Shankar Mishra, IAS, U.P. Govt. was the Chief Guest who emphasized on the importance of Water Conservation through Ponds' Restoration. He also shared about the ongoing schemes of U.P. Govt. on this issue. Many eminent scientists, academicians, environmentalists, policy makers, non government organizations, etc from all over the country attended ERBC 2022 to discuss the problems of Ecology and Biodiversity and their solution. National Conference was held in a well planned manner and was a grand success due to the team work of CGES and CSIR-NBRI. The following programs were undertaken by CGES during the year 2023. Hands -on- training on Bonsai culture was organized on Feb 4, 2023, and Dr. S C Sharma gave a presentation on "Bonsai Art and Science" at the CB Gupta Post Graduate Agriculture College at Bakshi Ka Talab, Lucknow.

On May 6, 2023, Clean and Green Environmental Society organized a visit to KGMU, Rotary Herbal Park in Pulmonary Department, KGMU, Lucknow. This innovative project is the brain child of Dr. Suryakant, Prof. and HOD Respiratory Medicine, who has developed the Herbal Garden in collaboration with the Rotary Club of Lucknow. There was also an interactive session in the get together at the Herbal Garden. On World Environmental Day June 5, 2023 CGES in Collaboration with the Lucknow Management Association and Assocham with great pride organized an interactive session on "Healthy Environment and Human Health Complementing each other". Dr. SC Sharma, former Director Grade Scientist CSIR-NBRI, and Senior Vice President, CGES gave a presentation on the Indoor Pollution and Phytoremediation. Mr. A.K.Singh, former CGM, NABARD, Mr. Praveen Kumar, Environmental Practitioner and Pravin Kumar Dwivedi, Vice President, LMA and Vipin Gupta, Secretary LMA shared their views on the occasion.

I would also like to Congratulate Dr SC Sharma, Dr Anil K Goel and Dr. Y.K. Sharma for their New Publication of a book on "Lotus – National Flower of India "Dr. S.C. Sharma is the backbone of CGES and its activities. My earnest thanks and gratitude to Dr. S.C. Sharma and grateful thanks to the Secretary General, Professor Yogesh Sharma, Dr Rana Pratap Singh, Dr Naveen Arora, Dr. S.N. Pandey, Dr Col Ajai Gupta and all other CGES Executive body members and the Entire CGES family for their cooperation, guidance and support. CGES is regularly publishing it's News Letter, detailing the various activities of the society and other articles of useful knowledge and interest for the protection and preservation of the environment and its inhabitants. We would like to offer our, sincere thanks to Director, CSIR-NBRI, Dr. A. K. Shasany for providing facilities for holding the 8th foundation day of CGES at NBRI.

"हमें अपना ध्यान 'पर्यावरण ,प्रदूषण एवं जलवायु' परिवर्तन के प्रति एकजुट होकर साथ काम करने पर केंद्रित करना होगा। जिससे हम समाज को अपनी ज़िम्मेदारियों के प्रति जाग्रत होने की प्रेरणा दे सकें। तभी हम एक' अच्छे समाज, अच्छे वातावरण, अच्छे परिवेश' और एक अच्छे विश्व की कल्पना को सार्थक कर सकते हैं"।

BE THE INSPIRATION : "काम ऐसा करो, कि मिसाल बन जाए, हर कदम चलो ऐसे, कि निशान बन जाए। यह ज़िन्दगी तो, सब काट लेते है, ज़िन्दगी ऐसे जिओ कि मिसाल बन जाए"।

Once again on behalf of CGES and my own behalf, I extend you my best wishes on the occasion of 8th Foundation Day of the Clean and Green Environmental Society CGES.

JAI HIND

सुमेर अग्रवाल

Er. Sumer Agarwal
President, CGES
Chairman, Levana Group, Lucknow
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New CGES Members

Prof. S. C. Tripathi, Dr. Girish Chandra Pathak, Shri Praveen Kumar, Smt. Usha Kumar, Mr. Vipin Gupta, Smt. Vidhu Gupta, Mr. Pravin Kumar Dwivedi, Mrs. Deepti Dwivedi, Mr. Naresh Agarwal and Mrs. Nirmal Agarwal

BOOK REVIEW

Story of Kalanamak Rice: Past, Present and Future

Author: Dr. Ram Chet Chaudhary

PUBLISHED by; BFC publications PRIVATE limited
Cp-61 Viraj Khand, Gomti Nagar, Lucknow-226 010, India
www.bfpublications.com
ISBN-978-93-5632-355-1

Author, Dr. Ram Chet Chaudhary holds Ph.D degree in Genetics and Plant Breeding and Post Doctorate from Germany. He served as the Rice Breeder, Associate Professor and Associate Director in the G.B. Pant University of Agriculture and Technology, Pant Nagar, India for 10 years. Next 5 years, he served Dr. Rajendra Prasad Central Agricultural University, Pusa (Bihar) as Chief Scientist Rice, and Director of the Institute, followed by 5 years as Rice Specialist with the World Bank in Nigeria. With the International Rice Research Institute (IRRI), he worked as the Rice Breeder in Cambodia and Global Coordinator of INGER for 10 years in the Philippines. He was awarded Gold Medal by the Prime Minister of Cambodia for making "Basket Case" country as the rice exporter. With the Food and Agriculture Organization (FAO) of the United Nations, he worked for 10 years in African and Asian countries. Dr. Chaudhary developed and released more than 156 rice varieties in 60 countries, 33 for India and Cambodia alone. He has published more than 50 books and bulletins and over 250 scientific papers related to rice. His books have been published by the World Bank and FAO, most prominent ones "Speciality Rices of the World: Breeding, Production and Marketing. His book "Introduction to Plant Breeding" is a text book at UG level in the Indian Agricultural Universities.

About the Book: There are 9 chapters: Introduction, Historical Back ground of Kalanamak, Legal Frame Work, Milestone Activities, Supporting activities from the government, Publications, Future, Annexure

Kalanamak rice is an epitome of the best aromatic rice cultivated and consumed in north-eastern part of Uttar Pradesh (India). It is a heritage rice variety, which has been under cultivation since time immemorial. Exact history of its cultivation is not recorded but it is believed that Kalanamak originated from the blessing of Lord Buddha.

Some 3,000 years ago, Kalanamak has been under cultivation mainly in the north-eastern part of Uttar Pradesh and western and central part of Nepal. Outstanding above Basmati group of rices, Kalanamak, a non-basmati and medium slender grained scented rice variety is nutritionally most superior.

Because the husk is black and tolerance to salinity and alkalinity the rice is known as Kalanamak, which outclasses Basmati in agronomical abilities. Drought tolerant Kalanamak is normally grown under the rain-fed conditions.

Cultivation of Kalanamak rice is recorded since the Buddhist period (600 BC). The grains were found from the excavation of Kapilvastu in district Siddharthnagar, Uttar Pradesh. During the excavation at Kapilvastu, carbonized rice grains resembling to Kalanamak rice were recovered from the kitchen store of the King Shuddhodhan. The first authentic report about Kalanamak rice comes from the notes of Chinese traveller Fa Hien, who visited India (399-414 AD) and wrote the story of Lord Buddha (Siddharth) was fed Kheer after he fasted for 49 days.

Nutritional Value of Kalanamak Rice: It has much double amount of protein, 3 times more iron and 4 time more zinc in comparison of other rice varieties. Kalanamak is unique rice as it is the only rice that has naturally occurring Vitamin A in the form of Beta Carotene. For those who had to quit eating white rice due to their diabetic problem, Kalanamak has low Glycerine Index in the range of being "Sugar Free", so it is diabetic friendly rice.

Under One District One Product (ODOP) scheme, Uttar Pradesh Government, Kalanamak rice has been proposed for inclusion in 5 districts out of 11 in the GI AREA.

Dr. R. C. Chaudhary has written the first ever exclusive book on Kalanamak rice in a very lucid way for the benefit to the commoners. His researches of last 25 years on Kalanamak together with the history of last 3,000 years are recorded in this book. His findings will be very helpful to the research scholars and scientist for undertaking further research work on Kalanamak rice.

Dr. Chaudhary is a very committed scientist for promoting the cultivation and marketing of the Kalanamak rice. I am sure the book will help in tripling the income of the farmers.

Climate Change and Sustainable Agriculture for Food Security

Prof. Dr. K. M. Patel

M.Sc., Ph.D., FES, FAPS
President: Global Agro Biotech & Pharma Research Foundation,
Ahmedabad

Human civilization has made an impressive progress to achieve economic Wellbeing and all-round development that has certainly made life a lot more comfortable. However, this progress has come at enormous cost to the environment that often negates the advantages of economic growth. The term environment refers to everything that is around us, land, water, atmosphere, Plants, animals, micro and animal life. In fact, environment is the main supplier of vital resources, that we need to survive. It is no wonder that the other planets have no life simply because their atmosphere cannot sustain Life. It is a truth, ecosystems and its peoples are bound together in a tenuous symbiosis. The industrial society is increasingly destroying this relationship. giving rise to many complex environmental problems of far reaching consequences. In addition, the unintended and unanticipated environmental and Social damage caused by the prevalent paradigm of economic development has resulted in complex environmental problems that seriously undermine food security, water security and biodiversity.

"Mother earth has enough to satisfy the need but not the greed of its children" said Mahatma Gandhi. proves much relevant in times of recent challenges of climate change and global warming. Environment changes, be the natural or man-made are increasing, hydro-climatic disasters. These disasters are for example floods, drought, cyclones, vegetation fires and pest attacks. Incidences of extreme events like heat waves, hailstorms, cloudburst, fog and smog have become frequent instance and more uncertain to forecast.

India is one of the 12-mega diversity nation in the world. Two areas in India have been identified as mega biodiversity hot spot areas, which are western ghat forests and eastern Himalayan forests but India as a whole mega diversity nation is remarkable in both species richness and endemism although its ranks 10th position.

Friends, India is rich in microbial and plant diversity, one third of global diversity exists in India. The diversity enables scientists to learn what important genes are actually contained in millions of plants specimen housed in gene bank around the world.

Recent Indo-German conference on environmental knowledge for disaster Risk Management (2011) at New Delhi, released a special volume wherein the noted environmental scientist, the father of Indian Green Revolution Dr. M. S. Swaminathan stressed on rural ecosystems approach to disaster risk management and climate change adaptation, knowledge of environment-natural systems and processes is therefore key to disaster management and sustainability of natural resources in developing nations like ours.

Diversity is not only genes species, population community and ecosystem only but also it refers to productivity, nutritional status, biocontrol, biofertilizers, bioenergy, breeding strategies ages, livelihood, life style Indigenous knowledge with ex-situ and in-situ conservation. We have a lot of endogenous species of flora and fauna in all ecosystems which are important for developing countries, particularly India where the economy depends heavily on these resources. India's megadiversity is well placed, cultural

diversity, different religions, languages, traditions and festivals, Ayurveda, Unani Homeopathy and herbal preparations (cosmetics and pharmaceuticals).

They are part of traditional biodiversity. Many crops like rice, sugar cane, mango, jute, citrus, banana, bajra, jowar etc. arose in India and spread in large part throughout the world and large proportion of India, biodiversity is still unexplored.

The green revolution in India refers to the period when Indian agriculture was converted into an industrial system due to adaptation of modern methods and technology such as the use of high yielding variety (HYV) seeds, tractors, irrigation facilities, pesticides and fertilizers. It was mainly found by M.S. Swaminathan. This was part of the larger Green Revolution endeavour initiated by Norman Borlaug, which leveraged agricultural research and technology to increase agricultural productivity in the developing world.

Towards a more Holistic Approach:

Second Green revolution will require a more holistic approach that is against new scientific understanding about soil health and plant microbiome. Major benefits will accure for every grower, crop inputs suppliers and consumers, if we embrace this new paradigm. The goals of this new generation of agriculture must include a sharp focus on soil health: how to restore soils to serve their original purpose of efficiently delivering nutrients to plant to improve yield, retain water for drought resistance, store carbon to reduce the effects of climate change, purify groundwater, and help crops naturally resist diseases.

Re-Energizing the Plant Microbe:

An important focus of soil-enhancement innovation is happening in the plant microbiome a miniature world where millions of organisms coexist, with dizzying variety of shapes, sizes and functions. The plant microbiome also called the phyto-microbiome includes not just microorganisms found.

In soil, but also those that colonize the roots of plants and enter plant tissues to form beneficial partnerships. Healthy soils can contain up to 25000 species of microorganisms per gram. Depleted soils might contain only one fifth as many. Soils need to contain a healthy mixture of microorganisms, including fungi and bacteria, if they are to produce large crop yields, with minimal disease loss. Biological crop inputs, such as those now in commercial production by Concentric and others, increase microbial activity in the plant microbiome. They are being used alone, or in combination with traditional crop inputs, on farm fields and in green houses. Farmers can improve water quality and soil health through more efficient nutrient management. Products that help improve nutrient use efficiency and nutrient uptake to increase crop yields will attract the attention of growers.

Role for Scientific Initiatives:

Soil health is getting a lot of buzz. Important work at a number of institutions seek to understand the complexities of nurturing and measuring healthy soil.

The soil health initiative (SHI), established in 2013 by the Noble Research Institute and Farm Foundation (Ordmore, OK), is perhaps the leading initiative dedicated to Advancing soil health science for both agriculture and land management. A September 2017 article by SHI President and CEO Wayne. Honeycutt, the language of soil health impressively unravels the mysteries of soil health. 2 based on their years of input and feedback from scientists, conservationists and growers. SHI has created a list of 19 "Tire!" soil health measurements that can be used by growers, to chart and map their soil health progress. What can be defined, can be measured, and therefore, improved. Another organization, Organic Farming Research

Foundation (OFRF, Santa Cruz, CA) devotes considerable resources to spreading scientific understanding about soil health to the agriculture community through regular conferences and symposiums.

New Areas of Biotechnology:

Biotechnology working towards creating plants that are resistant to salt. Introducing a gene from salt tolerant mangroves into food crops creates resistance. With this technology available water sources can be used more efficiently and lands near rising concerns that are subject to groundwater Stalinization will become fertile for these salts tolerant seeds. With more research and investment in these adaptive seeds. biotechnology will play a key role in the adaptation of agriculture to new climate realities. The National Research Council (NRC) reported recently that interspecies gene flow "has not been a major concern" in the U.S., a leader in adoption of genetically engineered crops meanwhile a growing body of engineered crops. Meanwhile a growing body of economic and agronomic research suggests that the adaptation of existing agricultural biotechnology reduces greenhouse gas emissions from agriculture by boosting carbon sequestration on cropland lessening the pressure for cropland expansion, and reducing the use of carbon intensive inputs like fuel, insecticides and, in some instances, herbicides. Genetic modification can be used to address these coming problems, by creating seeds that are tolerant of new agriculture conditions. As droughts and water scarcity become more prevalent biotechnology will create plants that can withstand these harsh conditions. Prof. Swaminathan, UNESCO chairman in Eco technology and chairman of the National Commission on Agriculture, Food and Nutrition Security of India, explains that climate change results in drought: moisture stress because of higher temperature and lack of rainfall. We must therefore develop less water demanding plants. Biotechnology can offer new ways to address climate change. Drought tolerance can be built into crops, for instance rice by transferring genes. These new climate resistant seeds are already in development and in test markets. Water efficient plants in addition to hardier and more water efficient plants, biotechnology is also creating more space efficient plants. With climate change threatening large portions of land areas, it is inevitable that population migration will occur. This means more people will be having in concentrated areas, specifically in the developing world, and will need access to reliable food sources, adding to the problem of food supply. populations are predicted to significantly increase. Extreme events including floods, droughts, forest fires, and tropical cyclones have already increased in temperate and tropical Asia, in the last few decades. Run-off and water availability are projected to decrease in the arid and semiarid regions of Asia. Sea level water rise and increase in the intensity of tropical cyclones, is expected to displace tens of millions of people in the low-lying coastal areas of Asia, with expectation of around 17% land getting inudated in Bangladesh alone. On the contrary, the increased intensity of rainfall and contraction of the monsoon would increase flood risks in temperate and tropical Asia. Water is a key constraint for attaining food production targets and will remain so in future as well. Steps are therefore needed by all the stakeholders to prioritize enhancing water use efficiency, in addition measures for water storage using proven approaches such as small on farm ponds, large reservoirs ground water recharge by and the storage, and watershed approach manage by the farming communities require attention.

Food Security:

Food security for all will be a prominent issue for the present century. Today, one billion people of the world are undernourished and more than a third are malnourished, as the world's population continues to increase and the looming threat of climate change will exasperate the situation even

further. There is concern that climate change could increase food security due to the myriad interation between climate variability and food systems, of which little is known. It is therefore critical that implications of climate change for food security are explored and understood, in order to respond efficiently and effectively. The changes showed that natural systems have been affected by climate change and temperature increased in particular. Changes include those in hydrological, terrestrial, biological, marine and freshwater systems. Increase in the frequency of droughts and floods are projected to affect local production negativity, especially in subsistence sectors at low latitudes. The impact of climate change on the world's food supply is predicted to be far reaching. At high risk is sub-Saharan Africa, a drought prone continent with a little under 10% of current land designated to have agricultural potential predicted to turn into desert within the next 50-70 years (Global Hunger Index).

By 2050 the global population will surpass 9 billion and require nearly a doubling of agricultural output to provide an adequate food supply. At the same time, the world's agricultural system will be increasingly challenged by water scarcity and climate change, raising the risk of production shortfalls in a world where over 1 billion people are already undernourished. A challenge like this can be met through biotechnology innovation and appropriate agricultural development and trade policies. It is necessary to encourage countries to think proactively about the role technology can play in addressing food security and climate change about its strong potential as an engine of economic growth. Unfortunately, the lack of science-based regulations in many countries discourages innovation and adaptation and creates barriers to trade.

Biofortified and Other Nutritionally Enhanced Foods:

One way to address the ever-growing need for more food crops is to nutritionally enhance those crops which are currently considered to be staples for the world's poor. By producing biofortified rice, wheat and corn, the principal gains which feed much of the human race today, with increased mineral and vitamin content the nutritional status for those who have little variety available in their diet can be improved. The generation of plants with enhanced micronutrient content can thus be a means to support those whose food supply may dwindle with respect to diversity in the face of climate change. For example, vitamin A deficiency causes approximately 5,00,000 cases of blindness in children. By increasing the vitamin A content of rice and other staple crops, this number can be greatly reduced.

Other examples of biofortification strategies include Zinc, and iron enriched corn cassava and rice of calcium enriched carrots and tomatoes. Historically food fortification such as iodized salt or vitamin D- Fortified milk, served as a public health measure to address population wide nutrients deficiencies. Now there are also calcium and vitamin D Fortified juices, breads fortified with omega-3 fatty acids, and vegetable oil spreads with plant sterols available for health-conscious consumers searching for food with additional health benefits. These types of foods contain added nutrients and ingredients that may promote or support overall health and wellness in a variety of ways across many different body systems including heart, bone, digestive, eye and brain health, weight management, and increased energy and immune health, among others. Biofortified foods can be produced either through the generation of transgenic plants which possess additional bio synthetic pathways such as vitamin A enriched 'Golden Rice' or by altering the general physiology of the plant in such a way that it is able to extract more micro nutrients from the soil such as iron enriched wheat. The design and generation of plants which accumulate more vitamins and minerals can also be beneficial for the health of the plant

itself. Plants which are nutrient-rich are better able to weather more extreme environmental conditions, imposed by climate change. Biofortified foods can be incorporated into the dietary habits and farming programs of the rural poor of developing countries. People who would have access to fortified foods may very well be better prepared to withstand detering effects of their livelihoods due to climate change.

The desperate scenario presented by the environment challenges can be reversed and turned into opportunities provided urgent and concentrated action are taken simultaneously on multiple fronts, Environmental conservation and effective us of ecosystem Services must receive highest priority and should be the wider bying theme of all developmental activity. We have to make an all-out effort to decarbonize the economy increase resources use efficiency protect biodiversity and ecosystem for the benefit of present and future generation Paris climate change agreement and global agreement on Sustainable developmental goals SGDS, are very encouraging developments. We must support these Support these initiatives and resolve to protect Mother Earth- Our only home from environmental abuse and commit to work for improving quality of life and human well-being.

Mangroves for Absorbing CO2

Prof. Sharad Chaphekar

Mumbai

The first ecological study of mangrove vegetation in India was carried out by Navalkar, a student of Dr. Bharucha (1942). Those studies revealed zonation of species with reference to the reach of tides. Morphological and physiological adaptations in mangroves were the focus of subsequent studies, by a number of scientists in different parts of the world. Interest in mangroves has increased lately due to revelation that this vegetation is important due to its unusual properties that may prove to be assets for survival of humanity.

Mangroves grow in the intertidal regions along shores of creeks and seas in tropical and subtropical countries. They tolerate salinity of the growing medium and survive on muddy ground loosened by tidal movement of water. More research carried out at present in several countries shows that in addition to traditional uses, mangroves can be used in ways not appreciated earlier.

Traditional uses – Coastal human communities have been visiting mangroves for collection of fuel wood (wood from most species are reported to have high calorific value) and for extraction of tannin from bark of trees, useful for cottage-level leather industry. Some locals also collect molluscs and crustaceans for food, readily available in mud under shade of mangrove canopy.

Findings from recent studies have attracted serious attention of academicians, researchers and leaders in society at large. E.g.

1. Many species such as Tivar (*Avicennia, Bruguiera, Sonneratia)* with their negatively geotropic breathing roots and Kandal (*Rhizophora)* with profusion of stilt roots from lower part of the trunk, not only hold mud against tidal forces but also prevent litter in runoff from land, going into sea. Resulting accumulation of organic debris support variety of fauna like crabs, prawns, molluscs and fingerlings of fishes. Deep sea fishes are known to visit mangrove habitats for laying eggs and fingerlings in the comfort of mangrove shadow.
2. Healthy growth of coastal mangrove vegetation functioning as wind break provides protection to land vegetation, agriculture and habitat, as was observed when a tsunami visited India some years back. Mathematical models have been

prepared by scientists in Vietnam for optimization of efficiency of mangrove belt in terms of its height and width, for protecting land agriculture and habitat.

3. A few years back, during conversation, Dr. M.S. Swaminathan suggested that genetic studies should be carried out to identify salt-tolerant genes in mangroves. Transfer of such genes to rice would enable paddy cultivation in salt marshy areas, he suggested.

4. Mangroves form sustainable wetlands, which attract migratory birds, including flamingos. Some mangrove wetlands have earned international recognition as Ramsar sites and are now listed as attractive tourism sites in the country.

5. Recently we came across a write up in popular media, that mangrove vegetation functions as rich reservoir of carbon dioxide and can help in mitigating impact of climate change. It is claimed that mangroves soak up CO2 at five times more efficiency compared to terrestrial trees. Commercial potential of mangroves for international carbon trading is claimed to be very high.

Since the claim is very attractive commercially in Voluntary Carbon Market, it will be wise to go into scientific details, before approaching international community for Carbon trade. It is well-known that green plants absorb CO2 from surrounding atmosphere, during the food-building process of photosynthesis. Rate of this process depends on environmental factors like sunlight, temperature, water, other nutrients and health of plant. Assuming that there are no limiting factors operating, a tree will remove CO2 from atmosphere at a certain rate. Whether this rate is five times more in mangroves as claimed, a comparative study using a tree of another terrestrial species with comparable biomass, needs to be studied for its CO2 removal rate, under identical conditions.

The term Mangrove is inclusive and consists of a dozen or more species, with their own shapes, sizes, foliar mass and life cycles. It is necessary to know details of the species examined. Results from research on Kandal (*Rhizophora)* may not be applicable to mangroves of Mumbai, where the coastline is occupied mainly by Tiwar (*Avicennia),* till the latter are also examined in the same way.

Litter from Kandal is reported to be very high, some 7 to 8 tons per ha. One would like to know if this litter production is annual or a one time observation, made after some years of progressive litter accumulation. Litter decomposes in warm, wet soil and contributes to organic carbon content of soil. In case of mangroves, litter carried by runoff from land adds to the value of soil carbon content. Fauna in the mud relishes organic carbon as food, much of which is metabolized into shells of bivalves, crabs, prawns etc., thus removing it from soil carbon stock. It is hence possible that high carbon value of mangrove soil is due to decomposing litter arrived with runoff from land and locally generated litter of decaying fauna. Unless it is assured that all fauna-bound carbon, say carbonates in shells, is accounted for, mangrove soil carbon is likely to show exaggerated value.

Last week an industrial house in Mumbai reported that more than 10 lakh tons of CO2 is stored by mangroves since inception, in their area at Vikhroli, a Mumbai suburb. This report indicates, as expressed earlier in this article, that the CO2 storage value relates to some period of time. These observations can get strengthened by values of annual increments in CO2 storage by the same stretches, even patches of mangrove vegetation.

Certainly a new and interesting task for all concerned – scientists young and old and policy makers at state and national levels.

Prajamna Das, in Times of India (Mumbai), 21 April, 2023. How India's coastal forests could become a goldmine.
Ms. Damle, in Vidnyan Patrika, 2023.
Times of India, 5 May, 2023. Magical Mangroves.

Back to Millets

Dr. Priyanka Sharma

Assistant Professor
Lord Shiva Degree College, Kailavan (Bulandshahr)

Millets are an ancient crop of the mankind and hold a lot of importance in the agriculture of India. Millets were among the first cultivated crops. Millets were consumed in the Indus-Sarasvati civilization, according to research (3,300 to 1300 BCE). Earliest domestication of common millet (*Panicum miliaceum*) in East Asia extended to 10,000 years ago.

The Original Millets Man of India, Padma Shri awardee Prof Khadar Vali, the founder of Deccan Development Society, and a renowned food and nutrition specialist, elaborated upon the significance of millets. He not only popularised millets but also worked for agro-biodiversity, food sovereignty, women's empowerment, Dalit rights, social justice and local knowledge systems. Another icon PV Satheesh 'Millet Man of Telangana' founder and executive director of the Deccan Development Society (DDS) was civil society activism in India. The man who also deserves the honour of being called the Millet Man of India for pioneering work in demonstrating an alternate, ecologically sustainable agricultural food system.

Recognising the enormous potential of Millets, which also aligns with several UN Sustainable Development Goals (SDGs), the Government of India (GoI) has prioritized Millets. In April 2018, Millets were rebranded as "Nutri Cereals", followed by the year 2018 being declared as the National Year of Millets, aiming at larger promotion and demand generation. The global millets market is projected to register a CAGR of 4.5% during the forecast period between 2021-2026. Spearheaded by the Prime Minister, and to create domestic and global demand and to provide nutritional food to the people, the Government of India sponsored the proposal for International Year of Millets (IYM) 2023. On 6th December 2022, the Food and Agriculture Organization (FAO) of the United Nations, organized an opening ceremony for the International Year of Millets – 2023 at Rome, Italy. The event was attended by a delegation of senior government officials from India. Next in the series, prior to the year-long celebration of 'International Year of Millets (IYM) 2023', the Department of Agriculture & Farmers Welfare hosted a special 'Millet Luncheon' for the Members of the Parliament at the Parliament house. It was accepted by the United Nations General Assembly (UNGA). The declaration has been instrumental for the Government of India to be at the forefront in celebrating the IYM. Thus the year 2023 was declared as the "International Year of Millets (IYM) 2023". PM Narendra Modi has also shared his vision to make IYM 2023 a 'People's Movement' alongside positioning India as the 'Global Hub for Millets'. Indian embassies across more than 140 countries participated in celebration of IYM during 2023 by conducting side events involving the Indian diaspora through exhibition, seminars, talks, and panel discussions.

Millet is a common term for categorising small-seeded grasses that are often called Nutri-cereals. India produces all the nine commonly known millets and is the largest producer and fifth-largest exporter of millets in the world. Multiple types of millets are produced in India. Some of them are sorghum (jowar), pearl millet (bajra), finger millet (ragi), little millet (kutki),

foxtail millet (kakun), proso millet (cheena), barnyard millet (sawa), and kodo millet (kodon). The Buckwheat and Amaranths are also there as Pseudo Millets in the list. Millets are primarily grown during the kharif season in rainfed areas as these crops require less water and agricultural inputs than other cereals. Millets production has great potential to generate livelihoods, increase farmers' income and ensure food and nutritional security, not only in India but also in other parts of the world. Unless consumption is increased, the demand will not be generated to motivate farmers for shifting to millets.

An essential staple cereal crop for millions of smallholder dryland farmers across Sub-Saharan Africa and Asia. Millets offer nutrition, resilience, income and livelihood for farmers, and have multiple uses such as food, feed, fodder, biofuels and brewing.

The main millet-growing states in India are Rajasthan, Maharashtra, Karnataka, Andhra Pradesh, and Madhya Pradesh which grow the grain for both domestic and international markets. Rajasthan tops the country with 48.64 lakh tonnes of millet production, followed by Karnataka (23.99 lakh tonnes) and Uttar Pradesh (22.31 lakh tonnes). Haryana ranks fourth in the country in terms of production of millets and has produced more than 11.77 lakh tonnes of millets in the last three years, between 2019-20 and 2021-22.

However, Punjab comes at the bottom of the chart among 20 states with an output of just 320 tonnes during these three years. Neighbouring Himachal Pradesh, on the other hand, produced 4,350 tonnes of millets during this period.

Millets are nutritionally superior to wheat and rice owing to their higher protein levels and a more balanced amino acid profile. Millets also contain various phytochemicals which exert therapeutic properties owing to their anti-inflammatory and anti-oxidative properties. Further, besides being climate resilient, millet grains are rich sources of nutrients like carbohydrates, protein, dietary fibre, and good-quality fat; minerals like calcium, potassium, magnesium, iron, manganese, zinc and B complex vitamins. Most importantly, millet production is not dependent on the use of chemical fertilizers.

Increasing consumption in India will help improve people's health since millets contain many nutrients and minerals crucial for the human body. Millets are rich in dietary fibre and this helps control blood pressure and sugar levels. Though the awareness of the health benefits of millets has improved post-Covid, there is still a long way to go. Production of millets is crucial to promote its consumption and meeting future demand.

Even though MSP of millets (ragi, bajra and jowar) has been raised by 80-125 per cent between 2013-14 and 2021-22, their combined production has dropped by 7 per cent to 15.6 million tonnes during the last eight years. While Bajra output has been stagnant, both jowar and ragi production has declined. This points to the requirement of policy-level intervention so that farmers get remunerative prices for millets and their returns become higher than that of crops such as paddy. The $470-million (in 2021) global millets market is projected to register a CAGR of 4.5 per cent during the 2021-2026 period. APEDA has set a target of $ 100 million millet exports by 2023-24 from $64.28 million in 2021-22.

Scenerio of Climate Changes

Dr. Satyendra Kumar Singh

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Future changes are expected to include a warmer atmosphere, a warmer and more acidic ocean, higher sea levels, and larger changes in precipitation patterns. The extent of future climate change depends on what we do now to reduce greenhouse gas emissions. Climate change refers to the change in the environmental conditions of the earth. This happens due to many internal and external factors. The climatic change has become a global concern over the last few decades. Besides, these climatic changes affect life on the earth in various ways. These climatic changes are having various impacts on the ecosystem and ecology. Due to these changes, a number of species of plants and animals have gone extinct. The main threats of climate change, stemming from the rising temperature of Earth's atmosphere include rising sea levels, ecosystem collapse and more frequent and severe weather. Rising temperatures from human-caused greenhouse gas emissions affects planet-wide systems in various ways. Human-induced climate change is the largest, most pervasive threat to the natural environment and societies the world has ever experienced, and the poorest countries are paying the heaviest price, a UN expert said.

By 2050, outdoor air pollution particulate matter and ground-level ozone is projected to become the top cause of environmentally related deaths worldwide. A study showed that with no change in emissions by 2050, 1,126,000 premature mortalities are expected each year due to ozone.

Climate change affects human health and wellbeing through more extreme weather events and wildfires, decreased air quality, and diseases transmitted by insects, food, and water. Climate change could affect our society through impacts on a number of different social, cultural, and natural resources. For example, climate change could affect human health, infrastructure, and transportation systems, as well as energy, food, and water supplies.

From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global in scope and unprecedented in scale. Without drastic action today, adapting to these impacts in the future will be more difficult and costly. By 2030, almost all countries will experience “extreme hot” weather every other year due mainly to greenhouse gas pollution by a handful of big emitters, according to a paper published Thursday by Communications Earth & Environment, reinforcing forecasts that the coming year will be one of the hottest on record. Between 2030 and 2050, climate change is expected to cause approximately 250 000 additional deaths per year from malnutrition, malaria, diarrhoea and heat stress alone. The direct damage costs to health are estimated to be between US$ 2–4 billion per year by 2030.

The chief benefits of global warming include: fewer winter deaths; lower energy costs; better agricultural yields; probably fewer droughts; maybe richer biodiversity.

The Swiss firm IQAir released the 'World Air Quality' report which says that India was the world's eighth most polluted country in 2022, dropping from the fifth spot the previous year. The PM2. 5 level of most polluted Indian cities stands at 53.3, according to the data.

It is extremely likely (> 95%) that human activities have been the dominant cause of that warming. Human activities have contributed substantially to climate change through: Greenhouse Gas Emissions. Reflectivity or Absorption of the Sun's Energy.

Based on CO2 released the India ranks at third.

- China, with more than 10,065 million tons of CO2 released.
- United States, with 5,416 million tons of CO2.
- India, with 2,654 million tons of CO2.
- Russia, with 1,711 million tons of CO2.
- Japan, 1,162 million tons of CO2.
- Germany, 759 million tons of CO2.
- Iran, 720 million tons of CO2.

Australia topped the list as the least polluted country in the world, with 7 cities in the top 25. Of the 25 least polluted cities in the world with the best air quality, Nordic countries (Finland, Sweden, Norway, Iceland, Estonia) dominated the rankings with some of the cleanest air in the world in 2022.

How Lucknow residents can contribute towards preserving our mother Earth

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Lucknow, the capital of Uttar Pradesh, is a bustling city known for its rich cultural heritage, vibrant cuisine, and bustling markets. However, like many other cities in India, Lucknow is facing numerous challenges in terms of sustainability. These challenges include water scarcity, air pollution, waste management, and urbanization. Therefore, it is imperative for citizens of Lucknow to play an active role in building a sustainable society. As a resident of Lucknow, it is crucial to take steps towards preserving the environment to ensure a healthy and sustainable future for ourselves and the generations to come. Environmental preservation refers to protecting and conserving natural resources, reducing carbon emissions, and promoting sustainable practices. In this article, we will discuss several ways in which Lucknow residents can contribute towards preserving the environment.

1. REDUCE ENERGY CONSUMPTION:

Reducing energy consumption is one of the most effective ways to preserve the environment. Lucknow residents can take several steps to reduce their energy consumption, such as:

❖ Using energy-efficient appliances:

As an Indian citizen living in Lucknow, choosing energy-efficient appliances can have a significant impact on reducing electricity consumption and saving money on energy bills. Energy-efficient appliances use less energy than their standard counterparts, which can result in lower electricity bills and a reduction in greenhouse gas emissions.

In India, where energy is a precious resource and energy prices are on the rise, choosing energy-efficient appliances can help reduce the burden on the country's electricity grid and help reduce power outages. **According to the Bureau of Energy Efficiency (BEE), replacing old appliances with energy-efficient ones can save up to 50% in energy consumption.**

For example, choosing a **BEE star-rated air conditioner can save up to 15%** on energy consumption compared to a non-star rated one. Similarly, **a BEE star-rated refrigerator can save up to 30% on energy consumption** compared to a non-star rated one.

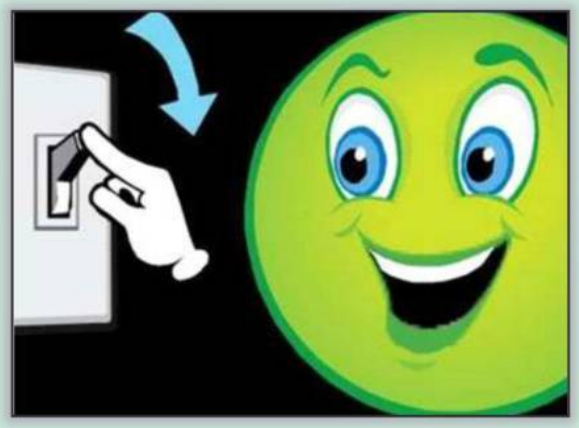
(BEE star rating)

Furthermore, the Indian government has implemented various initiatives to promote energy efficiency in households, including the UJALA (Unnat Jyoti by Affordable LEDs for All) scheme, which provides LED bulbs and tube lights at subsidized rates to Indian households. The government has also introduced the Standards and Labeling (S&L) program to set minimum energy performance standards for appliances and promote the use of energy-efficient appliances.

To summarize, choosing energy-efficient appliances can have a significant impact on reducing electricity consumption and saving money on energy bills for Indian citizens living in Lucknow. By choosing BEE star-rated appliances and taking advantage of government initiatives such as UJALA and S&L programs, Indian citizens can contribute towards a more sustainable future for themselves and the country.

❖ **Switching off electronic devices:** Turning off electronic devices when not in use can save a significant amount of electricity in India. According to the Bureau of Energy Efficiency (BEE), standby power can account for up to 7% of total electricity consumption in Indian households. This means that turning off electronic devices when not in use can help reduce the standby power and result in significant energy savings.

For instance, **turning off a desktop computer and monitor when not in use for 8 hours a day can save up to 150 units of electricity annually, which is equivalent to Rs. 900 in energy cost savings**. Similarly, **turning off a television set and set-top box when not in use for 8 hours a day can save up to 200 units of electricity annually, which is equivalent to Rs. 1,200 in energy cost savings.**



(switching off electronic devices)

By turning off electronic devices when not in use, Indian citizens living in Lucknow can help reduce their electricity bills and contribute towards a more sustainable future.

Moreover, this practice can also help reduce the load on the country's electricity grid and minimize power outages, especially during peak demand periods.

❖ **Using natural light:** Using natural light instead of artificial light during the day can help reduce energy consumption. According to the Bureau of Energy Efficiency (BEE) in India, lighting accounts for about 18% of the total electricity consumption in the country. This translates to a significant amount of energy consumption that can be reduced by using natural light during the day.

The exact amount of energy savings can depend on various factors such as the availability of natural light, the type and efficiency of artificial lighting being replaced, and the specific location and building design. However, a study conducted by the Indian Green Building Council (IGBC) found that using daylighting strategies in commercial buildings in India can result in energy savings of up to 50% in lighting systems.

Additionally, a case study conducted by The Energy and Resources Institute (TERI) in a school building in Delhi found that by using **daylighting strategies such as skylights and light shelves, the energy consumption of the lighting system was reduced by 30-40% compared to a building without daylighting strategies**.

(representing skylight)

Overall, these data suggest that using natural light during the day can lead to significant energy savings in India, which can help reduce the country's carbon footprint and contribute to a more sustainable future.

❖ **Switching to renewable energy like solar panels:** Installing solar panels at homes or workplaces can help reduce dependence on fossil fuels and reduce carbon emissions. On average, a 3 BHK house in Lucknow may consume around 10-15 units of electricity per day. A typical 3 kW solar panel system installed on a rooftop in Lucknow can generate around 12-15 units of electricity per day, depending on the location and weather conditions.

(representation of solar panels in residential buildings)

Assuming an average of 13 units of electricity generated per day, **the solar panel system can meet approximately 80% of the daily electricity requirements of the house**. This can result in significant energy savings and a reduction in electricity bills.

In addition, **the installation of a solar panel system on a 3 BHK house in Lucknow can help reduce carbon emissions by around 3,600-4,500 kg per year. This is equivalent to planting around 150-180 trees per year** (estimate from organizations like Trees for future say that 1 tree can offset 22kgs of CO_2).

2. PROMOTE SUSTAINABLE TRANSPORTATION

Transportation is a significant contributor to carbon emissions, and promoting sustainable transportation is crucial to preserving the environment. Lucknow residents can take several steps to promote sustainable transportation, such as:

❖ **Using public transport:** Using public transport, such as buses or trains, can help reduce carbon emissions.

To quantify the benefits of shifting from private transport to public transport like **Lucknow Metro** as an individual, we can use the following data:

Cost savings: According to a study conducted by the UITP, the average cost of owning and maintaining a private vehicle in India is around INR 4.5 lakh per year. In comparison, the cost of using public transport like Lucknow Metro is much lower, with a single ridecosting between INR 10-60 depending on the distance travelled. By using public transport, you can save a significant amount of money on transportation costs. **For example, if you take two rides per day on Lucknow Metro, with each ride costing INR 20, you would save around INR 10,000 per year as compared to using a private vehicle.**

Time savings: According to the LMRC, Lucknow Metro trains run at a frequency of 5-10 minutes during peak hours and 10-15 minutes during off-peak hours. This means that you can plan your travel time accordingly and avoid getting stuck in traffic. Additionally, by using Lucknow Metro, you can avoid the time and stress of finding parking, which can save you time and hassle.

(Lucknow metro)

Environmental benefits: By using public transport like Lucknow Metro, you can help reduce carbon emissions and other pollutants, which can lead to a cleaner and healthier environment. As an individual, the exact impact you have on reducing carbon emissions will depend on how often you use public transport and the distance you travel, but even a small reduction can have a positive impact on the environment.

❖ **Walking or cycling:** Walking or cycling short distances instead of using a car can help reduce carbon emissions and promote physical activity. Walking or cycling short distances instead of using a car can have a significant impact on reducing carbon emissions and promoting physical activity in India. **According to research, a 5- kilometer commute to work by car produces approximately 1.5 kilograms of CO2 emissions**. By walking or cycling the same distance, one can reduce their carbon footprint by up to 90%. Additionally, regular physical activity can lower the risk of chronic diseases and improve mental health. **In terms of cost savings, walking or cycling instead of driving can save up to INR 7,500 per year on fuel and maintenance expenses**. These savings can add up and help individuals to reduce their carbon footprint while also promoting healthier lifestyle habits.

❖ **Electric vehicles:** Switching to electric vehicles can help reduce carbon emissions and reduce dependence on fossil fuels. In 2020, EVs accounted for 4.6% of global passenger car sales, which translated to a **reduction of 40 million tons of CO2 emissions compared to gasoline vehicles.**

On average, an electric vehicle can save an individual in India up to 60-70% in fuel costs compared to a petrol or diesel-powered vehicle. For example, if an individual travels 1,000 km per month in a petrol car that has a fuel efficiency of 15 km/liter and petrol costs Rs 100 per liter, they would spend approximately Rs 6,667 on fuel per month.

However, if they were to switch to an electric car that has an efficiency of 8 km/kWh and if they pay Rs 6 per kWh for electricity, they would spend approximately Rs 1,875 on electricity to cover the same distance.

(check out government's incentive on EVs)

3. CONSERVE WATER

Conserving water is essential to preserve the environment, especially in a city like Lucknow, where water scarcity is a significant issue. Lucknow residents can take several steps to conserve water, such as:

❖ **Fixing leakages:** Fixing leakages in taps, pipes, and toilets can help reduce water wastage. Fixing leakages in taps, pipes, and toilets can help save a significant amount of water in an Indian household. The amount of water saved will depend on the extent of the leak and how long it goes undetected.

As per the Central Public Health and Environmental Engineering Organisation (CPHEEO), a leaking tap can waste around 6 liters of water per day, which is about 2,190 litres per year. Similarly, a leaking toilet can waste up to 60 litres of water per day, which is about 21,900 litres per year.

(lets fix this leakage... each drop matters)

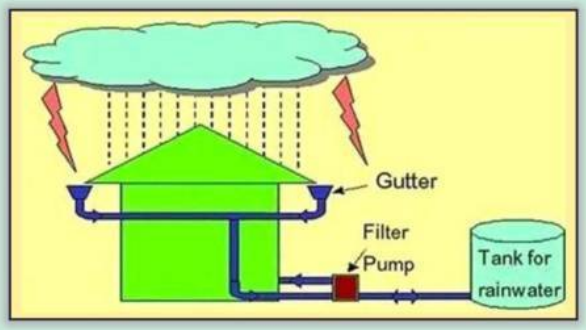
Assuming a typical Indian household has 2-3 taps and 1-2 toilets, fixing all the leakages could potentially save around 10,000 litres of water per year. This can help reduce the water bill and contribute towards water conservation efforts.

❖ **Using water-efficient appliances:** Using water-efficient appliances, such as low-flow showerheads, can help reduce water usage. The Indian Green Building Council (IGBC) suggests that low-flow showerheads can save up to 10 litres of water per minute compared to traditional showerheads. Similarly, a study by the Centre for Science and Environment (CSE) found that water-efficient showerheads can reduce water usage by up to 20 liters per minute. Therefore, using a low-flow showerhead in India can save around 10 to 20 liters of water per minute compared to traditional showerheads. **This means that a family of four can save up to 1,500 litres of water per month, which is a significant amount of water.**

❖ **Harvesting rainwater:** Harvesting rainwater can help reduce dependence on groundwater and other sources of water. Harvesting rainwater can be a great way to conserve water and reduce dependence on groundwater in Lucknow houses.

Here are some methods that can be used for rainwater harvesting:

- Rooftop Rainwater Harvesting: The most common and effective method of rainwater harvesting is to collect rainwater from rooftops. The collected rainwater can be stored in tanks, barrels or underground storage systems.
- Surface Runoff Harvesting: In areas where the ground is flat, surface runoff harvesting can be done by creating shallow trenches or channels to collect rainwater from the surface.
- Percolation Pits: Percolation pits can be constructed in areas where the soil is porous. These pits allow rainwater to percolate into the ground, which helps to recharge the groundwater.
- Rain Gardens: A rain garden is a shallow depression that is designed to collect rainwater from roofs or other surfaces. The collected water is then used to water plants and trees.
- Recharge Wells: Recharge wells can be dug to allow rainwater to percolate into the ground and recharge the groundwater.



(rain water harvesting in a typical house)

To implement rainwater harvesting in Lucknow houses, homeowners can take the following steps:

- Identify suitable areas for rainwater harvesting and choose the appropriate method based on the site's conditions.
- Install gutters and downspouts to collect rainwater from the roof and direct it to the storage tank or other collection systems.
- Install a first-flush system to divert the initial rainwater that may contain debris or pollutants away from the storage tank.
- Install a filtration system to remove debris, sediment, and other contaminants from the collected rainwater.
- Ensure proper maintenance of the rainwater harvesting system to ensure its efficiency and effectiveness.

Overall, rainwater harvesting can be an effective way to conserve water in Lucknow houses, and implementing these methods can help reduce dependence on groundwater and other sources of water.

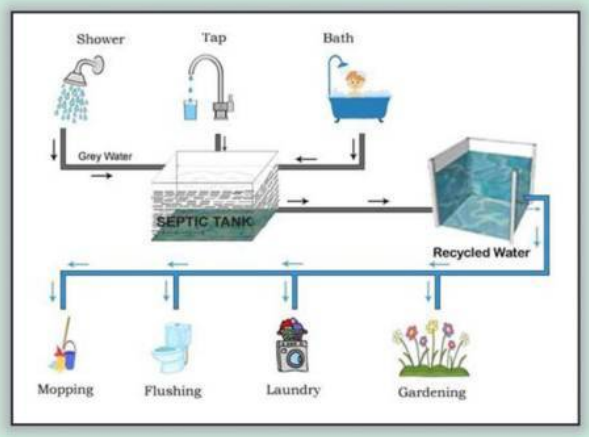
❖ **Using greywater:**

Greywater is wastewater generated from household activities such as washing dishes, clothes, and taking showers, **excluding wastewater from toilets and kitchen sinks.** Greywater is relatively less contaminated than blackwater and can be reused for non-potable purposes such as irrigation, flushing toilets, and cleaning.

Lucknow, like most Indian cities, is experiencing rapid urbanization and a growing population, resulting in increased demand for freshwater. Adopting greywater reuse practices can significantly contribute to water conservation efforts in Lucknow.

Here are a few ways Lucknow residents can take advantage of greywater:

- **Install a greywater recycling system:** Installing a greywater recycling system can be a viable solution for reusing greywater. A greywater treatment system can be installed, which purifies greywater to a standard suitable for non-potable reuse.
- **Reuse greywater for irrigation:** Greywater can be used to water plants and gardens, reducing the reliance on freshwater for irrigation. The nutrients present in greywater can also help plants grow better.
- **Use greywater for flushing toilets:** Flushing toilets accounts for a significant portion of household water consumption. Reusing greywater for toilet flushing can reduce freshwater demand and save water.
- **Use greywater for cleaning:** Greywater can be used for cleaning outdoor spaces, vehicles, and other items that do not require potable water.



(grey water recycling) – don't use toilet flush water or kitchen sink water

In conclusion, Greywater is an excellent resource that can significantly contribute to water conservation efforts in Lucknow. Adopting greywater reuse practices can help Lucknow residents reduce their freshwater consumption and contribute to a more sustainable future.

4. REDUCE WASTE

Reducing waste is crucial to preserve the environment. Lucknow residents can take several steps to reduce waste, such as:

❖ **Segregating waste:** Segregating waste into recyclable and non-recyclable categories can help reduce the amount of waste sent to landfills. This process also helps to reduce the amount of waste sent to landfills, which can reduce the negative environmental impact associated with these facilities. Additionally, the practice of segregating waste can raise awareness among individuals about the importance of recycling and sustainable living practices. Overall, segregating waste is a simple yet impactful step towards building a more sustainable and resilient society.

(use of different bins for different purposes)

❖ **Composting:** Composting food waste and garden waste can help reduce the amount of waste sent to landfills and create organic fertilizer for plants. Composting is the process of breaking down organic materials, such as food waste and garden waste, into a nutrient-rich soil amendment. It involves creating a pile or container filled with organic materials and allowing the materials to decompose over time, with the help of microorganisms, into a dark, crumbly substance known as compost.

This process can have numerous benefits for society. One of the most significant benefits is reducing the amount of waste sent to landfills.

(composting)

Composting this waste instead of sending it to landfills can help reduce methane emissions and lessen the environmental impact of waste disposal.

Composting can also help to improve soil health and fertility. Compost is rich in nutrients and can improve soil structure, water retention, and aeration. Using compost as a fertilizer can reduce the need for synthetic fertilizers, which can have negative environmental impacts such as water pollution and soil degradation.

In addition to environmental benefits, composting can also have economic benefits. Composting can create jobs in waste management, landscaping, and agriculture. It can also reduce costs associated with waste disposal and fertilizers, which can be a significant expense for households and businesses.

Overall, composting is a simple yet effective way to reduce waste, improve soil health, and benefit society as a whole. By implementing composting practices, individuals and communities can make a positive impact on the environment and create a more sustainable future.

❖ **Reusing and recycling:** Reusing and recycling helps to reduce the amount of waste sent to landfills, which can help to reduce the environmental impact of waste disposal. There are several household items that a Lucknow resident can think of recycling such as

- Plastic bags
- Glass bottles and jars
- Paper and cardboard
- Clothing
- Electronics
- Kitchen waste
- Water bottles
- Plastic containers
- Old newspapers

(recycling materials from a typical house)

If household items are not recycled, they can have a detrimental effect on the environment in several ways. Firstly, if they are sent to landfills, they take up space and can contribute to soil and water pollution. When organic waste such as food scraps and yard waste decompose in landfills, they produce methane, a potent greenhouse gas that contributes to climate change.

Secondly, if materials such as plastic are not recycled, they can take hundreds of years to decompose, and can harm wildlife that mistake them for food or become entangled in them. This can have a negative impact on ecosystems and biodiversity. Thirdly, if natural resources such as trees, water, and minerals are not conserved through recycling, they can become depleted over time, leading to environmental degradation and even more waste.

Finally, if household items are not recycled, it can contribute to the emission of greenhouse gases during the production of new products. This can have a negative impact on the climate and contribute to global warming.

Overall, the failure to recycle household items can have a significant and lasting impact on the environment, leading to pollution, biodiversity loss, resource depletion, and climate change. Therefore, it is important for individuals and communities to prioritize recycling and reduce their environmental impact.

❖ **Avoiding single-use plastic**: Avoiding single-use plastic can have a significant positive impact on the environment and public health in Lucknow, as well as throughout India. Single-use plastic items such as straws, plastic bags, and cups are major sources of pollution, and they require significant amounts of energy and natural resources to produce.

The Modi government has launched several initiatives to reduce the use of single-use plastic in India. One of the most notable is the Swachh Bharat Abhiyan, a national campaign aimed at promoting cleanliness and sanitation in India. As part of this campaign, the government has banned the use of single-use plastic items such as bags, straws, and cups in many cities, including Lucknow.

To ensure that avoiding single-use plastic is being practiced, individuals can take the following steps:

- **Bring your own bags:** Carry a reusable bag or tote whenever you go shopping, to avoid using plastic bags.
- **Use a refillable water bottle:** Instead of buying bottled water, carry a refillable water bottle and fill it up from a trusted source.
- **Say no to straws:** When you order a drink, ask the server not to give you a straw, or carry a reusable metal or bamboo straw with you.
- **Spread awareness:** Encourage others to avoid single-use plastic by explaining the benefits and suggesting alternatives.

(detrimental effect of plastic by 2050)

In conclusion, avoiding single-use plastic can have significant positive impacts on the environment and public health in Lucknow and throughout India. By reducing litter, decreasing pollution, and conserving resources, residents can help make their city cleaner and more sustainable. The government's initiatives to ban single-use plastic items and individuals' efforts to bring reusable bags, refillable water bottles, and metal/bamboo straws can help ensure that avoiding single-use plastic becomes a widespread practice.

5. PLANT TREES

According to a study published in the journal Environmental Pollution, planting trees in urban areas can significantly reduce air pollution levels, which can have a positive impact on respiratory health. In fact, the study estimates that if India were to plant trees on 20% of its urban land, it could reduce pollution-related deaths by up to 40%.Planting trees in public spaces: Planting trees in public spaces, such as parks, schools, and hospitals, can help reduce the carbon footprint and make the city greener.

According to the Global Forest Resources Assessment, India's forest cover increased by over 5,000 square kilometres between 2010 and 2020, resulting in an estimated reduction of 299 million tons of carbon dioxide emissions.

Studies have shown that spending time in green spaces can have a positive impact on mental health and well-being. Trees and other greenery can reduce stress and anxiety, increase feelings of relaxation and calm, and improve mood. In fact, a study published in the International Journal of Environmental Research and Public Health found that spending time in green spaces can improve mental health by reducing symptoms of depression and anxiety. By planting more trees, we can help to promote biodiversity and create healthier ecosystems. In fact, a study published in the journal Nature found that planting more trees could help to restore the habitats of up to 55% of threatened species and 25% of priority species.

- Planting trees in residential areas: Planting trees in residential areas can help reduce the carbon footprint and improve air quality.
- Taking care of trees: Taking care of trees by watering them, trimming them, and protecting them from pests can help ensure their survival and growth

6. SUPPORT ENVIRONMENTAL ORGANIZATIONS

Supporting environmental organizations is crucial to preserve the environment. These organizations work towards protecting natural resources, promoting sustainable practices, and educating the public about environmental issues. Lucknow residents can support environmental organizations by:

- Volunteering: Volunteering with environmental organizations can help support their initiatives and promote environmental preservation.
- Donating: Donating to environmental organizations can help support their initiatives and promote environmental preservation.
- Participating in events: Participating in events organized by environmental organizations, such as tree-planting drives and clean-up campaigns, can help promote environmental preservation.

CONCLUSION:

To summarize, making our Earth green is not just a responsibility but a necessity. Lucknow residents can take several steps to preserve the environment, such as reducing energy consumption, promoting sustainable transportation, conserving water, reducing waste, planting trees, and supporting environmental organizations. By taking these steps, we can help ensure a healthy and sustainable future for ourselves and the generations to come. It's important to note that every positive step, no matter small, can make a significant impact.

Let's join our hands and take action towards making our earth green and sustainable. Together, we can make a difference.

Dr. S. C. Sharma
Senior Vice-President
CGES, Lucknow

Aims and Objective of the Society

Seven billion People one Planet, consume the Resources with care.

Clean and Green Environmental Society (CGES) has been established as a Vibrant Body of Professionals to promote the program for Clean and Green India to saving the environment with the following Aims and Objectives.

1. CGES will act as a Think Tank to promote environmental education, diffusion of useful knowledge for the protection and preservation of the environment among the members, public, institutions.
2. Think Globally but act Nationally.
3. Care and Share the Nature.
4. To provide opportunity for better interaction among researchers, teachers, social workers, school children and NGOs on the environmental issues.
5. To generate awareness among the masses and policy makers for saving the environment.
6. To organize lectures of reputed professors and environmental scientists of India as well as abroad.
7. To hold seminars, conferences / symposia / workshops / training programs, focusing on the thrust areas of environmental awareness / issues at national and international levels.
8. To grant financial support to scientists / research workers for attending National / International seminars / symposia, conferences in India.
9. To award medals / certificates / honours to individuals / organizations who / which have achieved outstanding distinction in the area of environmental education, awareness, conservation of bio-diversity and research programs.
10. To honour outstanding environmentalists, life members of the CGES as 'Fellow of the Society'.
11. To publish Newsletter of the Society.
12. To address all such issues or matters as may be related to the protection, preservation etc. of the environment at the local, state, national or international levels
13. To provide consultancy services for the establishment and improvement of the Botanic Gardens, Arboreta, Parks, Herbal Garden, Green Belt, Construction of Urban Ecology etc.
14. To conduct training courses for the gardeners, supervisors, managers under the Skill Development Program of the Govt. of India and other such programs in Uttar Pradesh and other states.
15. To provide authentic information on the medicinal, economical, ornamental, pollution tolerant plants and their source of availability

Clean and Green Environmental Society (CGES)

Lucknow 226 010, Uttar Pradesh (India)
(Registered under Society Registration Act No. 1860)
www.cgesindia.org

MEMBERSHIP APPLICATION FORM

Please Paste Recent Passport Photograph

To,
The Secretary General
Clean and Green Environmental Society
'*Green Villa*'
2/111, Vishwas Khand
Gomti Nagar, Lucknow-226 010 (India)
Mobile: +91-94153-43141

Dear Sir,

I wish to enroll myself as a ……..... Member of the Clean and Green Environmental Society. I am paying herewith the Membership fee Rs……..(in figures), (Rs. .....(In words) by Cash, Cheque / Bank draft / Electronic transfer/No..... in favor of CLEAN AND GREEN ENVIRONMENTAL SOCIETY.

1. Category of Membership: (Please tick) **(Membership fee one time only)**

Life Member:	**Rs.5, 000/-**
Life Member with Spouse:	**Rs.6, 000/-**
Patron Member:	**Rs.15, 000/-**
Institutional Member (Non-Commercial)	**Rs.10, 000/-**
Institutional Member (Commercial)	**Rs.25, 000/-**

2. Name (Prof. / Dr. / Er. / Ar. / Mr. / Mrs. / Ms. / Miss):

3. Father's Name:

4. Educational Qualification:

5. Organization / Institute (If any):

6. Designation (If any):

7. Mailing Address:

8. Phone/Fax Nos.:

9. E-mail ID:

Date: **Signature of Intending Member**

Mode of Payment/Remittance:
Membership can be paid in Cash or through Bank transfer, Account Payee Cheque / Bank Draft.
Note: All correspondence should be addressed to Dr. S.C. Sharma, Secretary General, Clean and Green Environmental Society, '*Green Villa*', 2/111, Vishwas Khand, Gomti Nagar, Lucknow-226 010, Uttar Pradesh (India)
Mobile: +91-94153-43141, Email: scsharmagardener@gmail.com; cleanandgreenenv@gmail.com ; Website:www.cgesindia.org

IMPORTANT
The cheque / draft of the Membership fee should be made in favour of CLEAN AND GREEN ENVIRONMENTAL SOCIETY, SBI Current Account No: 35542148634 (IFS Code : SBIN0009916) State Bank of India, Gomti Nagar, Lucknow-226 010.
Membership fee should be mailed along with the Application Form to the Secretary General, Clean and Green Environmental Society, '*Green Villa*', 2/111, Vishwas Khand, Gomti Nagar, Lucknow-226 010, Uttar Pradesh (India)
If any Member wants to leave the CGES, Membership fee will not be refunded.

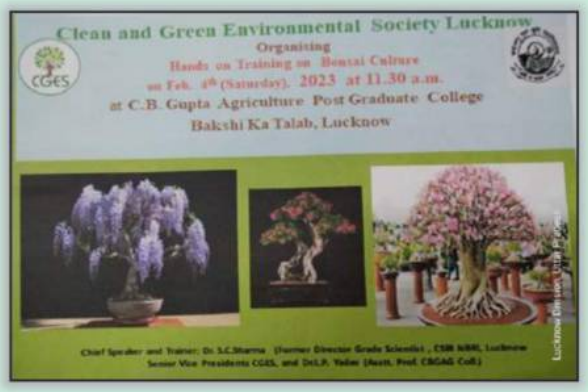
For Office Use Only

Membership no. **Membership Accepted / Not Accepted**

(Treasurer's Signature) **(Secretary General's Signature)**

Media Coverage

VISIT OF EXPERTS' TEAM ON AGRICULTURE FARM OF
C.B.GUPTA AGRICL. COLLEGE BAKSHI KA TALAB, LKO ON 4.2.2023



बोनसाई बनाने पर दिया प्रशिक्षण

बख्शी का तालाब। चंद्रभानु गुप्त कृषि स्नातकोत्तर महाविद्यालय में क्लीन एंड ग्रीन एनवायरमेंटल सोसायटी लखनऊ की ओर से बोनसाई कल्चर पर ट्रेनिंग का आयोजन किया गया। सोसायटी के वरिष्ठ उपाध्यक्ष डॉ. एससी शर्मा ने बोनसाई के महत्व को बताया तथा बोनसाई बनाने में पौधे चुनने पर चर्चा की गई। उन्होंने अनार, आम, अमलतास, नीम, बरगद, बॉटलब्रश, कनेर, संतरा, गूलर एवं पीपल की खासियत बताई। कहा कि ये पौधे 24 घंटे ऑक्सीजन छोड़ते हैं। (संवाद)

Our Banker

CGES Executive Body

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