CGES Newsletter

CLEAN AND GREEN ENVIRONMENTAL SOCIETY

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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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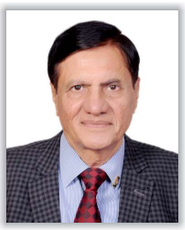
PRESIDENT'S MESSAGE



CGES- Clean and Green Environmental Society, is a Vibrant Body of Professionals to promote the program for Clean and Green India to saving the environment with the Objective to promote environmental education, diffusion of useful knowledge for the protection and preservation of the environment, and 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. It also offers Advisory/Consultancy Services for Inspection, Selection, Collection and Plantation of the Pollution tolerant Trees, Shrubs and Herbs for the Green Belts, Highways, Flyovers, Road sides, Dividers, Construction of Urban Ecology and Phyto-remediation of Outside and Inside Pollution of our Surroundings and awareness amongst children – 'CATCH them young & make them AWARE.

The last six months of CGES have been quite fruitful as we have organized the third "National Conference on Ecological Restoration & Biodiversity Conservation- ERBC-2022," in collaboration with CSIR–National Botanical Research Institute Lucknow (CSIR – NBRI). After the ups and downs, due to the Corona pandemic, we were able to organize it in the month of Sept. 2022. Its goal was to address- recent advances in the biodiversity-ecological functioning relationship to illuminate the biodiversity maintaining mechanisms. The seminar provided an opportunity to 242 participants from U.P. and many other states of the country to join hands to discuss these problems and to come to a sustainable solution.

This conference undoubtedly provided a chance to mend the fractured relationship with nature as "biodiversity conservation" serves as an insurance policy for the future. National conference was held in a well planned manner which was a grand success. I would also like to welcome the new members in CGES, Prof. R.S. Dwivedi and Dr. S.N. Tyagi (IFS).

CGES and I personally lost a dear friend and well wisher Dr. Prahlad Seth. Dr. P.K. Seth was former Director of Indian Institute of Toxicology Research (IITR) and the first CEO of Lucknow's Biotech Park and advisor of CGES The news of his demise brought a wave of grief among people of the scientific fraternity.

CGES will always miss his gentle affectionate behavior and smiling face.

My earnest thanks and gratitude to Dr. S.C. Sharma who is the driving force behind CGES and its activities. My Grateful thanks to Prof. Dr. Yogesh Sharma, Prof. S.K. Barik and all well wishers of CGES.

I would like to express my sincere thanks to the Editorial Team and specially Prof. Naveen Arora for their dedication in making the CGES Newsletter a significant publication. On behalf of the Clean and Green Environmental Society (CGES) and on my own behalf, I extend you best wishes for your health and well being for the New Year 2023.

Jai Hind

सुमेर अग्रवाल

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CGES New Life Members

Prof. R.S. Dwivedi, Dr. S.N. Tyagi

Summary of 8th Foundation Day

Clean and Green Environmental Society celebrated its Seventh Foundation Day on July 8 (Friday), 2022 at 5.00 p.m. at LEVANA Suites, Madan Mohan Malviya Marg, Lucknow. The Foundation Day address was given by Chief Guest Prof. P.K. Seth, NASI Senior Scientist, Platinum Jubilee Fellow, Former Director, IITR & CEO, Biotech Park, Lucknow.

Key Note Speaker was Prof. Naveen Arora, (Dean School of Earth & Envl. Sciences, BBA University Lko.) who delivered a lecture on "Only one Earth" addressing specially the importance of sustainabile system for strengthening the Earth resources for human kind.

A special lecture was given by Mr. Brajesh Sharma (Wellness Advisor & Lung Trainer, Gurugram) on "Healthy Lungs for Healthy Life" and emphasized the importance of lungs in human body, a lesson taken from Corona pandemic. He presented his talk with some simple model exercises for healthy lungs and our food habit for healthy lumgs.

Summary of Third National Conference held on 17, 18 Sept. 2022

Third National Conference on Ecological Restoration & Biodiversity Conservation was Organized on September 17-18, 2022 in collaboration with CSIR-National Botanical Research Institute, Lucknow. The Organizing Secretaries were Dr. Priyanka Agnihotri, Prof. Yogesh K. Sharma and Prof. Naveen Arora. There were more than two hundred participants in the conference. Sri Durga Shankar Misra, 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. The entire program in the conference included different Theme areas-

- Landscape ecology, Restoration and Community
- Ecological processes, Ecosystem functioning and Services
- Transboundary approaches to eco-restoration
- Restoration to address climate change and biodiversity loss
- Plant diversity, Inventorization and conservation
- Endemism & Phytogeography
- Bioprospection & Sustainable utilization
- Overcoming threats to biodiversity: The Global and Local solutions
- Importance and conservation of microbial biodiversity

In each theme area the invited lectures (by eminent Academicians and Scientists) with paper presentations were held as per different sessions. More and more youngsters were given opportunity to present their research work. Poster session was also organised, and the winners were awarded cash prizes and certificates after proper judging.

Tribute to Prof. P.K. Seth

Untimely demise of a scientist like Prof. Seth, is a big loss to entire Science community. He was born on15.06.1943, and left to heavenly abode on 22.12.2022 at the age of 79. He is survived by a son and two daughters. He was NASI Senior Scientist, Platinum Jubilee Fellow, Former Director, IITR & First CEO, Biotech Park, Lucknow. He was founder member of Clean and Green Environmental Society, and a strong pillar in all the good doings of the society. He contributed enormously to various areas of Toxicology like Neurotoxicology, Reproductive toxicology etc. He will be remembered for his stellar contribution in these branches. He founded Indian Academy of Neurosciences. A condolence meeting of Executive members of the Society was held on 21.1.2023 to mourn his death, who prayed for the peace of the departed soul.

Importance of Greenbelt in Aesthetic and Landscape Development

R.K. Roy

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Greenbelt basically refers the plantation of trees and other plants in a particular place in a planned manner for a specific purpose. This is a systematic biological effort for sustained amelioration of environment by greening. Development greenbelt is made to achieve many purposes and act as a functional green tool for improvement of environment. If it is planned in a specific way, the greenbelt developed may serve many functions and fulfills many objectives, in addition to its primary purpose.

Purposes of Greenbelt:

- Development of greenbelt is a good and positive planning to achieve multiple objectives.
- It stops urban sprawl and encourages the vital regeneration of large cities.
- It protects the landscapes important to our environment, heritage and wellbeing of human beings.
- Both UN-Habitat and the European Commission have highlighted the particular problems arising from uncontrolled urban sprawl around large cities.
- Building on the greenbelt is a solution to the housing crisis – partly because of its proximity to cities, and partly due to its 'low environmental value'.
- Greenbelt often includes significant local biodiversity and heritage assets. Moreover, it also captures carbon, provides space for water to prevent flooding, and protects the underground water.

Additional Benefits of Greenbelt for the People:

- Relaxation, outing, walking, camping, and escapes from the cities and towns.
- An opportunity to come close to the nature and natural habitats particularly with wild plants, animals and wild life.
- Provide cleaner air and water.
- Better land use of areas within the bordering cities.
- Provides an aesthetic improvement, act as climatic amelioration, biomass generation, and enhancement of biodiversity through the presence greenery in the concerned areas.

Therefore, greenbelts are recommended for combating air pollution in the human environment, especially in urban and industrial environment. In addition, there were a number of other following benefits.

- Greenbelt development envisages the multiplicity of objectives encompassing the micro level air pollutant abatement to enhancement of socio-economic value of the region.
- The prime objective of greenbelt is attenuation of air and noise pollution.
- Greenbelt also improves the soil quality in degraded landscape.
- Development of greenbelt helps to generate the employment avenues and thus involve the mass participation in environmental protection activity. On the whole, Green Belt can also act as a backup technology for pollution abatement measures which could substantially reduce pollution hazard.
- Greenbelt also serves as a measure for soil protection for erosion losses, enhance the aesthetic value and beautify the landscapes.

Current Status of Green Belt Development in India:

Govt. of India has made it mandatory to have Greenbelt around the new as well as existing industries. However, no specific norms regarding the width of greenbelt and pollution potential activity have been defined so far.

The width of the Greenbelt varies from 50 to 500 m. depending on pollution level of the Industry. However, land availability becomes a major constraint in greenbelt development around any source of pollution in India. By and large, as par usual practice depending on space availability for mega industries the width of greenbelt should be 200m to 500m around pollutant emitting sources.

Greenbelt / Green Space : A Necessity:

Planning for Open spaces to make cities healthy is a must. As cities grow, development of green space becomes more important and mandatory. Paris Climate Change Agreement mandates for making cities sustainable and livable by promoting larger green cover in the following way.

- Planting more trees
- Creating larger carbon sink
- Taking green cover from 24 to 33% by 2030
- To create additional carbon sink of 2.5-3 billion tones

WHO Emphasizes Physical Inactivity as a Major Public Health Risk:

Studies found that people using open spaces are three times more physically active. Greenbelt / green space are, therefore, a necessity for every large town / cities, as:

- People prefer nearby attractive larger parks/ open spaces / greenbelts.
- Improving access / creating network of parks / open spaces results in increased physical activity, improved mental health, better general health, reduced stress levels, reduced depression, reduced healthcare costs.
- Environmental benefits to the adjacent urban and industrial areas.
- Providing healthy habitats for humans/ wildlife / plants in densely built places.
- Preserves ecosystems around growing cities.

Advantages of Green Spaces /Open space in urban environment:

- Formal / informal sport recreation.
- Preservation of natural environment.
- Modulating environment.
- Improved quality of life.
- Making city people healthier.
- Making people more productive.
- Acts as vital lungs to city.
- Improving community feeling.

Benefits of Greenbelt / Green Space in Cities:

- Open space provides three types of benefits to the citizens - Recreation, Ecology, Aesthetic value.
- Recreational - active recreation (organized sports / individual exercise), Passive recreation (being in open space).
- Other benefits such as - Reprieve from urban environment, Ecological, Conserving nature, Creating ecological awareness, Promoting biodiversity and Providing home to natural species.

Aesthetic Value of Greenbelt:

- Scope for people for enjoying nature.
- Delightful neighbourhoods for an outing and other attractions.
- Creates positive attitudes for the urban people by seeing well designed landscape.

Conclusion:

Greenbelt serves multiple purposes, if properly

planned and executed. Developments of greenbelt adjacent to cities and towns have multiple advantages. In addition to pollution abatement, it is a facility for urban peoples for many things viz. a perfect outing place, scope for interaction with natural elements, association with nature, relaxation, recreation, physical activities and many more.

Therefore, aesthetic and landscape importance of greenbelt is equally significant with environmental amelioration. However, proper designing, selection of right plant species, together with proper agro-technological practices are needed. Then only a greenbelt can successfully be exploited for multiple purposes.

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Conservation of plants: Need of the hour

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Biodiversity is a source of significant economic, aesthetic, health and cultural benefits which form the foundation for sustainable development. Biodiversity refers to the variability among the different species of plants and animals present on the earth. Plant diversity forms one of the most fundamental characteristics of the environment. Plants have been of indispensable significance. They are an integral part of life and form the backbone of one great interdependent system. There are about 3,91,000 described plant species in the world. Plant diversity has a direct control over the climate regulation, maintenance of food reservoirs, mitigation of soil erosion, enhancement of medicinal sources, protection of

watersheds and providing shelter to animals.

Unfortunately, the vast plant diversity of earth is endangered due to human and natural activities which will result in biodiversity loss over a long term and there are considerable evidences that contemporary biodiversity decline will lead to subsequent decline in the functioning and stability of ecosystem. Anthropogenic elements dominate the natural factors responsible for the biodiversity loss. Human activities have been a source of biodiversity crisis, with high rate of extinction of species. The scale of human impact on biological diversity has been increasing exponentially primarily because of the world wide patterns of consumption, production, trade, agricultural, industrial and settlement development. Those processes that drive extinction are also responsible for eroding the environmental services on which humans are dependent. Therefore, it is imperative to say that an alarming situation is already existing which requires immediate efforts for the conservation of biodiversity so as to prevent it from further decline. Conservation efforts necessarily need to be prioritized.

Conservation is the protection, preservation, management or restoration of wildlife and natural resources. Conservation of plants ultimately aims at protecting the species from becoming extinct at local, regional and global level. In the last few decades, the steady decline in the diversity of genes, species and ecosystems hindered the way to a sustainable world. Before setting up the ways for conservation, the reasons for the loss need to be understood. Plants face many threats driven by different factors. One of the most important causes of decline and extinction of plant species include anthropogenic factors which result in alleviated population sizes. Habitat loss, fragmentation, degradation, introduction of exotic species, climate change, overexploitation and pollution are the major factors responsible for loss of plant diversity. Recently, climate change has also been revealed as a major driving force for plant extinction as it directly interferes with the growth and flowering in plants. To a greater extent, climate change alters the geographical distribution of plant species, leading to their extinction. Besides, overexploitation of the economically important plants for commercial and medicinal use obviously results in decreased plant diversity. During the last decades, atmospheric carbon dioxide has reached unprecedented level along with the nitrogen deposition which is expected to have pronounced effects on environment, especially the plant communities.

Considering the present situations, it is the time to adopt offensive and integrated approach towards plant conservation rather than the defensive one. Within the face of the global biodiversity crisis, and the often tightening budgets, traditional and effective ways should be adopted for the conservation of biodiversity. Following more offensive and integrated approach, rational conservation policy for the protection of plants should be implemented mainly focussed on creation of space for plants, improvement of environmental quality for plants, developing targeted conservation policy for specific plant species and enhancing the social awareness for plant conservation through education programmes.

Besides, different *in-situ* and *ex-situ* methods provide effective ways for conservation. *In-situ* is the conservation of habitats and ecosystems where organisms naturally occur. It includes the set-up of biosphere reserves, national parks, wildlife sanctuaries, sacred groves and biodiversity hotspots. On the other hand, ex-situ conservation is a set of techniques involving the transfer of target species from its native habitat to a place of safety like a botanical garden or gene bank. The primary objective of *ex-situ* conservation is to support conservation by ensuring the survival of threatened species and maintenance of associated genetic diversity.

Owing to immobile habit of plants, habitat loss is particularly disastrous for them, as they disappear with their habitat. Therefore, the

preservation of the remaining habitats and the enlargement of existing habitat patches is precondition for any conservation strategy. Preservation of habitat quality usually enhances the population size and flowering probability of plant species which in turn accelerates the reproductive success of the plant species by reducing inbreeding depression. In addition, the establishment of 'corridors or stepping stones' may counter balance fragmentation of the land and reduce its negative implications for plant population. Increased connectivity can help to improve the persistence of plant species. The cost effective conservational strategy also includes identification of biodiversity hotspots where exceptional degree of endemic species is facing considerable habitat loss. Currently, there are 36 biodiversity hotspots on our planet inhabiting 2.5% of the earth's surface and supporting about more than half of the world's endemic plant species. Apart from conservation within their natural habitats, threatened and endangered plants may also be preserved ex-situ. Botanical gardens and seed banks fulfil an important role in the preservation of highly endangered species, playing an operative role in complementing in-situ conservation. Moreover, overexploitation of the medicinal and other economically important plants should be controlled so as to prevent them from becoming threatened and get extinct.

It is true that conservation of plant diversity has acquired less attention than those of animals. As a result, conservation of plants is greatly under-resourced. Therefore, conserving plants is a complex task for which a series of combined efforts is needed. Though, there are certain barriers to the goal of achieving effective conservation including incomplete survey of plants, incomplete assessment of IUCN, uneven global coverage of protected areas and absence of enthusiasm towards the conservation of plants, which need to be overcome; yet integrated efforts involving a combination of well- designed, well-regulated and well-managed system would help to achieve the target of zero-extinction of plants and their efficient conservation.

Conservation of Medicinal Plant Diversity in Indian Himalayan Region

The use of natural herbal drugs to alleviate suffering is perhaps as old as the origin of man itself on this planet. Plants and animals with medicinal properties were held in the highest esteem in indigenous medicine system all over the world. All indigenous remedies, whether traditional or modern, have originated directly or indirectly from folklore or modern, have originated directly or indirectly from folklore and rituals or measures hold the key to the treasures of folk medicinal knowledge and ethno medic-botany. It is estimated that 70-80% of people worldwide rely chiefly on traditional herbal medicine to meet their primary healthcare needs and the global demand for herbal medicine is not only large, but growing. The use of alternative medicine is growing because of its moderate costs and increasing faith in herbal medicine. Allopathic medicine can cure a wide range of diseases, however, its high prices and side-effects are causing many people to return to herbal medicines which tend to have fewer side effects. A great amount of traditional knowledge about the use of medicinal plant species is still carried and orally transmitted by indigenous peoples. Regions with less accessibility and a comparatively slow rate of development, such as and mountainous areas like the Himalayas are excellent examples. Because of the fast acceleration of market demand for herbal medicines, and recent controversies related to access, benefit sharing and biopiracy, the documentation of indigenous knowledge is of urgent priority. Indigenous knowledge, supplemented by the latest scientific insights, can offer new holistic models of sustainable development that are economically viable, environmentally benign and socially acceptable. Currently, approximately 25% of allopathic drugs are derived from plant based compounds,

and many others are synthetic analogues built on prototype compounds isolated from plant species. According to the World Health Organization (WHO), as many 80% of the world's people depend on traditional medicine to meet their primary health care needs.

The Himalaya is a biodiversity hotspot and a storehouse of endemic medicinal plants, which grow in valleys, hills, terraces and on the exposed flat mountain tops and valleys. The Himalayan regions are particularly rich in biodiversity because of their varied geographical, physiographical, topographical, climatic and ecological zones. Due to a wide range in altitudinal variations (1000-6300 m), the Himalaya harbors a variety of natural flora comprising subtropical to temperate, alpine and nival floral elements. Of the approximately 8000 species of angiosperms, reported in the Indian Himalaya, 1748 species are known for their medicinal properties. The state of Uttarakhand is a part of north-western Himalaya, and still maintains a dense vegetation cover (65%). The maximum species of medicinal plants have been reported from Uttarakhand, followed by Sikkim and North Bengal. The trans-Himalaya in contrast sustains about 337 species of medicinal plants, which are low compared to other areas of the Himalaya due to the distinct geography and ecological marginal conditions. Recent years have seen a sudden rise in the demand of herbal products and plant based drugs across the world resulting in the heavy exploitation of medicinal plants. Habitat degradation, unsustainable harvesting and over-exploitation to meet the demands of the mostly illegal trade in medicinal plants have already led to the extinction of more than 150 plant species in the wild. More than 90% of plant species used in the herbal industries are extracted from the wild, and about 70% of the medicinal plants of Indian Himalaya are subject to destructive harvesting, and the majority of these plants stems from sub-alpine and alpine regions of the Himalaya. The importance of ethnobiological knowledge on species-ecology can provide leads for new paths in scientific research and conservation, and has received growing attention in resource management worldwide. International agencies such as the World Wildlife Fund (WWF) and United Nations Educational, Scientific and Cultural Organization (UNESCO) as part of their people and plants initiative, are promoting research on ethnobotanical knowledge and the integration of people's perceptions and practices in resource management at the local level.

Due to cultural and ethnic diversity in different biogeographic provinces of the region the traditional knowledge base varies considerably. The indigenous knowledge of the region is unique. Such knowledge is widely followed and relied upon throughout this region, particularly by people of remote areas. Increasing population pressure, and the spread of global market economics and consumerism have already brought profound changes to the region, and its inhabitants are gradually changing their traditional way of life. However, with renewed global interest in traditional medicine and the increasing demand for plant products, the documentation of medicinal plant diversity and associated traditional knowledge is necessary to maintain the cultural view point as well as to establish a sound scientific basis of the efficacy of traditional medicine, and for the conservation of important species.

As a result of continuous and relentless extraction over many decades, many valuable species are facing danger to their survival in their natural habitats. Some of the threatened species are *Aconitum heterophyllum*, *Atropa acuminata*, *Dioscorea deltoidea*, *Dactylorhiza hatagirea*, *Jurinea dolomiaea*, *Nardostachys grandiflora*, *Picrorrhiza kurrooa*, *Podophyllum hexandrum*, *Rheum australe*, *Swertia chirayita*, *Valeriana hardwickii*, *Saussurea royleii*, *Saussurea gossypiphora*, *Saussurea obvallata*, *Pleurospermum brunonis*, *Polygonatum cirrhifolium*, *Fritillaria cirrhosa*, and *Codonopsis ovata*. Unregulated exploitation and

disorganized trades are responsible for the sharp decline in the herbal wealth of the area. During our field work in the Himalayan region, we found that a wealth of knowledge regarding the ethno botanical and medicinal uses of plant species lies with shepherds (*Gaddies*, *Gujjars*), healers (*Vaids*) and the old people living in the area. However, these people seldom agree on revealing the information and only through persistent requests and motivation do they share their knowledge about the use of herbs. One superstitious belief is that the herbs loose healing power if their 'secret' is shared with 'outsiders' and another reason they cite is that herbs are useful only when used in combination with 'tantra-mantra' (i.e., occult practices). The Indian Himalayan Region is very rich in plants with medicinal value and concerted efforts are needed for their conservation. To check the loss of biodiversity owing to overexploitation and habitat degradation, effective measures for conservation and management need to be put in place. *In-vitro* propagation techniques and conventional methods to allow for their transplantation into natural habitats will be an important step towards the conservation and management for threatened, rare and endangered species. The development of agro-techniques for high-valued himalayan species can help to meet the requirement of raw material for commercial use and reduce the pressure on the existing populations in natural habitats.

Contribution of plants to sustain the environment and human life

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In the prehistoric period the origin of life on the earth led to the appearance of fundamental elements, compounds and complexes which helped evolve a variety of micro-organisms, plants and animal species that culminated into angiosperm plants and mammalian animals including human organized into biodiversity. The human life could cross through several ages of evolution i.e. Stone Age, Bronze Age, Iron Age and finally stabilized to the present day human (*Homo sapiens*) and the environment. Since the dawn of evolution of human civilization, an intricate inter-relationship among them and interaction with the environment took place, what we call ecosystem.

Eventually the fundamental requirement for existence of a normal human life was the availability of oxygenated air and water in the environment for proper breathing and hydration of living cells. Then after a series of gradual human needs (primary, secondary and tertiary) were advanced for the existence and survival with comfort and modern facilities in which plants played a significant role.

As such the following active participation of green plants to fulfil the various categories of needs in human life will throw light on the issue of human interests towards nurturing of plants.

(A) Primary needs:

1. Natural Oxygen generators: The green plants absorb Co_2 and release O_2 into environment through photosynthetic reactions as result of which ample amount of carbohydrates are synthesized and the solar energy is transformed into chemical energy. It has been estimated that one tree in its life supplies oxygen which is equivalent to 05.50 lakh (INC). Areca palm (*Chrysalidocarpus lutesans*) and Money Plant (*Epipremnum aureum)* provides about 40% oxygen to the environment per 12 hours.

2. Food eatables and beverages: Majority of angiospermic plants provide various food eatables and beverages in form of cereals, pulses,

vegetables, spices, tea, coffee, cocoa, chocolate.

3. Fruits and nuts: A good number of plants are **fruits and nuts** yielding with higher contents of vitamins, minerals, antioxidants and carotenoids.

4. Fibre yielding: The **fibre** yielding plants such as jute (*Corchorus olitorius*), flax (*Linum usitatissimum*) and cotton (*Gossypium herbaceum*) are prominent to solve the requirement of clothing.

5. Building and hut construction: The **timber** yielding plants e.g. sal (*Shorea robusta*), sisso (*Dalbergia sissoo*), sagwan (*Tectona grandis*), Gambhar (*Gmelina arborea*), Karam (*Adina cordifolia*), Deodar (Cedrus deodara), Pines (Pinus roxburghii and bamboo (*Bambusa balcooa*) are useful in building construction as posts, pillars, furniture, fire wood, fencing materials.

(B) Secondary needs:

1. Soil fertility: The leguminous plants have power of nitrogen fixation by absorbing nitrogen from air through their root nodules. The water holding ability of plants retains the essential minerals for increasing the fertility of soil.

2. Medicine providers: More than 70% allopathic drugs like antibiotics, antioxidants, ant-allergic, antipyretic, anticancer, antiseptic, anti-ophthalmic, vitamin supplements, cardiac and hepatic tonics, ayurvedic and homeopathic medicines are prepared from plants. So medicinal plants contribute immense therapeutic materials for human health management.

3. Plant by-products: The plant by-products such as dye, turpentine, pesticides, resin, perfumery, essential oils and rubber are greatly useful in human life.

4. Soil binders: Plant trees and shrubs save from soil erosion during flood and also from wind blows by weakening the speed of storms, cyclones and typhoons.

5. Avenue trees: Large trees like Pipal (*Ficus religiosa*), banyan tree (*Ficus benghalensis*), Gular (*Ficus glomerata*), Pakar (*Ficus rumphii*), Putranjiva (*Putrnjiva roxburghii*), Neem (*Azadirachta indica*), Gulmohar (*Delonix regia*) are known as shade plants which provide shades to the travellers on roadside.

(C) Tertiary needs:

1. Stress relievers: The beautiful and attractive flower yielding plants provide great relief to persons who are suffering from tension (37%), depression (58%), fatigue (38%), anxieties (44%).

2. Creativity providers: Wild and cultivated plants contribute greatly to develope lawn, national park, botanic garden, resort, sanctuary and world safari for creativity of human populations.

3. Environmental cleaners: The plants such as *Cactus species*, *Aloe vera*, *Sansevieria trifasciata*, mustard green, *Chlorophytum comosum*, *Ocimum sanctum*, *Adiantum*, *Asparagus*, *Nephrolepis exaltata*, *Hedera helix*, and *Ficus elastica* have unique capability of absorbing UV, X-rays, β-rays, γ-rays, nuclear and computer radiations. The plants like *Chamaedorea erumpens, Guzmania lingulata, Dracaena fragrans, Aglaonema modestum, Chrysanthemum morifolium, Ficus benjamina, Gerbera jamesonii* and *Anthurium scherzerianum* able to absorb greenhouse gases (CO_2, CFC, NH_4, and N_2O) and toxic chemicals e.g. benzene, formaldehyde, ammonia, trichloroethylene, xylene, toluene, acetone, air pollutants, allergens and carbon dioxide, therefore these plants are called detoxifying plants which are capable to reduce the effect of global warming. The outdoor detoxifying plats are Ferns, Orchids, *Monstera*, *Philodendron*, *Schefflera*, *Spathiophylum*, *Roystonea regia*, coconut tree, *Ginkgo biloba*, *Dracaena marginata* and *Calatheas* Thus these plants are directly involved in environmental cleaning.

4. Fossil fuels: The fossil fuels such as charcoal, coal, petroleum, oil and natural gases including LPG, CNG, PNG are actually fossilized plant

remains of the past. These fuels are used as energy resources for steering thermal power plants for electricity generation, transportation (road, rail and aviation) and industries like petrochemicals, automobiles and cooking fuels.

5. Research materials: Plants have occupied the front lines in form of the most suitable experimental materials for researches in biotechnology, molecular biology, genomics, proteomics, immunology, pharmacology, agricultural sciences.

The above contributions of plants to the environment and human life clearly indicate that without plants there would be no imagination of a sustainable environment and the survival of human life.

Eco-Terrorism

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For many years there has been a problem of terrorism across the world and India is also facing severe impact of terrorism. Since long back due to terrorism, a lot of death in many countries occur and so far it is going on. Efforts are underway to stop terrorism activity. This is very well known disaster in society, however, another type of terrorism which has not get noticed for many years, is gradually increasing. Unfortunately, this is hidden or latent incidents which cause adverse impacts not only on human beings and animals but of course entire ecosystem is being suffered. It is called Environmental Terrorism (Eco-Terrorism). Acts of eco-terrorism, also known as ecotage (a combination of the prefix "eco" and the word "sabotage"). A new environmental problem has introduced over the years. A problem is far more dangerous for present as well as future world. Due to terrorism only a few people are affected or die of the attacked place, but environmental terrorism affected not only few people but damage many people as well as the upcoming generation likewise chernobyle, atomic attack on Japan and in India Bhopal gas tragedy. Due to severe effects of all these disasters all environmental media like water, air and soil become contaminated from xenobiotics. Environmental terrorism mainly affected the nature or natural sources.

Another term is bioterrorism which may be strong weapons to create turmoil, for example, threats to pollute the water supply or destroy or disable energy services, as well as practices such as the deployment of anthrax or other biological agents.

Eco terrorism refers to violate the rules and regulations set for environmental protection which may cause severe damage to natural resources as well as ecosystem. Eco-terrorists are those people who do not follow the rules relating to the environments.

In India, there are many factors responsible for destruction of the environment. These factors are various types of pollutants, industrial wastes, smog, heavy metals (HMs), plastic material, E-waste and much more. Pollution is the major factor which is responsible for eco-terrorism because due to various types of pollutions the environment become more and more polluted.

Air pollution occurs when harmful or excessive quantities of substances including gases,

particulates, and biological molecules are introduced into earth's atmosphere. There are various manmade sources which play a key role in environment destruction. These molecules/ substances mix in the air and fall down into the soil, rivers and other water bodies. Most commonly used harmful products by human are fossil fuels, fumes from paint, hair spray, varnish, aerosol sprays and other solvents, nuclear weapons, toxic gasses, fertilized farmland, etc. In India the most famous example is the Smog in Delhi (capital of India) which is a consequence of air pollution. In year 2017 it is detected in PM 2.5 and PM 10 level. First time reported as one of the worst levels of air quality in Delhi since 1999 (Hindustan Times). An another marvelous example is the Bhopal gas tragedy which is occur on December 1984 by leakage of Methyl isocyanate (MIC) in a large amount. There are approximately 5,00,000 people were exposed by this gas and officially 2,259 immediate deaths are recorded (Fig. 1A).

Another important factor of Eco-terrorism is the Soil pollution. Soil pollution causes the soil to become unfertile. There are various man-made/natural chemicals which are harmful for soil fertility is collectively called as xenobiotic. In India it is recorded that West Bengal is highly polluted with arsenic (As). Not only West Bengal, even in Uttar Pradesh arsenic contamination is spreading day by day and many districts like Sant Kabir Nagar, Siddharth Nagar, Lakhimpur-kheri has been reported as As contaminated zone. In Bhatinda, Punjab approximately 60 people travel daily for treatment of cancer due to agricultural contamination with pesticides. So the train through which these people travel local people called "cancer train".

Another important factor of contamination of fresh water bodies as well as ground water is the use of HMs, pesticides, fertilizers and other herbicides as well in excess amount. These products carried off with the rain water into water bodies. Fly ash produced from thermal power station, damages the surrounding agriculture land, water and also affected the people. HMs particles present in fly ash is an important source of toxicity. In India, at the manufacturing/ research centers of many factories, institutes, laboratories, hospitals and universities do not follow the environment protection protocol properly. Due to improper disposal products originating from these sites not only mess up the atmosphere but also damage the environment (Fig. 1B).

For few years, there has been enormous use of electronic devices which are not being proper disposed after use. These discarded electronic items are called electronic waste. This includes discarded computer monitors, motherboards, mobile phones and chargers, compact discs, headphones, television sets, air conditioners and refrigerators etc. According to the Global E-waste Monitor 2017, India generates about 2 million tonnes (MT) of e-waste annually and ranks fifth among e-waste producing countries, after the US, China, Japan and Germany. In 2023, there will be approximately 347 Mt of unrecycled E-waste on the planet. Flushed e-waste is known to be only 20% recycle. The remaining E-waste and the resulting toxic agent degrades water, soil and air. It promotes eco-terrorism born from the modern era.

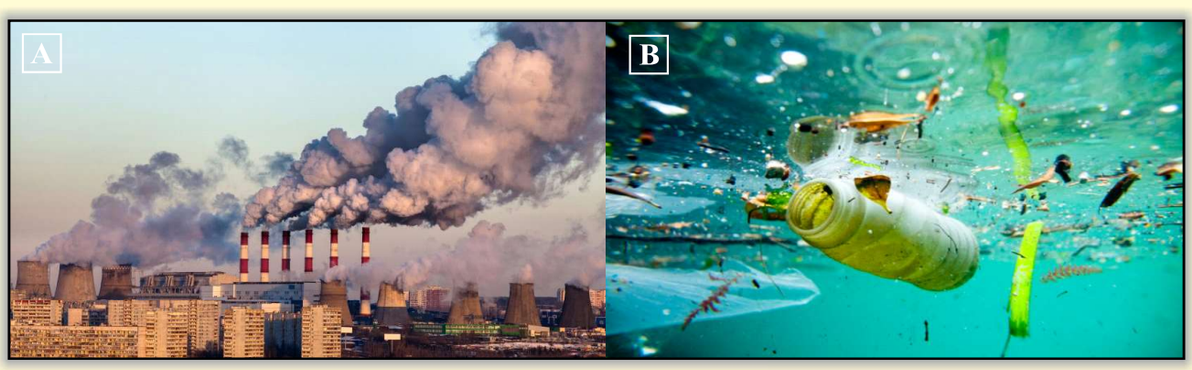


Figure 1: Flames and smoke of fire (A) and plastic waste in Sea Water (B).

In the current era nanoparticle has become a part of life due to its increasing usage in the various fields such as agriculture, medical fields, food technologies, personal care products cosmetics industry and electronics. Nanoparticle toxicity depends on its shape, size and reactivity. Dr. Kumar (2018) reviewed that nanoparticles negatively affect plant growth, germination, biomass and root and leaf growth. It either directly affect human health or indirectly through contaminated environment. These products can enter in to human body through various routes of inhalation, oral or through skin. Many scientists reported that nanoparticles entering into aquatic systems, might pose harmful effects on aquatic ecology, thus alarming environment balance.

In 2019, Pakistan complaint against India at the United Nations, accusing it of "eco-terrorism" over air strikes that damaged pine trees near the northern Pakistani town of Balakot, about 40 km (25 miles) from India's border in the Himalayan region of Kashmir.

Acts of eco-terrorism are usually committed by individuals who believe that the exploitation of natural resources is not a problematic issue or it could be compromised. At present scenario environmental contamination is at so high risk that action outside of conventional legal and environmental channels is required. It is necessary to know about eco-terrorism because in upcoming years it will acquire a dangerous face which will neither be able to control by government nor by eco-terrorism controlling agencies.

According to the FBI, eco-terror was born in 1977. This ecoterrorism has been defended for decades. The Sierra Club and Greenpeace, which formed in 1892 and 1971 respectively, are two activist organizations that have pressured legislators, corporations and individuals to protect the environment throughout their existence – without resorting to violence. In 1980, the group Earth First! came along and raised the stakes by engaging in acts of civil disobedience like tree spiking (the practice of hammering a nail into a tree to prevent it from being cut down, which can severely injure loggers). Other well-known group linked to eco-terror in the U.S., the Earth Liberation Front, or ELF.

Indian Prime Minister 'Modi Ji' took a new step against to plastic bags. No manufacture or vendor can use plastic bags is below 50 microns as thinner bags pose a major threat to the environment due to its non-disposability.

Indian Law for Environmental Protection

After Bhopal Gas Tragedy, Indian government incites the rules relating to storing, handling and use of hazardous waste. On the basis of these rules, the Indian Parliament enacted the Environment Protection Act, 1986 and the Public Liability Insurance Act, 1991. Control the Eco terrorism, Government incite Act and policy such as Air Act, 1981; Water Act, 1974, 1977 (Prevention and Control of Pollution); National Water Policy; Indian Forest Act, 1927; Forest (Conservation) Act, 1980; Biological Diversity Act, 2002. Waste management and handling related acts like Batteries Rules, 2001, Recycled Plastics, Manufacture and Usage Rules, 1999; Hazardous Wastes Amendment Rules, 2003. The National Green Tribunal established under the National Green Tribunal Act of 2010 at New Delhi. The objective of the Acts and policy is to protect and improve the environment in India.

Solutions

- The government should introduce new laws and ensure strictly implementation of them as well as previous rules and regulations.
- People should be aware of the environment.
- Government contributes more funds for environmental issues.
- Public should follow 5 R's rule - Refuse, Reduce, Reuse, Repurpose, Recycle.
- Environment education and awareness programme should be included in curriculum of syllabus of all formal education.
- Non formal environmental education programme should also be scheduled for our netizens.
- Star up programme should be included in field of environmental science at metric and onwards courses.

Release of the Lotus Book

Prof. Y.K. Sharma, Dr. S.C. Sharma, Dr. A.K. Goel and Rajyapal Smt. Anandiben

राज्यपाल महोदया ने किया लोटस भारत का राष्ट्रीय पुष्प नामक काफी टेबल पुस्तक का विमोचन

दैनिक रिपब्लिक रेनेसां
संवाददाता हरिओम दीक्षित

बीकेटी लखनऊ।भारत का राष्ट्रीय पुष्प नामक काफी टेबल पुस्तक डॉ सुरेश चंद शर्मा,अनिल कुमार गोयल व चंद्र भानु गुप्त कृषि स्नोक उत्तर महाविद्यालय के निदेशक प्रो योगेश कुमार शर्मा द्वारा लिखी गई तथा बिशन सिंह महेंद्र पाल सिंह कनॉट प्लेस देहरादून द्वारा सन् 2022 में प्रकाशित की गई थी। पुस्तक का विमोचन उत्तर प्रदेश की महामहिम राज्यपाल आनंदीबेन पटेल ने किया।आनंदीबेन पटेल ने बताया कि यह पुस्तक बहुत उपयोगी है एवं इस पर अभूतपूर्व पौध प्रजाति के विषय में विस्तृत जानकारी को जनमानस तक उपलब्ध कराया गया है राष्ट्रीय पुष्प कमल का प्राचीन काल से हमारे देश में धार्मिक सांस्कृतिक ऐतिहासिक महत्व रहा है इस पुस्तक लिखने एवं प्रकाशित करने वाले सभी शिक्षकों को बधाई देती हूं। पुस्तक की सह लेखक अनिल कुमार गोयल ने बताया कि लोटस सभी धर्म में पवित्र माना गया है भारतवर्ष के अतिरिक्त चीन और जापान में भी कमल वहां की संस्कृत में पूर्णतया रचा बसा हुआ है बौद्ध कालीन समस्त स्मारकों पूजा ग्रहों, कलाकृतियों पर कमल का अंकन मिलता है। यह पुस्तक बहुत ही उपयोगी सिद्ध होगी। पुस्तक के सह लेखक प्रो योगेश कुमार शर्मा ने बताया कि इस पुस्तक में कमल के संरक्षण के साथ-साथ इस की वैज्ञानिक खेती तथा पोषक मानो व अनेक प्रजातियों पर भी प्रकाश डाला गया है आशा है कि कमल पर प्रकाशित या काफी टेबल पुस्तक छात्रों शोधार्थियों शिक्षकों एवं जनता जनार्दन के लिए लाभकारी सिद्ध होगी। पुस्तक सह लेखक प्रो एस सी शर्मा ने कमल ककड़ी भारतीय चीनी जापानी भोजन का अभिन्न अंग है या विटामिंस मिनरल्स तथा प्रोटीन से भरपूर है कमल के बीज कच्चे खाए जाते हैं जो हृदय के लिए लाभकारी हैं इसके अलग-अलग भागों का प्रयोग स्वसन तंत्र, जनन तंत्र, परिसंचरण तथा तंत्रिका तंत्र की बीमारियों में अत्यंत गुणकारी है। कमल पुष्प के दल पत्र सौंदर्य वर्धक होते हैं कमल का तेल एवं खुशबू अत्यंत ही लाभकारी होती है कमल की खेती करके अच्छी आमदनी कमाई जा सकती है। ? डाक टिकटों एवं करेंसी नोटों तथा सिक्कों पर भी हमारे देश व विदेशों में बहुतायत से प्रयोग किया गया है तथा सेना के सबसे श्रेष्ठ पुरस्कार परमवीर चक्र पर भी कमल के पुष्पों के चित्र अंकित है हाल ही में भारत की अध्यक्षता में जी-20 के लोगों पर भी कमल पुष्प को अंकित कर पृथ्वी को इस पर रखा गया है इसको आशावान एवं लचीलेपन का द्योतक माना गया है।

Glimpses of the Eighth Foundation Day



Glimpses of the Third National Conference



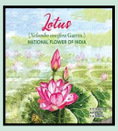


Up coming events of CGES in 2023

In the meeting of Executive members of CGES on 21.1.2023 held in Lavana office Hazratganj, Lucknow the members agreed on following proposals-

- Environment awareness campaign and plantation drive in different schools, parks etc.
- Hands on Training on Lotus cultivation for farmers,
- Conducting some model programs for environment awareness with Dr. Rajan Johri,
- Celebration of 8th Foundation day on 8 July 2023.
- Bonsai Culture an Art and Science on February 4, 2023.
- Lotus Cultivation and Marketing in March 2023.
- Eighth Foundation Day of Clean and Green Enviromental Society 8th July 2023.

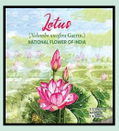
New Publication



Lotus (*Nelumbo nucifera* Gaertn.) - National Flower of India [hardcover]
S. C. Sharma, Anil K. Goel, Y. K. Sharma
[Jan 01, 2022], for ₹2,250.00 via @amazon
https://www.amazon.in/gp/product/8121107334/ref=cx_skuctr_share?smid=A2XS6C24SI1O3P

Book Review

Lotus (*Nelumbo nucifera* Gaertn.) National Flower of India
Authors: Dr. S.C. Sharma, Dr. Anil K. Goel & Y.K. Sharma
Published by: Abhimanu Gahlot for Messers Bishen Singh Mahendra Pal Singh
23-A, New Cannaught Place, Dehradun-2448 001 (India)
Year of publication: 2022; Pages: 108; ISBN: 978-81-211-0733-4; Price: Rs. 2250/-(Inland)



The authors Dr. S.C. Sharma, Former Director Grade Scientist, CSIR-National Botanical Research Institute (NBRI), Lucknow, Dr Anil K Goel, Former Chief Scientist, CSIR-NBRI, Lucknow and Prof. Y.K. Sharma, Former Head, Botany Department, University of Lucknow have recently brought out a comprehensive document on the most sacred flower Lotus (Nelumbo nucifera Gaertn), the National Flower of India occupying a unique status in art and mythology since ancient times. It was an outcome of project work on introduction, conservation, documentation, multiplication and dissemination of Lotus sponsored by Ministry of Environment and Forest, Government of India and undertaken at CSIR-NBRI as mentioned by Dr. P.V. Sane, Former Director, CSIR-NBRI in his foreword of the book. Dr Sane has also suggested Agriculture Universities to take up R&D work for working out the techno-economics of the Lotus cultivation and the progressive farmers should take the advantage of its cultivation in ponds for enhancing their income. The book also contain messages by Dr. S.K Barik, Former Director, CSIR-NBRI, Dr. Girish Sahni, Former Director General, CSIR and Former Secretary, Government of India, Padma Shri Dr. Mansoor Hasan, Founder, LARI Cardiology and Former Head, Cardiology Dept. KGMU, Lucknow and Dr. Amrita Dass, Founder Director, Institute for Career Studies, Lucknow who had praised the efforts of the authors in writing this book. The book published in form of a Coffee Table Book gives detailed information on Lotus in twenty nine chapters. These include Lotus in Hindu mythology, Buddhism, other religions, philosophy, architecture, literature, Egyptian blue Lotus, distribution of lotus, habitat and ecological environment, morphological and anatomical characters of Lotus, taxonomy and nomenclature, horto-taxonomy of Lotus varieties, floral biology, Lotus effect, thermo regulation, Lotus seed longevity, genetic and molecular improvement, conservation of Lotus, propagation, pests and diseases, cultivation, medicinal importance, Lotus perfume, economic importance of Lotus, list of Lotus varieties, Lotus for bioremediation, Lotus in landscaping, Lotus as the crop of future and the Lotus immortalized on stamps and coins. All the chapters of the book are illustrated with beautiful color photographs which make the reading more interesting and enjoyable. The references have been quoted at the relevant places in the text and listed in the last pages of the book. This makes the book as an excellent reference material to the readers including students, research scholars, entrepreneurs and scientists who may be interested in seeking further information on the various aspects of Lotus during their studies as well as research.

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