Conservation of Natural Resources

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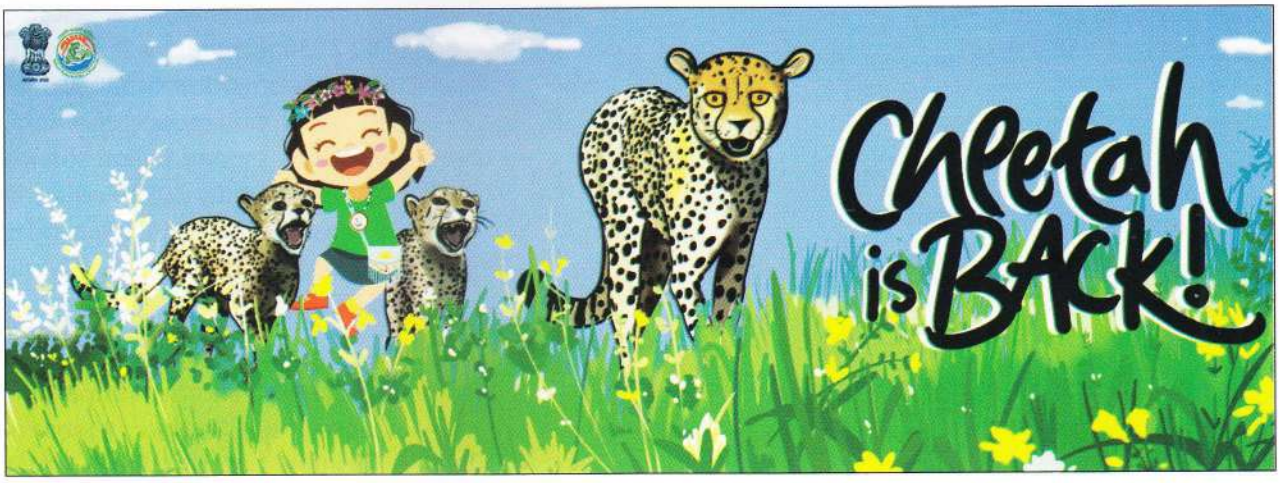
On the occasion of National Science Day (28th February 2022), Hon'ble Prime Minister of India while sharing his thoughts urged families to begin with small efforts to develop scientific temperament among their children. Today when climatic conditions are changing, there is a need to inculcate effective environmental education along with the use of technology for environment protection, which will play an important role in sensitising the people about environmental issues. Environment protection is enshrined in our Constitution of India wherein the State's responsibility has been laid down under Article 48-A. Recently, LiFE - Lifestyle for Environment was unveiled at Conference of Parties (COP) - 26 at Glasgow, which aims to promote environment conscious lifestyle. Science and technology for environment conservation has immense potential to strike the economic and ecological balance. Satellite Remote Sensing technology has emerged as powerful tool in providing reliable information on various natural resources of a region. Such technologies definitely help and complement government's policies, enhance efficiency and transparency to make sound decision making.

The term "environment" was introduced in the Constitution of India for first time in the year 1976 and the State's responsibility with regard to environmental protection was laid down under Article 48-A, which reads as : "The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country". Also, Article 51-A (g) on Citizens' fundamental duties mentions "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures". The "Environment" comprises all entities, natural or manmade, external to oneself, and their inter relationships, which provide value, now or perhaps in the future, to humankind. National Environment Policy 2006 of India formulated by Ministry of Environment, Forest and Climate Change for the protection and conservation of environment identifies the following seven objectives:

1. **Conservation of Critical Environmental Resources:** To protect and conserve critical ecological systems and resources, and invaluable natural and man-made heritage, which are essential for life support, livelihoods, economic growth, and a broad conception of human well-being.

2. **Intra-generational Equity-Livelihood Security for the Poor:** To ensure equitable access to environmental resources and quality for all sections of society, and in particular, to ensure that poor communities, which are most dependent on environmental resources for their livelihoods, are assured secure access to these resources.



3. **Inter-generational Equity:** To ensure judicious use of environmental resources to meet the needs and aspirations of the present and future generations.

4. **Integration of Environmental Concerns in Economic and Social Development:** To integrate environmental concerns into policies, plans, programmes, and projects for economic and social development.

5. **Efficiency in Environmental Resource Use:** To ensure efficient use of environmental resources in the sense of reduction in their use per unit of economic output, to minimise adverse environmental impact.

6. **Environmental Governance:** To apply the principles of good governance (transparency, rationality, accountability, reduction in time and costs, participation, and regulatory independence) to the management and regulation of use of environmental resources.

7. **Enhancement of Resources for Environmental Conservation:** To ensure higher resource flows, comprising finance, technology, management skills, traditional knowledge, and social capital, for environmental conservation through mutually beneficial multi-stakeholder partnerships between local communities, public agencies, the academic and research community, investors, and multilateral and bilateral development partners.

For the protection and conservation of Environment, several legislations exists namely Environment Protection Act, 1986; Water (Prevention and Control of Pollution) Act, 1974; Water Cess Act, 1977; Air (Prevention and Control of Pollution) Act, 1981. The law in respect of forest and biodiversity are Indian Forest Act, 1927; Forest (Conservation) Act, 1980; Wild Life (Protection) Act, 1972 and Biodiversity Act, 2002. Recently under the visionary leadership of Hon'ble Prime Minister of India, LiFE (Lifestyle for Environment) was unveiled at COP 26 at Glasgow, which aims to promote environment conscious lifestyle. And to combat climate change, Panchamrit were given that are: (1) India will get its non-fossil energy capacity to 500 gigawatt (GW) by 2030, (2) India will meet 50 percent of its energy requirements from renewable energy by 2030, (3) India will reduce the total projected carbon emissions by one billion tonnes from now onwards till 2030, (4) By 2030, India will reduce the carbon intensity of its economy by less than 45 percent and (5) By the year 2070, India will achieve the target of Net-Zero.

To enjoy the benefits of quality life, effective environmental education is another important pre-requisite. Moreover, it is an essential component of education at all levels that

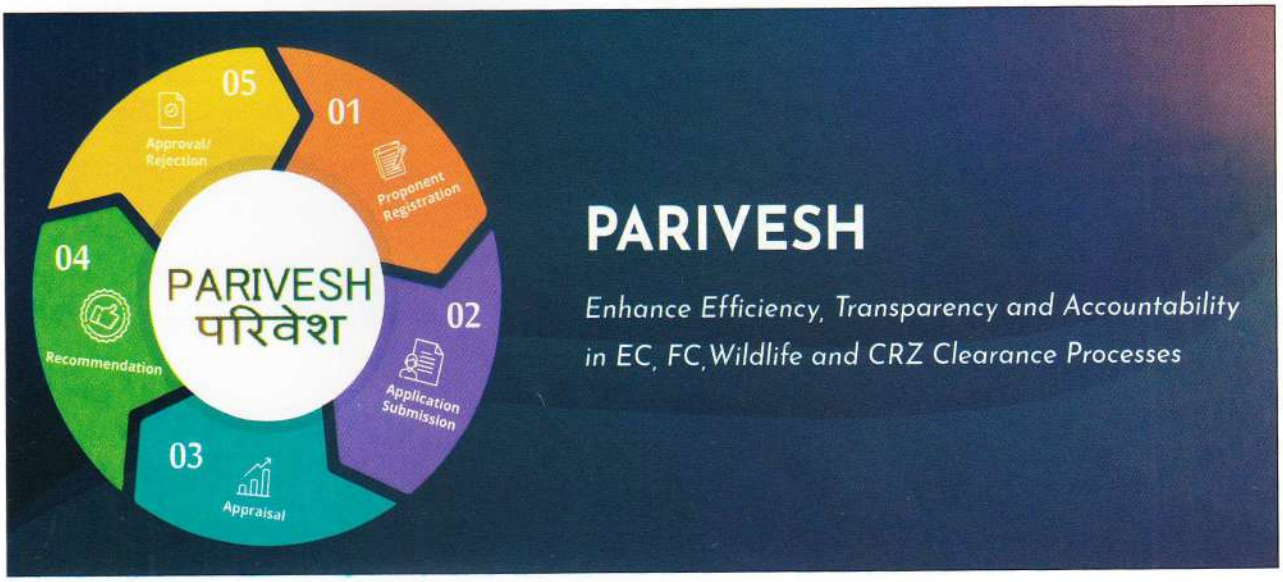
enable the individuals to adopt green habits for sustainable social development and preserve a cleaner and greener environment for our future generation. Understanding and addressing the environmental crisis is not an easy task, in fact it needs proper examination of the problem and its source. Confronting with the environmental glitches needs scientific, educational and political interventions. Innovative solutions are needed to counter environmental deterioration and to ensure sustainable development. India has around 23 percent of the population in the 6-17 age group, and to ensure that this young population saves the environment, it is utmost important that they are provided with quality education with respect to environment. Of the 17 Sustainable Development Goals (SDGs), SDG '4' refers to 'ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'. And if this percentage contributes its small bit towards environment protection and conservation of natural resources, then one can imagine the cascading effect it will have for nature's protection. In Strategy for New India @75 by NITI Aayog, 2018 indicates the need to broaden the scope of Massive Open Online Course (MOOCs) and Open and Distance Learning (ODL) and tap their potential to provide access to quality education beyond geographical boundaries. It is imperative that such MOOCs are scaled up for the environment education with the necessary adaptations in respect of the current environmental issues. Also National Education Policy of India (2020) has climate change, pollution, waste management, sanitation, conservation of biological diversity, management of biological resource, forest and wildlife, and sustainable development and living as some of the thrust areas for environmental education.

Talking about science and technology for environment conservation, it has immense potential to strike the economic and ecological balance. The knowledge of spatial land cover information can help in proper management and monitoring of natural resources. Satellite Remote Sensing technology has emerged as powerful tool in providing reliable information on various natural resources of a region. The changes in land use/land cover can be linked to the human and natural activities. For example, forest fire risk areas can be predicted and an early warning of forest fires through risk modeling can be conducted. Available literature also highlights the use of Geographic Information System (GIS) technology in corridor mapping, forest dynamics, forest fragmentation and its relation with the wildlife movement in the corridor complexes (various studies conducted by researchers).

Off- farm technologies like "bio-briquetting" can also help in preventing forest fire hazard as well as loss of biodiversity. This is a sustainable technology which is efficient, simple, cost-effective and which can generate energy on a local scale (http://gbpihedenvis.nic.in). Biomass energy from pine needles can be generated by using simple technology of biomass briquetting. Under the niche of G.B. Pant National Institute of Himalayan Environment, Almora (autonomous body of MoEFCC) by manufacturing of bio-briquettes and bio-globules, under its RTC (Rural Technology Complex), one seeks to involve lower and marginalised group of villagers to provide them with resource utilisation training and furthermore livelihood generating capacity.

Technological Interventions of Ministry of Environment, Forest and Climate Change (MoEF&CC)

- **PARIVESH:** In pursuant to the spirit of 'Digital India' initiation and capturing the essence of Minimum Government and Maximum Governance, a single-window integrated environmental management system named PARIVESH (Pro-Active and Responsive facilitation by Interactive, Virtuous and Environmental Single window Hub) has been developed by the Ministry of Environment, Forest and Climate Change through NIC [www.parivesh.nic.in]. Launched on 10 August 2018, it has an automated process starting from submitting of application, preparation of agenda, preparation of minutes to grant of clearances. It facilitate sound and informed decision-making, real time information about the status of application with alerts at each of the stages through SMSs and emails, standardisation of processing and real time monitoring/compliances. There will be single registration and single signing for all types of clearances (Environment, Forest, Wildlife, CRZ). It has paved a way for constituting the Centralised Processing Center in the Ministry and has resulted in a paradigm shift in the environmental clearance process with hallmarks such as transparency, accountability, efficiency, consistency, etc.
- **Decision Support System (DSS):** This is a web GIS application developed to provide qualitative and quantitative information with respect to forest area. It uses different spatial layers for providing the information like state and district boundary, tiger reserves, tiger corridors, forest type maps, biological richness, hydrological layer, etc. available at www.fsigeoportal.gov.in/dss.
- **Climate Change Knowledge Portal:** India's Climate Change Knowledge Portal (https://www.cckpindia.nic.in/) is a single point information resource which captures sector-wise adaptation and mitigation actions that are being taken by the various ministries in one place including updated information on their implementation. The knowledge portal will help in disseminating knowledge among citizens about all the major steps the Government is taking at both national and international levels to address climate change issues.
- **National Mission on Himalayan Studies (https://nmhs.org.in):** MoEF&CC attaches highest priority to protect unique but highly fragile Himalayan ecosystem. This portal covers the aspects of National Mission on Himalayan Studies which is a Central Sector Grant-in-aid Scheme through holistic understanding of system's components and their linkages, in addressing the key issues



relating to conservation and sustainable management of natural resources in Indian Himalayan Region. Mission strategy is to focus on enhancing livelihoods of local communities in line with the National Environment Policy, 2006 of the Government, with a basic premise that the most secured and effective basis for conservation is to ensure that people dependent on particular resources obtain better livelihoods from the act of conservation than from the degradation of the resources.

- **Wetlands of India portal:** This portal (https://indianwetlands.in/) is an initiative to provide a single point access system that synthesises information dissemination regarding wetland sites of the country, projects, initiatives and trainings. Wetlands are shallow water-bodies, transitional between terrestrial and aquatic systems, with high biodiversity and productivity. Twelve National Biodiversity Targets, framed by the MoEF&CC in line with the Convention on Biological Diversity's Strategic Plan 2011-2020 also cover wetlands significantly. The portal provides a platform for the people of the country to learn more about wetlands and get involved in their conservation and management.

In the year 2020, Ministry of Science and Technology initiated formulation of fifth draft of National Science, Technology, and Innovation Policy, which aims to bring about profound changes through short-term, medium-term, and long-term mission mode projects by building a nurtured ecosystem that promotes research and innovation on the part of both individuals and organisations. To attract, nurture, strengthen and retain critical human capital through a 'people-centric' science, technology and innovation ecosystem, has been kept as one of the broader vision of the policy. It also aspires to ensure a clean environment for people and future generations through green initiatives based in science that promote sustainability and clean energy, water, air, rivers, forests, parks, and neighborhoods (https://dst.gov.in). Kishore Vaigyanik Protsahan Yojana, National Science Olympiad Programme, India Innovation Growth Programme and Million Minds Augmenting National Aspirations and Knowledge Awards Programme under the Innovation in Science Pursuit for Inspired Research' (INSPIRE) scheme are some of the programmes being conducted by the Department of Science and Technology individually and in cooperation with different organisations, to foster a creative thinking towards scientific education. This year on the occasion of National Science Day (28 February 2022), Hon'ble Prime Minister while sharing his thoughts with the people through his monthly radio programme 'Mann Ki Baat', has urged families to begin with small efforts to develop scientific temperament among their children. The application of both science and technology for environment conservation must go hand in hand, for the country to achieve the objective of sustainable development. These technologies shall definitely help and complement government's policies, enhance efficiency, transparency to make sound decision-making.

It is rightly said by environmentalist and green activist Dr. Anil P. Joshi (Padma Bhushan and Padma Shri) that true capital of a nation is its natural resources, and future demands balance between economy and ecology. Through science and technology, environment conservation can be achieved in holistic manner with the convenience of citizens in accessing information. Further, environmental attitude is directly linked with the level of knowledge regarding environmental issues possessed by an individual. Today when climatic conditions are changing, there is a need to inculcate effective education along with the use of technology for environment protection, which will play an important role in sensitising the people about environmental issues. This will also facilitate people to adopt green social responsibility for the protection of environment.

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