

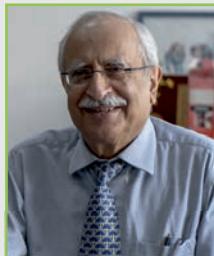
GAIA

Our mother earth as a living Planet



ACKNOWLEDGEMENT

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Ms. Jacqueline Garewal
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Dear Friends,

All my previous Calendars have been about India and various aspects of our Culture, such as **Origins of Navratri, The Eternal Saree, and Headgears of India.**

This time I have taken a more important topic which has to do with our future and our environment. It starts off with COSMOS, the creation, a Big Bang 13.5 billion years ago, with the formation of earth 4.5 billion years ago, beginning of life 3.8 billion years ago, the emergence of Homo-Sapiens about 2.5 million years ago, and the beginning of our civilization 10,000 years ago.

Within the last 50 years we have experienced the effects of Climate change which is **entirely the result of human activity.**

The Indian population at the time of Independence was 35 Crore, today it is 4 times as much, 140 Crores. The land has not increased but the resources are wearing thin with ever-rising consumption. The effect on our lives with increasing consumption is depicted in the Calendar by looking at various aspects such as Agriculture, Pollution, Forest Cover, Bio-diversity, Climate Change amongst others, in today's context.

Solutions are three: I) Reduce our carbon footprint by phasing out fossil fuels to 50% of its current value in next 5 years. II) Recycle all waste. III) Increase our share of renewable energy from 30% to 100% in next 10 years.

We need to do this in the next five years and have to start "**NOW**" - for the survival of our grandchildren.

Pradip Burman

Recommended: Documentary: Beyond Boundaries-available on NETFLIX.

ABOUT THE ARTIST

“The theme of nature in art has almost always been present. Nature can be a simple add on to a painting to convey a sense of depth or perspective. However, it can also be the main focus of a work of art. Just like nature can be recreated through art, it can also be used as a stand in for greater thought.



Gautam Partho Roy

A realistic depiction of a mountain or an abstract depicting the future can symbolize not only the sublime, but also curiosity for the unknown. We are living in a time when our culture is becoming more socially responsible and active. Creative fields, including fashion, architecture and visual arts are leading the way in conversations around sustainability, the environment and social consciousness. In art, sustainability has led to the development of pioneering works that use innovative ways to convey powerful messages about climate change and social injustice.

“In other words, art speaks for what nature cannot and I have made an effort to do it as loudly as I can with this calendar.” - **Gautam Partho Roy, Artist**

Gautam Partho Roy holds a Bachelor of Fine Arts degree from Rabindra Bharati University, Kolkata and is the only artist for our calendars since we started making calendars.

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GAIA

Our mother earth as a living Planet

It is important for us to know **OUR ORIGINS** as well as origins of our Planet and our Universe.

Who am I ? **WHERE DO WE COME FROM ?** What is the Milky Way ? How did it all start ? These are questions Physicists, Biologists, Astrophysicists and the Scientific Community ask and most agree that it started with a Big Bang 13.5 billion years ago when time and space were created. It is observed that there are clusters of stars known as Galaxies which are moving away from each other and no body knows where the Universe ends.

We live in the **MILKY WAY GALAXY** of which the Sun is just one of the many stars. Like the milky way, there are thousands of other galaxies in the Cosmos.

The journey of the universe is believed to be:

Years Ago

- 13.5 billion : Beginning of time and space -the big bang
- 4.5 billion : Formation of Planet Earth.
- 3.8 billion : Emergence of life.
- 500,000 : Neanderthals in Europe.
- 200,000 : Homo sapiens
- 13,000 : Homo sapiens only surviving Human Species
- 12,000 : Beginning of Civilisation.
- 200 : Industrial Revolution

Within the last 200 years, with the use of Fossil Fuels, Chemicals and increasing Pollution, nature has degraded and is unable to repair itself. If no remedial measures are taken, it is quite possible that the human race may become extinct in another 200 years.

The Population in 1800 was 1 billion and today it is 8 billion. The planet Earth can no longer sustain this population at the current rate of consumption.

While the reduction in population is a long haul, what can be done to prevent global warming is to **PHASE OUT USE OF FOSSIL FUELS** in the **SHORTEST** period of time. Our goal has to be to have our energy needs met entirely from **RENEWABLE SOURCES**. We should also recycle and reuse everything that we can.



Agriculture

Sustainability is the Key

The term 'Agriculture' has a Latin origin where "agri" means 'soil' and 'cultura' means cultivation.

Agriculture is the science and art of cultivating plants and livestock. Agriculture produces most of the food that we consume and it provides raw materials for various industries. India is an agriculturally important country. The history of agriculture dates back to the Indus Valley civilisation. Today, India ranks second worldwide in terms of farm output. The country is the largest producer of milk and the second highest producer of fruits and vegetables; however, the growth of agriculture is still a matter of concern, as more than 50% of the population is dependent on agriculture for livelihood.

India is the most populous country in the world and its food security will be the prime concern due to climate change and environmental issues. **The solution lies in Sustainable Agriculture.** Sustainable agriculture is an economical viable method, which is socially supportive and environment friendly. This includes contributing towards healthy soil, preventing soil erosion, using water judiciously, minimizing soil, water and air pollution, increasing carbon content in the soil, promoting bio-diversity and Increasing resilience to climate change.

Some examples of sustainable farming are organic farming, zero-budget natural farming, integrated farming systems, climate-smart agriculture, conservation agriculture agro-forestry etc. For instance, Sikkim has already become 100% organic by adopting organic farming, while Andhra Pradesh aims to move towards 100% zero-budget natural farming by 2027. The chemical-based farming techniques introduced during the Green Revolution to gain self-sufficiency in food grains have reached their limits.

The painting is depicting the impact of chemical farming (1) and sustainable farming (2). The chemical farming impact is now visible in terms of poor soil health (3) Climate change is impacting the farmers financially, with higher input costs and gradual stagnation in the yield. Enriching the soil through bio-composting (4) will increase soil carbon which will improve soil fertility.

The suggested way out is reducing chemical farming, the traditional and modern technologies for resource conservation and environmental protection by adopting methods/technologies. like rainwater harvesting, drip irrigation, Vertical Farming, multilayer farming, integrated and crop-diversified farming, agri-forestry, natural and organic farming.

What can I do?

- Adopt less water-consuming crops in my food habits like millet.
- Purchase locally grown fruits and vegetables.
- Consume organic produce to promote organic and natural farming in the Country.
- As an agriculturist, promote technologies like drip irrigation, rainwater harvesting, vertical farming, organic and natural farming.



Air Pollution

Clean air for a healthy life

Air pollution is a major environmental and public health concern around the world. The World Health Organisation (WHO) has ranked India as the world's second most polluted country, after Bangladesh. In 2014, '15, '16 most polluted cities in the world were in India. Once confined to urban areas, air pollution is now a nationwide concern. Harmful pollutants (1) like Particulate Matter, NO₂, SO₂, and O₃ are released, exacerbating climate change and disrupting weather patterns.

Sources of air pollution are Vehicle emissions: India's booming economy has spurred a surge in vehicles (2), notably in urban regions. Industrial emissions: large and growing industrial sectors such as power plants, steel mills, chemical plants, etc. Agricultural crop residue is being burned to prepare fields for the next season. Construction activities and thermal power plants are major sources of dust in cities.

Health impacts of air pollution have been linked to a risk of Chronic respiratory diseases, like Asthma, Chronic Obstructive Pulmonary Disease (COPD), etc. Cardiovascular disease: increases the risk of heart disease, stroke and heart attacks. Cancer: lung cancer and other types of cancer and premature death.

The Indian government has taken some steps to address air pollution, such as the Air Act 1981, the Environment Protection Act 1986, and the latest one, National Clean Air Programme (NCAP), which aims to reduce air-pollution levels across the country by 20-30% in the next five years, introducing emission standards (BS-VI) for vehicles. By taking steps to reduce air-pollution, like promoting renewable energy, enforcing emission standards etc, India can improve the health of its citizens and protect the environment.

What we can do: As a conscious society:

- Promoting green/public transportation
- Supporting clean energy
- Advocating for sustainable practices
- Fostering awareness



Bees- Cross-Pollination

Save earth's busy gardeners

Cross-pollination, also known as **heterogamy**, takes place in all kinds of plants. It is a biological process that allows the male pollen grain to get transferred from the anthers of one flower to the egg of another flower. In a colourful garden in spring, bees with their familiar buzz roam around from flower to flower, collecting nectar but also play a significant role in a process of cross-pollination, which has substantial implications for India's agricultural and ecological landscape.

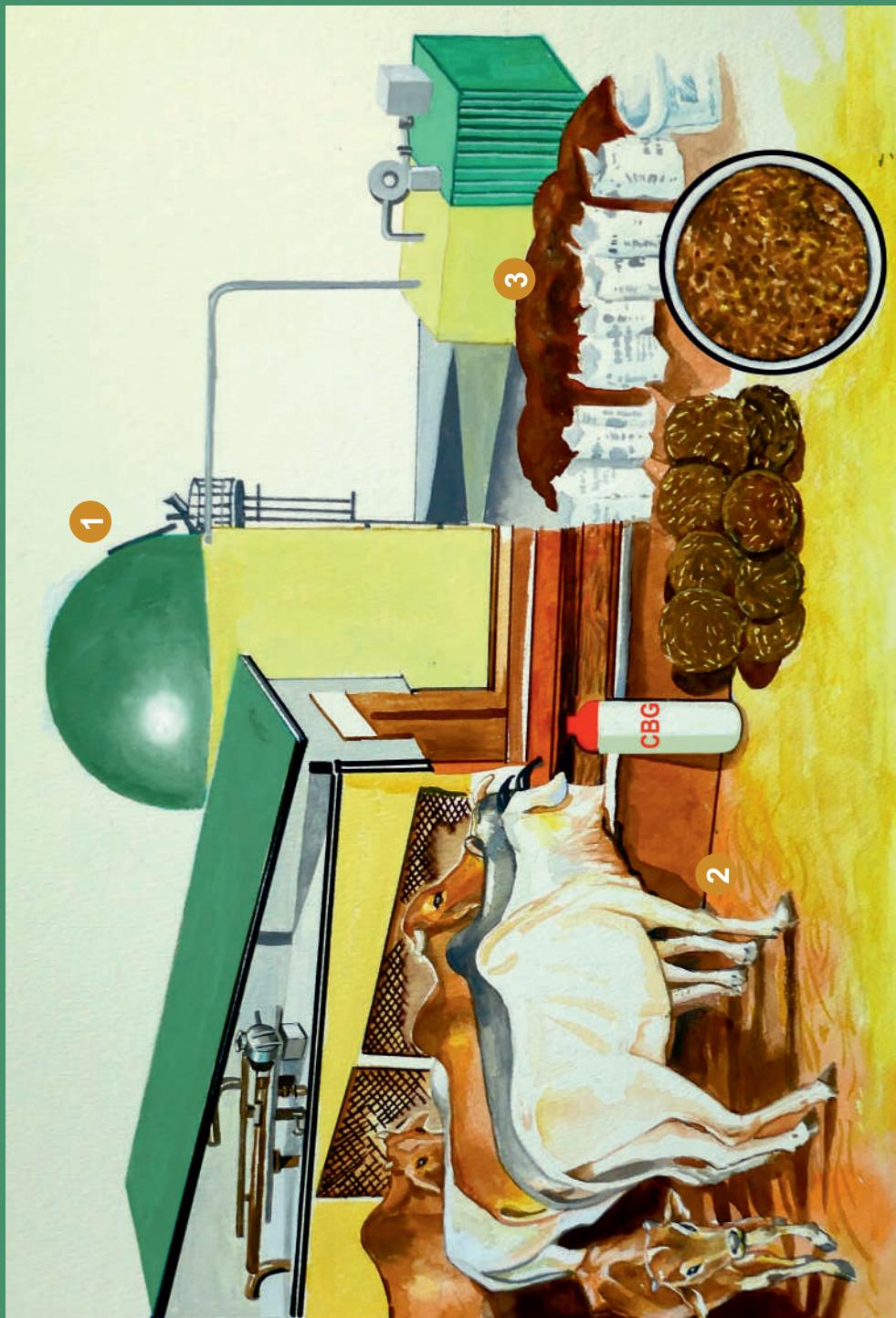
There are about 20,000 known species globally, varying from bumble bees, carpenter bees, honeybees and more, that carry these pollens from flower to flower and help in the process of pollination. Evidence has shown that bee-keeping has been around for 4000 years. Today, **India is home to about 5 known species**, that support the livelihoods of rural and tribal communities of India through beekeeping.

In India – being an agrarian country - **the bees and cross-pollination hold immense significance**. Crops like mangoes, sunflowers, and apples depend heavily on insect pollinators to yield high-quality and bountiful produce. The delicate balance of the food chain and ecosystem relies on their pollination efforts, ensuring the bearing of seeds and hence, the survival of plant species as it leads to greater genetic variety among plants. This, in turn, influences the entire food chain, from insects to mammals and ultimately the sustenance of human beings..

As a matter of concern, world-wide bee populations face significant challenges due to habitat loss, extensive usage of pesticides and the impacts of climate change. We must take substantial action to strengthen bee populations and acknowledge their indispensable contribution to cross-pollination mechanism. An effective approach can be having rooftop gardens, building small-scale butterfly gardens, and advocating organic and natural farming practices which will serve to reduce pesticide utilisation while promoting sustainability through collective action.

What can I do:

- *Promote rooftop gardening/kitchen gardening.*
- *Use only organic fertilizer and promote it around my surroundings.*
- *Create habitats that would support the bees and other pollinator populations.*
- *Plant diverse native flowers in my yard, to provide safe places for pollinators.*
- *Avoid pesticides and harmful chemicals.*



Biogas & Composting

Contributing towards soil fertility and energy needs

Biogas is produced through the digestion of biomass (material from living organisms) and waste products, resulting in the release of methane that can be combusted with oxygen. In general, a biogas digester utilises the principle of anaerobic decomposition of organic matter in a controlled environment. The resulting biogas is primarily composed of methane (55-64%) and carbon dioxide. Upon advanced purification, gas with 90-94% of methane can be obtained which is called Compressed Biogas (CBG).

Once the organic matter has decomposed, which typically takes 40 days, the remaining by- product is a solid and liquid slurry. This is generated as a by-product of biogas production, and can be further processed to compost/ organic manure which is rich in organic carbon content and nutrients and may help in enhancing crop production and promoting sustainable farming practices

India is the fifth largest economy in the world. However, the country is facing an ever-increasing demand for energy. **Currently, around 74% of the country's energy requirements are met by coal and oil.** As per the Nationally Determined Contributions (NDC) under the Paris Agreement, India pledged to use cleaner and renewable energy to increase its share of non-fossil fuels energy to 50% by 2030. Among the various solutions, biogas has emerged as a promising contender

It holds significant benefits for India's dairy and livestock sector. As the world's largest milk and cattle dung producer, India possesses a vast opportunity to leverage biogas production. Although the emissions from agriculture and livestock are higher, a big opportunity lies in switching to renewables. A lot of methane is produced by livestock. It is the component of natural gas which has commercial value. **Biogas technology helps capture the methane in a cost-effective manner** along with compost /organic manure for agriculture application

The painting exhibits a biogas plant (1) which can be part of a farmer's premises. The waste generated in terms of cow dung can be converted into assets by converting into biogas/ compressed biogas(2) It will solve his cooking needs and eliminate LPG or wood for cooking. It's a clean source of energy. The waste slurry generated through Biogas plants can be converted into carbon-rich biofertilizer (3) for enhancing soil and crop productivity.

What can I do?

- Will make compost with organic household waste.
- Will purchase diyas and flowering pots made from cow dung.
- As an agriculturist, promote Biogas and Composting technologies among the farming community, Gaushala, Dairy Industry and agriculture universities.
- Will contribute towards taking forward these technologies to policymakers in state and Central Govt.



Biodiversity

Essential to Maintain Stability

The concept of biodiversity, derived from “biological diversity,” encompass the range of life on Earth, spanning from the smallest genetic component to complex ecosystems. It includes the interplay of evolutionary, ecological, and cultural factors that support and maintain life, and is a measure of the variations at the genetic, species and ecosystem level. Despite covering only 2.4% of the Earth's land area, India is home to a remarkable 7 to 8% of the planet's plants and animal species.

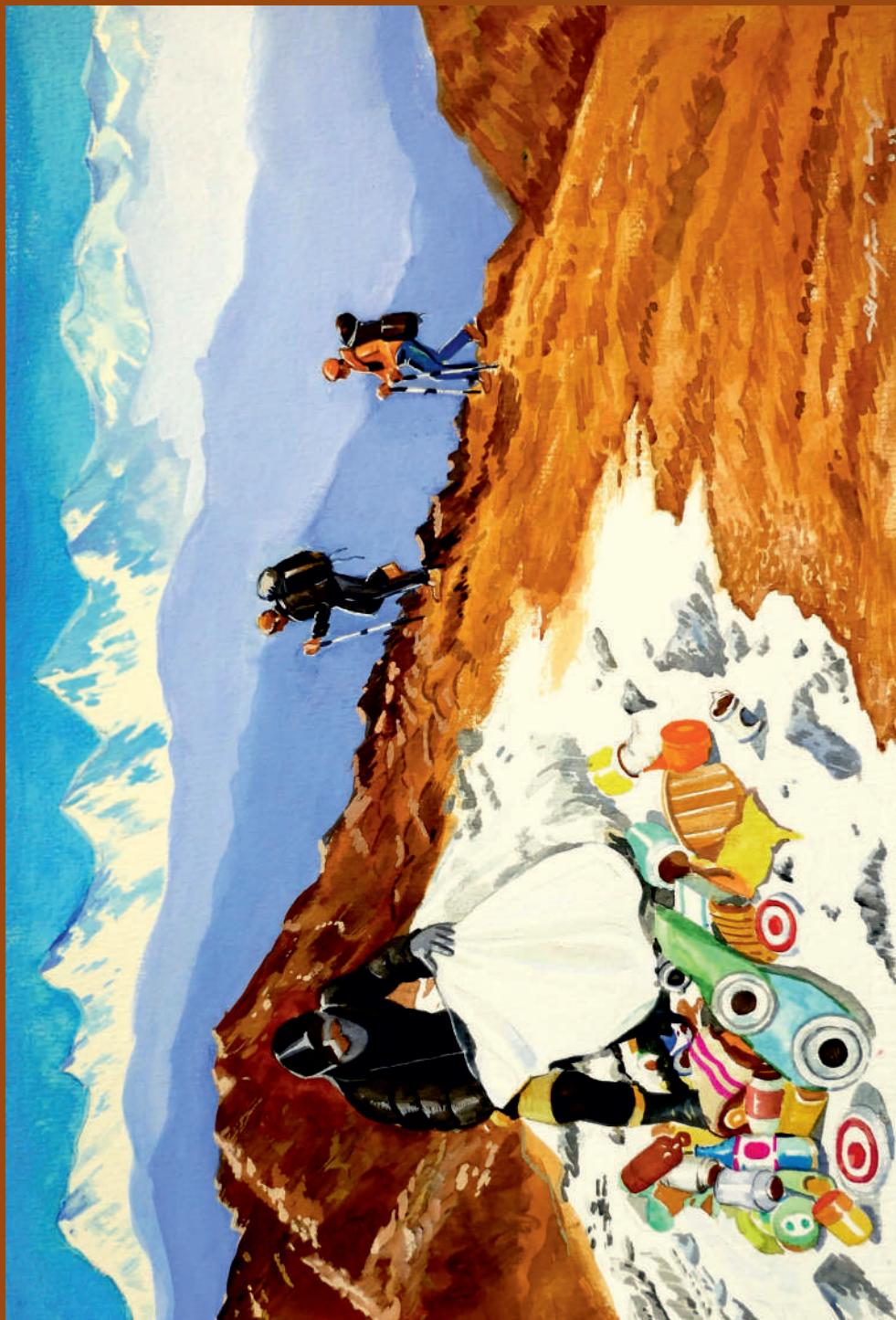
As one of the 18 mega-diverse countries, it supports a substantial portion of global biodiversity. Additionally, **India houses three out of thirty-six of the world's significant biodiversity hotspots**, making it a crucial location for preserving and studying diverse ecosystems. The three global bio-diversity hotspots are the Himalayas, Western Ghats and the Indo-Burma region. Another bio-diversity hot-spot, the Sundaland, overlaps the Nicobar Island region.

Regrettably, human activities have led to a significant loss of bio-diversity. Deforestation, habitat destruction, pollution, over-exploitation, and anthropogenic climate change are responsible for the loss. This loss of bio-diversity not only diminishes the intrinsic value of nature, but also threatens our own well-being. One of the greatest concerns is the disruption of critical eco-system services, which are vital for our survival and the functioning of our societies.

Protecting bio-diversity requires urgent action from governments, organisations, businesses and individuals alike. **Initiatives such as creating protected areas, promoting sustainable agriculture and fisheries, implementing stricter regulations against illegal wildlife trade and raising awareness about the value of bio-diversity are crucial steps forward.** Collaboration between scientists, policymakers and local communities is essential to develop effective conservation strategies that benefit both humans and nature.

What can I do?

- *Take steps to protect the environment; prevent felling of trees, especially native species.*
- *Reduce, Recycle and Re-use resources.*
- *Reduce consumption levels.*
- *Reduce pollution and of plastic bags and other materials that are potential threats for the environment.*
- *Use environment friendly products, segregate and dispose garbage correctly.*



Eco-Tourism

The future of tourism

Eco-tourism refers to responsible travel to natural areas with the twin objective of conserving the environment and improving the well-being of local people. It seeks to cultivate ecological sensitivity and economic value through tourism. According to the United Nations World Tourism Organisation (UNWTO), **eco-tourism is nature-based tourism**, whose main purpose is the observation and appreciation of nature and traditional cultures, while being beneficial to the local communities. It is educational in nature, minimises negative impacts on the environment and generates economic benefits to the host communities.

The unrivalled natural attractions of India, the vast natural wealth ranging from the pristine tropical forests of Malabar to the snow-clad Himalayas and the ecologically rich valleys of Shivalik, have attracted visitors from all over the world. The presence of mega-fauna consisting of iconic species such as tigers, elephants, rhinos and lions, have been a source of natural artistic inspiration since time immemorial.

Indian natural landscape is a rich resource for eco-tourism and gives an opportunity to pursue environmentally sustainable tourism while generating economic value for the local communities. This view was formalised by the Ministry of Tourism, by developing its National Strategy for Eco-tourism in 2022, based on the “Eco-tourism guidelines in and around Protected Areas 2021”, and has eight pillars (i) State Assessment and Ranking (ii) State Strategy for Eco-tourism (iii) Capacity Building and Certification (iv) Marketing and Promotion (v) Destination and Product Development (vi) Public-Private and Community Partnerships (vii) Governance and Institutional Framework.

Eco-tourism is all about creating practices that are a win-win for both tourists and nature, it provides a chance for the reintegration of local sustainable practices such as artisanal craftsmanship, eco-friendly, infra-structure and traditional medicinal knowledge into the mainstream. Eco-tourism needs promotion through its integration into our cultural re-cohesion, and with nature in our hectic modern life.

What can I do?

- *Participate in eco-tourism activities when possible.*
- *Support the local economies by buying local products and services.*
- *Explore opportunities for eco-tourism in my area and involve local communities.*
- *Make efforts to main-stream eco-tourism through social media posts.*



Climate

Climate action is the need of the hour

The World Meteorological Organization (WMO) defines climate as 'average weather', which involves the measurement of the mean and variability of relevant quantities of variables such as temperature, precipitation, pressure, and wind over a period which is generally 30 years. Weather, on the other hand, refers to short-term conditions such as rain, temperature, snow, wind, pressure and sunshine in a specific place and time. To simplify, a common man's saying captures it well: **"Climate is what you expect and weather is what you get".**

Climate has a profound impact on our planet's natural systems. From the equatorial regions with perpetual summers to the polar regions with perpetual ice caps, climate presents a diverse spectrum of patterns. It's an intricate interplay that shapes diversity on the Earth and influences human societies. **The development of human civilizations and cultures has been influenced by climate.** The cadence of life forms is determined to a great extent by the climate of their respective regions.

However, human activities such as the burning of coal and other fossil fuels, deforestation and agriculture over the years, have intruded into the fabric of climate and altered the delicate equilibrium, especially through the emissions of greenhouse gases causing climate change. **Climate change is among the most significant challenges to humanity today.** It is a universal concern and subject of international negotiations. For a sustainable future, it is important to conserve equilibrium in the earth's climates.

What can I do?

- *Reduce individual carbon footprint by not buying unnecessary stuff.*
- *Reduce flying.*
- *Sustainability as part of the school curriculum.*
- *Use electric vehicles.*



Deforestation

A costly mistake

Deforestation is the process of clearing or removing a forest or stand of trees to make way for agriculture, urbanisation, or industrialisation. One of the main drivers of deforestation is the need for agricultural land. As global population continues to grow, so does the demand for food. As a result, vast areas of forests are cleared to create space for crops and livestock. This unsustainable agricultural expansion leads to the loss of countless plant and animal species and destroys the habitats of many indigenous species.

Deforestation has severe implications for climate change. Trees play a critical role in mitigating global warming by absorbing carbon-dioxide from the atmosphere and releasing oxygen. When forests are cut down, large amounts of carbon-dioxide are released into the air, contributing to the greenhouse effect and accelerating climate change. **This destructive cycle also impacts rainfall patterns, further exacerbating droughts and desertification.**

Deforestation has far-reaching consequences for both biodiversity and human livelihood. Countless species, many of which are still undiscovered, face the risk of extinction due to habitat loss. Indigenous communities that rely on forests for their cultural and economic well-being are disproportionately affected by deforestation. Additionally, **deforestation can result in soil erosion and landslides**, further depleting fertile lands and causing long-term damage to agricultural productivity.

To combat deforestation, concerted efforts are needed. Governments, international organizations, and individuals must prioritize sustainable land use practices, encourage reforestation, and invest in preserving and protecting existing forests.

What can I do?

- *Protect trees; participate in tree-planting programmes in your community.*
- *Reduce paper consumption by going digital at home and office. Print on both sides of the paper.*
- *Support companies that are committed to reduce deforestation and promote sustainable practices and products.*
- *Advocate and support stricter regulations on deforestation.*



Ecosystem Restoration

Revive life by changing your actions

Ecosystems are functioning units of nature consisting of both biotic (or living) and abiotic (or non-living) components. They can range in size from a tiny pond to a vast forest or ocean providing a wide range of environmental, economic, and cultural goods and services. **Ecosystems are facing massive threats globally.** Forests are being cleared; rivers and lakes polluted; wetlands and peatlands drained; coastal areas and oceans degraded and over fished; mountain soils eroded; and farmlands and grasslands over exploited. These degradations are not inevitable but can be reversed through ecosystem restoration.

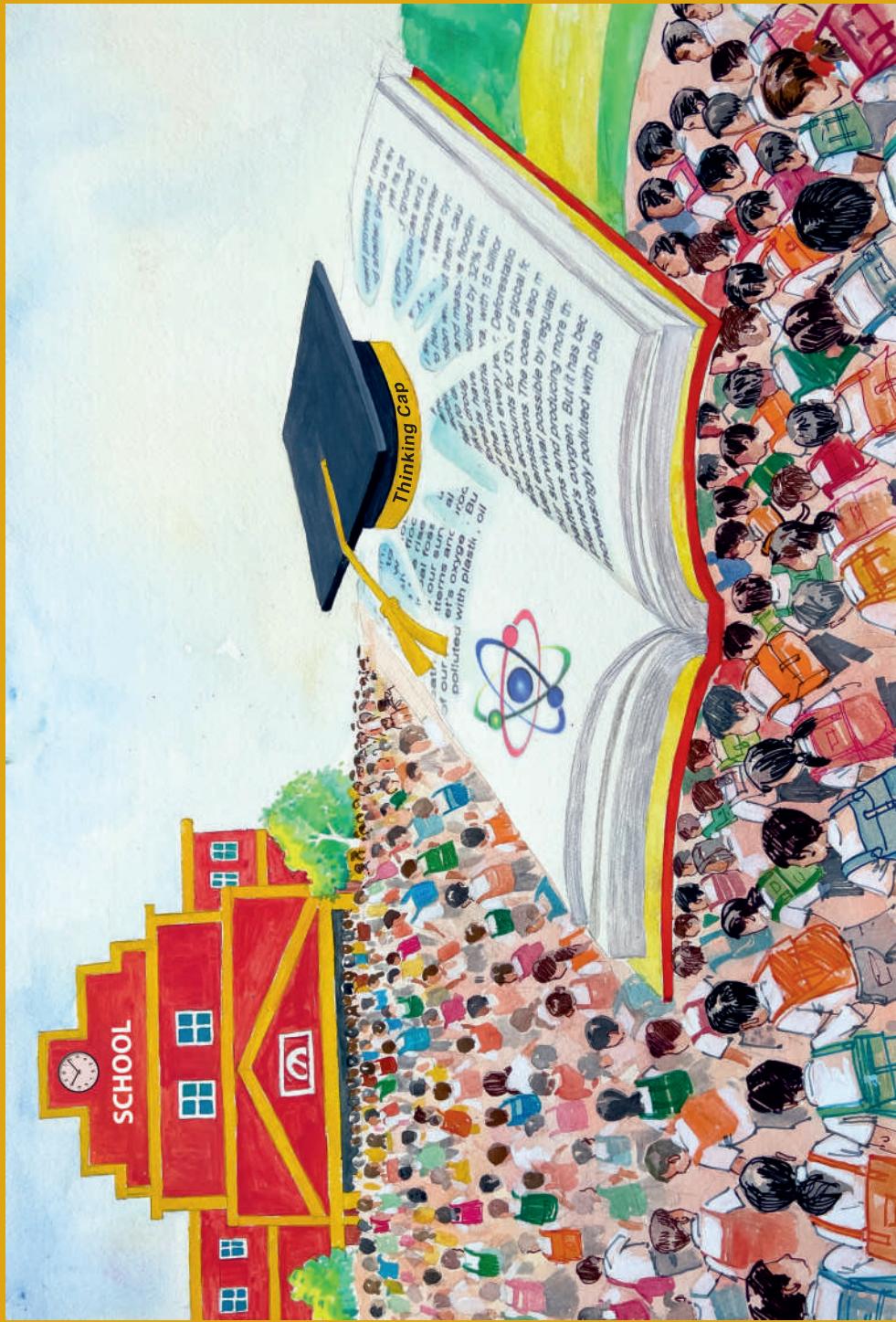
Ecosystem restoration is a process of rejuvenating habitats and ecosystem functions (1). with an aim to develop a healthy environment for humans and other life forms. This process creates the conditions needed for recovery so that plants, animals, and microorganisms can carry out the work of self-restoration.

Ecosystem restoration can be initiated by almost anyone, from governments and developing agencies to businesses, communities and individuals (2). On the World Environment Day 2019, the United Nations Environment Programme declared 2021-2030 the UN Decade on Ecosystem Restoration with an objective to halt the degradation of ecosystems and to restore and rejuvenate them. This entails creating the political environment needed for restoration along with initiating enabling mechanisms.

In order to preserve biodiversity, ecosystem restoration is crucial as it creates the habitat for threatened species and fosters the expansion of different plant and animal communities. This can help maintain the balance of ecosystems, stabilize the climate and provide breathable air; supply of water, food, and materials of different kinds; and also, protection from disaster and diseases. By restoring ecosystems, we can create a sustainable future for ourselves and future generations.

What can I do:

- *Individual should reduce its consumption level.*
- *Reduce the use of fertilizers and chemicals and use natural products.*
- *Plant trees and ensure their growth to full maturity.*
- *Volunteer some restoration projects.*
- *Buy less and live minimalist.*
- *Stick to 3R (Recycle, Reuse and Reduce) concept.*



Education

Environment Education for Tomorrow

Education is the process of acquiring knowledge, skills, values, and attitudes through various formal and informal methods. It involves the imparting and receiving of information, often facilitated by teachers, mentors or educational institutions, to promote intellectual, social, and personal development.

By 2030, India is set to have the world's largest young population, a tremendous asset if these youth are equipped with the skills to join the workforce. To realize this potential, quality education will play a major role. Yet, the present education scenario faces significant challenges.

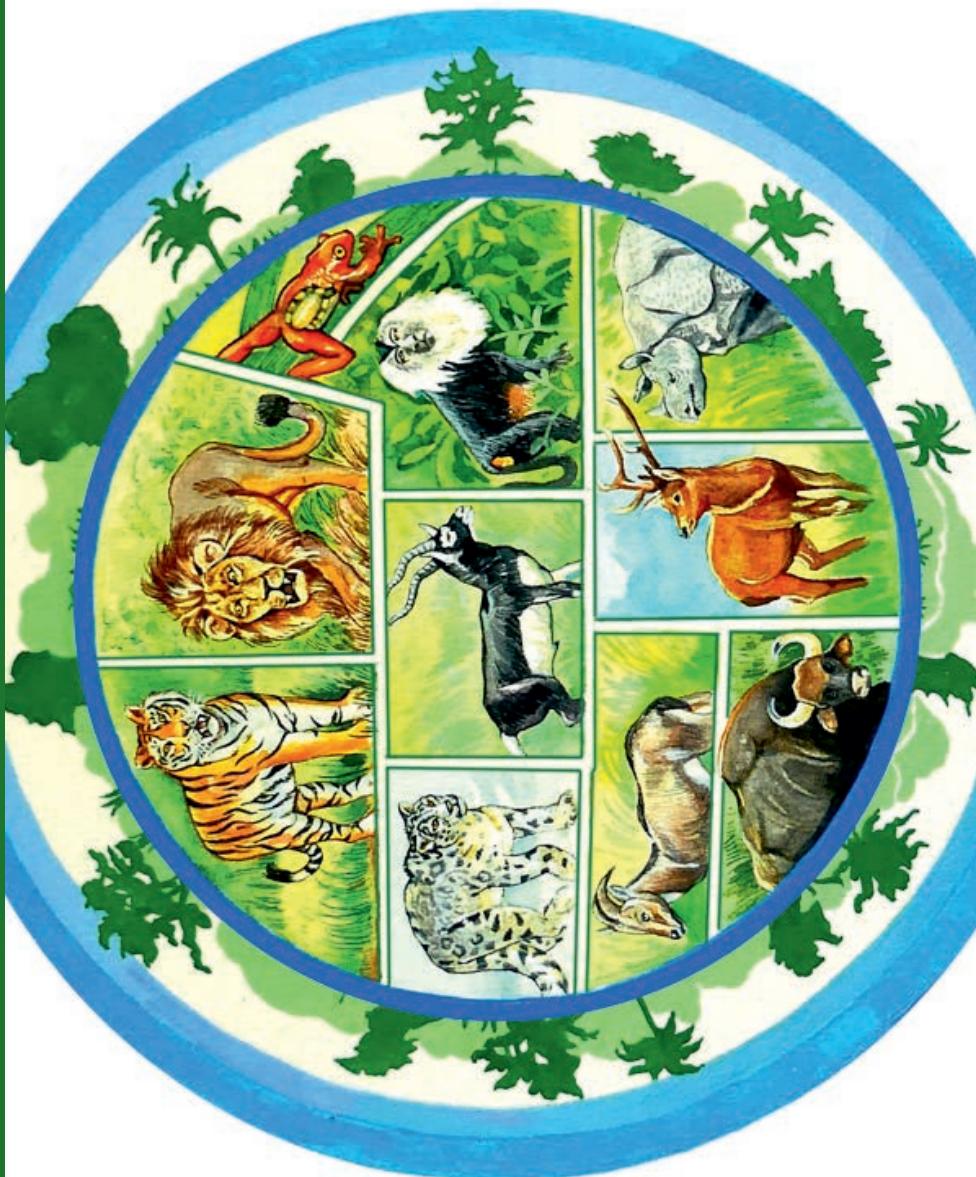
Insufficient infrastructure, limited government investment (less than 3.5% of GDP), and a pupil-to-teacher ratio of 24:1 in elementary schools, as per the Unified District Information System for Education (UDISE), highlight the gaps. It is therefore high time to tune the **Indian Education System in line with global standards and to adopt modern learning approaches that are responsive and relevant.**

There is a need for inclusion of problem-solving and decision-making related subjects in the school curriculum to offer a hands-on learning experience to students and prepare them to face the outside world when they enter into the workforce. Students in rural regions have great potential and are motivated to study but lack the right mentoring. This is required not just for the children but also for their parents that will in a way also reduce the gender gap in education. It is important to look to the future while keeping our long-established roots in mind.

Long time ago, the "*Gurukul*" system taught more than just books. It taught good values and skills. Our education today can do the same. Students can be assessed not only based on their recall but also on their practical application of knowledge and skills. By gradually improving education, our young individuals will be prepared for a more promising future.

What can I do?

- *Volunteer.*
- *Advocate for Change: Raise awareness about the importance of quality education.*
- *Parental Involvement: Educate Parents regarding the importance of education.*
- *Mentorship and Resource Sharing.*



Endangered species

Gems of our natural world

India, a land rich in biodiversity, is home to a multitude of exquisite and unique flora and fauna. Many of these species are under the threat of extinction, primarily due to habitat destruction, poaching, and pollution. This has led to the inclusion of several species in the “*endangered*” category, a designation highlighting their critical need for conservation measures. IUCN's Red List of Threatened Species is a comprehensive information source of the condition of wildlife species.

The prominent endangered species in India are the Tiger, Asiatic-lion, Snow-leopard, One- Horned Rhino, Red Panda, Hangul (Kashmiri stag), Nilgiri tahr, Lion-tailed macaque, Sangai, Hoolock gibbon, Pygmy-hog etc.

One such species - the Great Indian Bustard is found predominantly in Rajasthan and Gujarat. This majestic bird, which is also the largest bird of India, is on the verge of extinction due to hunting, habitat loss, laying of power lines, and industrialisation. It is estimated that less than 200 individuals remain in the wild.

Asiatic Lion with a population of around 400 individuals, is restricted to the Gir Forest in Gujarat. Their minuscule population size and limited habitat make them highly vulnerable to disease outbreaks and natural disasters. Similarly, the Indian Rhino, another emblematic creature, is also on the brink of extinction. Found primarily in Assam, their population has dwindled to a mere 2,640 due to rampant poaching and habitat loss. **Each of these species plays an essential role in maintaining the delicate balance and health of our ecosystems.** Urgent conservation interventions are required to prevent their disappearance. Reducing human-wildlife conflicts are crucial steps required to ensure their survival.

What can I do?

- Learn about endangered species in your area.
- Visit a Wildlife National Park or Sanctuary and support sustainable eco-tourism in wildlife areas.
- Raise awareness on conservation of wildlife and their habitat.
- Say no to products made from threatened or endangered species.
- Say no to illegal trade in wildlife products, e.g. ivory products, animal trophies, medicines and aphrodisiacs derived from animal sources, illegal shahtoosh and pashmina shawls.



Energy

Let's Phase Out Fossil Fuels

What is energy? This question has perplexed the greatest of human minds. The great Nobel Prize-winning physicist Richard Feynman expressed it earnestly, when he said, “*It is important to realize that in physics today, we have no knowledge of what energy is.*” A working definition of energy that physics provides us is that energy is the capacity to do work, a quantitative property that is transferred to a body or to a physical system and recognized as work, heat, or light. Energy exists in many different forms like, light, thermal, potential, kinetic, mechanical, gravitational, electrical, sound, nuclear, and chemical energy.

Human ingenuity in energy use has led to the creation of our industrial societies, which power our urban systems, our food production, our transportation, and now with the advent of the internet, even our imagination. However, it is time we start to reflect on the havoc that our actions have brought upon the natural world. **Unsustainable sources of energy are heating our planet, changing the climate, and destroying the natural world.** At the same time, our energy requirements are increasing.

Urgent steps are required to stop this damage. The world we live in is heating up due to human activities and our actions alone can stop this. The first step in this process is to reduce our carbon emissions, this can be achieved by using renewable sources of energy such as **solar (1), hydro (2) and wind energy (3)**, which while providing future energy needs will also reduce our carbon footprints.

What can I do?

- *Minimise the use of fossil fuels and use electric vehicles.*
- *Make efforts towards full-scale integration of renewable energy in the energy mix.*
- *Support the transition of communities towards the development of renewable energy infrastructure.*
- *Estimate and minimize our carbon footprint.*



Ecosystem

Nature's Way of Recycling

Ecosystem – the term 'eco' refers to a part of the world and 'system' refers to the coordinating units. An ecosystem is woven into a complex structure comprising the different elements of the environment – humans, plants, animals, microbes, and other non-living beings all together. These biological assemblages are interconnected with their associated physical environment and located in a specific place. **Within an ecosystem, energy flows while materials are cycled.** These two processes are linked and balanced energy flows within the ecosystem in terms of food chains are essential for the health of an ecosystem.

India, a land of diverse landscapes and vibrant cultures is also home to complex and fascinating ecosystems. **India has a diverse geography and climatic conditions that support a wide range of these ecosystems.** These include vast grasslands, hot and cold deserts, tropical forests, wet evergreen forests, mangroves etc.

Today, these ecological cycles are being disrupted by the influence of human activities. **Rapid urbanization and industrialization, increased pollution in air, soil, and water along with population growth exerts pressure on the intricate ecosystems.** If you take pieces away from the building blocks of an ecosystem, it's like removing the key to the building's foundation. It loses its strength and we lose our diverse wildlife and biodiversity.

Implementation of 17 Sustainable Development Goals, introduced by the United Nations in 2015 are of utmost importance to combat ecosystem degradation at the global level. Despite several actions and policies, **India ranks 112 on the SDGs among 193 nations.**

To foster a sustainable future, it is crucial to adopt eco-friendly practices. Our responsibility lies in safeguarding this interwoven tapestry of an ecosystem, as it not only sustains our country's natural beauty but also contributes to the global ecological cycle. By ensuring eco-conscious choices, we can ensure India's environmental legacy continues to flourish for future generations as well.

What can I do:

- *Be aware of natural landscapes and natural processes.*
- *Create awareness about the conservation of forests, wildlife and biodiversity.*
- *Reduce the use of pesticides and chemical fertilizers.*
- *Make sustainable choices, save water and plant more trees.*
- *Stop using single-use plastic, always opt for eco-friendly products.*



E-waste

Save it or waste it, it's your choice

Electronic waste or E-waste is the waste generated after discarding electronic goods. In the modern world, humans are extensively surrounded by electronic devices. With rapid advancement in technology, many of these devices are becoming obsolete and are discarded at a high rate. They broadly cover items like computers, mobile phones, laptops, mouse (1), televisions (2), ovens, fans, air conditioners, music systems, cars, buses and many more.

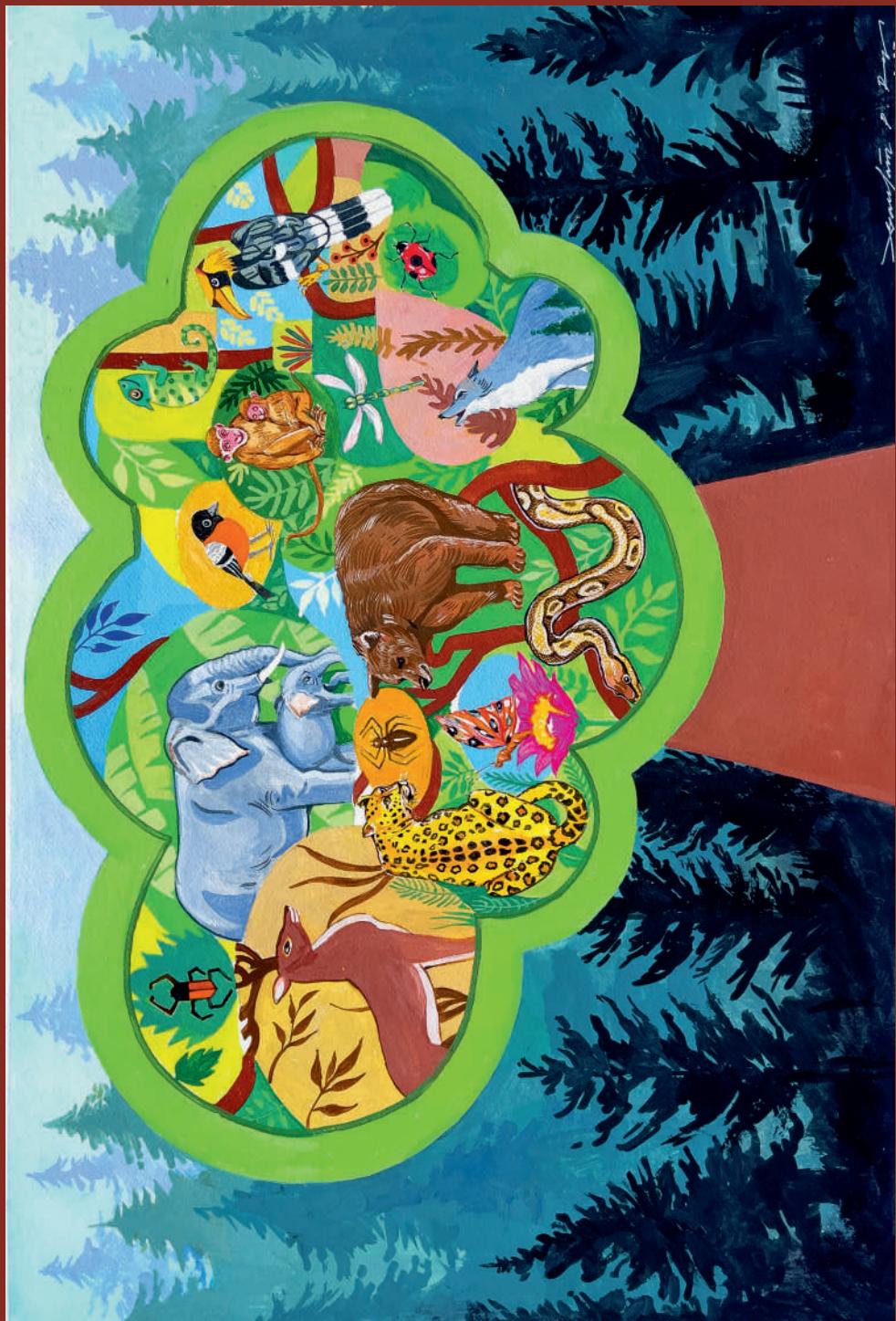
Tonnes of electronic waste is generated every year especially in developed countries like China and USA. India is the third largest generator of E-waste and has shown significant increase in generation from 700,000 tonnes to 1.6 million tonnes in the last three years.

Electronic waste is non-biodegradable in nature and contains harmful toxic substances such as lead, mercury, cadmium, nickel, etc. To get rid of this waste, people dump them in the open from where these toxins contaminate the soil and natural water bodies. The possible solution to this problem is proper disposal, management and recycling (3). A lot of components of E-waste including copper, aluminium, lead, iron or the parts that are new or in working condition can be extracted and reused.

The government has introduced several policies and regulations to address the E-waste problem. These aim to establish a framework for Extended Producer Responsibility (EPR), E-waste collection and recycling standards. It is imperative that all of us take steps to eliminate e-waste from the environment and become aware of this environmental hazard. Each one must assume personal responsibility to reduce e-waste as much as we can.

What can I do:

- Create awareness about E-waste
- Make recycling a part of lifestyle.
- Purchasing fewer items as per requirement.
- Organise the gadgets, wires and devices available at home to keep in check what you have.
- Donating devices which are not needed.
- Consider a buy-back program and return the old device to the store.



Forest

The Lungs of the Nature

The word forest denotes a vast expanse covered by trees. It is a natural landscape that harbours life and provides essential resources to humanity. **Forests are complex ecosystems, home to 80% of the world's land-based flora and fauna.** It is estimated that around 1.6 billion people worldwide are directly dependent on forests for food, shelter, energy, medicinal plants and livelihood.

Forests provide both direct and indirect benefits; direct benefits like food, fodder, wood, timber, bamboo, and shelter, while indirect benefits like regulating the flow of rivers, reducing the frequency and intensity of floods, preventing soil erosion and desertification, enhancing soil fertility and soil nutrients, maintaining water cycle, waste disposal and ameliorating the extremes of climate etc. They also help in reducing pollution, cleaning the air, prevent natural disasters, produce lifesaving medicines, generate rainfall and purify water. **Forests are home to millions of plant and animal species, and the complex interactions among these species create the forest ecosystems.**

The tropical rainforests are the richest source of genetic, species and ecosystem diversity. They are also called the '*lungs of the planet*'; it is estimated that tropical rainforests cover less than 7% of the earth's dry land surface generating about 20% of world's oxygen and harbour more than half of all plant and animal species.

At a time when humanity is facing the twin challenges of climate change and biodiversity loss, protection and restoration of forests is the way forward. It is imperative that the diverse forest ecosystems around the world are protected and conserved for our better future.

What can I do?

- *Conserve trees and forests in your area. Visit forests often and plant more trees.*
- *Support forest conservation organizations; reduce paper consumption by going digital at home and office.*
- *Buy forest-friendly products.*
- *Inculcate the love for forests and wilderness in the younger generation.*
- *Support companies promoting sustainable forestry practices.*
- *Prevent forest fires by being vigilant.*



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Forest fires

Burning forests, burning hope

Forests, often referred to as the lungs of our Earth, play a pivotal role in maintaining a stable climate. Forest fires have a profound impact on our ecosystem. Though, there is a beneficial aspect of natural forest fires in terms of releasing important nutrients into the soil, removing unwanted species, and aiding seed dispersal in maintaining the health of an ecosystem. **Most forest fires are man-made and cause heavy destruction of the forestry species.**

Forest fires have become more frequent now, burning nearly twice as much as tree cover today as they did 20 years ago. As per the World Resource Institute, 2021 has been one of the worst years for forest fires since the turn of the century, causing an alarming 9.3 million ha of tree cover loss globally. **Climate change is likely a major contributor to the extreme heat waves leading to major forest fires.**

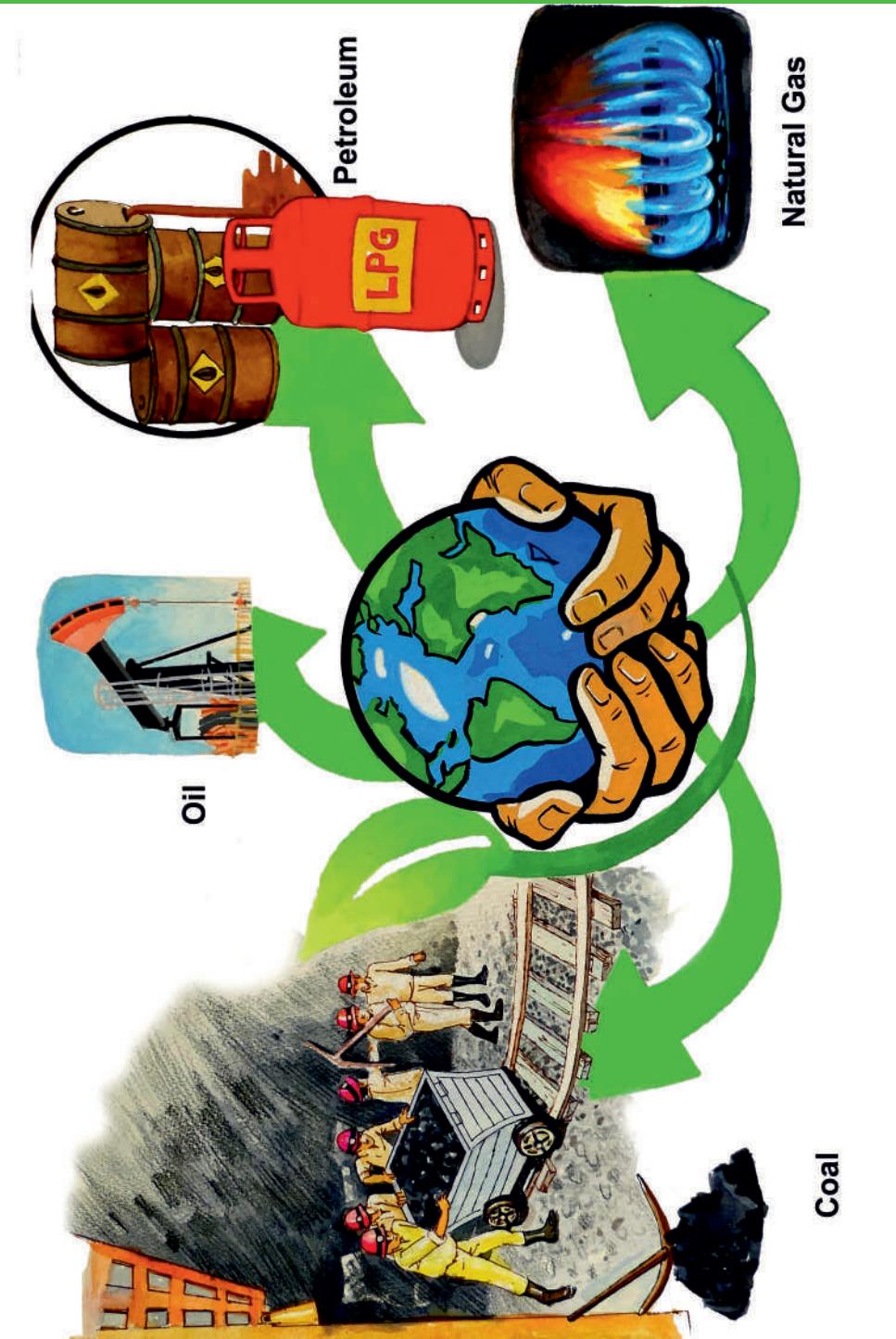
In India, varied landscapes ranging from the lush Western Ghats to the arid Thar desert, are susceptible to fires that spread rapidly due to the abundance of dry vegetation during dry seasons. **More than 36% of the country's forest cover has been estimated to be prone to frequent forest fires.**

When flames engulf these vital ecosystems, they release vast amounts of carbon dioxide into the atmosphere, contributing to global climate change. **The loss of trees, which absorb carbon dioxide, exacerbates the issue, creating a dangerous cycle that impacts us all.** The damage does not stop there; ash and debris can infiltrate nearby water bodies, posing threats to aquatic life and polluting valuable water resources.

Preventing and mitigating the consequences of forest fires is a shared responsibility. By understanding their impact and collectively striving for responsible land use and sustainable practices, we can work towards preventing and controlling of forest fires.

What can I do:

- *Be alert for dry weather and drought and casualties.*
- *Never leave a fire unattended. Always put the fire out before leaving from the site.*
- *Obey local laws and guidelines regularly for open fires, including camp fires.*
- *Have firefighting tools nearby and handy.*
- *Report instances of any forest fires to relevant authority.*



Fossil fuels

Switch and thrive, fossil-free drive

Fossil fuels are potent energy sources made from fossilized and buried remains of plants and animals that lived millions of years ago. On burning they produce heat, which can be used directly or can be used to generate electricity.

The Industrial Revolution was made possible by fossil fuels, the use of coal-powered steam engines, thermal power plants generated electricity, oil made vehicular transportation possible, and natural gas provided heating for millions of homes. Hydrocarbons have become an essential part of our modern world, making this '*The Age of Fossil Fuels*'. The great energy scientist Vaclav Smil has remarked that the modern world would not exist without cement, steel, plastics, and ammonia all of which cannot be produced on a mass scale without the use of fossil fuels.

Fossil fuels are also the main source of greenhouse gas emissions, their unregulated usage has led to economic inequalities and forced our world on the brink of global annihilation, between 1000 CE and 2022 CE, the carbon dioxide (CO₂) concentration in the atmosphere has risen from 290 to 420 parts per million (ppm), this increase in CO₂ is leading to human-induced global warming.

Noam Chomsky has remarked, "*We're approaching the most dangerous point in human history*". But, there is hope, our leaders have shown that we can work together and avert this crisis. The Paris Agreement is proof of this collaboration, and it shows that the world is committed to dealing with global warming and moving towards a sustainable future based on clean energy.

A start has to be made by reducing our dependence on fossil fuels and moving towards renewable energy sources such as solar, wind, biomass, geothermal, and hydroelectricity. Our timely actions alone can save the future of humankind and of our planet.

What can I do?

- *Support green initiatives like renewable energy, e-vehicles, etc.*
- *Contribute to green financing and innovation by practicing sustainable investing*
- *Spread awareness about the dangers of carbon emissions from fossil fuels*



Global Warming

Stop global warming before it's too late

Lifeforms have thrived on Earth because of the ideal warmth maintained by the Earth's atmosphere for a long time. **The Earth's climate has changed several times throughout its geological history because of natural reasons.** But, human activities, especially in the last two centuries have impacted the climate through increased emissions and have altered the balance. The burning of fossil fuels (coal, oil, natural gas etc.) since the Industrial Revolution has released heat-trapping greenhouse gases (such as CO₂, CH₄, and NO_x) into the atmosphere. Excess heat trapped in the atmosphere has elevated the global average temperature which is known as 'global warming'.

Compared to the pre-industrial period (1850-1900), the Earth's average temperature is estimated to have increased by 1.1°C. **There is consensus among scientists that the current warming trend is undoubtedly caused by human activities.** Nine out of the ten warmest years since 1880 have been recorded since 2005, and the five warmest years on record have been observed since 2015.

Global warming has led to another pressing issue of climate change. It has led to changes in weather patterns such as extreme weather events, increased frequency of wildfires etc. Further increase in emission levels is going to create an even warmer planet causing widespread implications across the globe.

The Intergovernmental Panel on Climate Change (IPCC) has reported in its latest assessment reports that we might have already missed the deadline to limit global warming below 1.5°C compared to the pre-industrial level. **Reducing the carbon footprint of human activities and adopting different mitigation and adaptation strategies are essential for a sustainable future.** Switching to renewable energy from fossil fuel for all our energy needs is a major way forward in that direction.

What can I do?

- Save energy at home; switch to renewable sources of energy.
- Walk, bike or take public transport.
- Switch to an electric vehicle.
- Reduce, reuse, and recycle.
- Reduce consumption patterns.
- Eat more vegetables.



Household waste

Reduce waste for a sustainable future

Household waste/ garbage/ trash means waste (1) which is generated in day-to-day activities, poses a critical environmental challenge globally, driven by modern consumerism's excessivematerialism and packaging. Household waste is classified into Six types: organic (food, garden, animal waste)(2), Plastic waste (packaging)(3), e-waste (old electronic devices)(4), Metal waste(5), Glass waste(6), paper waste (including packaging paper, newspaper etc.) (7).

Alarming statistics reveal that India generates 62 million tonnes of waste annually, with 70% collected, but only 12 million tonnes properly treated. About 72% is indiscriminately dumped. **Experts predict urban waste could reach 165 million tonnes by 2030.** Recognizing the gravity of the situation, waste management in India falls under the jurisdiction of the Union Ministry of Environment, Forests, and Climate Change (MoEF&CC).

In 2016, the MoEF&CC introduced the Solid Wastage Management (SWM) Rules, which aimed to address this crisis comprehensively. These rules mandated the inclusion of the informal sector (kabadiwala), enforced waste segregation at the source (Gilla and Shukha Kachra), and encouraged fast-moving consumer goods (FMCG) companies to reduce non- biodegradable packaging. Additionally, fines may now be imposed on individuals found burning or illegally discarding garbage in public areas. **The Indian PM also launched the ambitious Swachh Bharat Mission, aimed at instilling behavioural change in people regarding healthy sanitation practices.**

With the increasing urbanization and consumption patterns, it is crucial to implement and enforce policies like the SWM & SBM Rules to ensure a sustainable and cleaner environment for future generations.

What we can do: As a responsible community, we must;

- Cultivate a culture of Reduce, Reuse, Recycle
- Waste segregation in houses/market
- Reducing waste generation
- Promoting eco-friendly habits



Indian ethos of sustainability

The world is one family (Vasudev Kutumbakam)

The ancient roots of India's relationship with the natural environment can be found from the times of the Vedas, Upanishads, Puranas, Ramayana, and Mahabharata. India's way of looking at nature comes from a simple thought: people are connected to the planet. Just like a small part of a big world, we are like tiny parts of this Earth. We and the planet have a close relationship, where our well-being depends on the planet's health.

Earth is like a mother. We come from it, take things from it, and in the end, become one with it. Just like a mother who gives birth and cares for her child, the Earth gives birth to us and provides us with endless gifts. An old Hindu saying quietly tells us: "*The Earth is our mother and we are all her children.*" The Indian way of life emphasizes living in close proximity to nature.

Our ancient Indian medicine system, **Ayurveda (1)**, mostly uses herbs and plants to heal. It's clear about keeping nature balanced for good health and a clean environment. Planting Tulsi(2) trees is seen as a good thing and can be seen in every home. Tulsi is perceived as a motherly figure due to its beneficial effects on health and its ability to purify the air. Similarly, the Peepal tree is considered sacred and has great religious significance.

Indian ethos has a tolerant view of the world and towards the million other creatures who also deserve to live on this planet. Our way of thinking about the environment helps us understand the problems faced at the global level and teaches us to use the available resources judiciously while maintaining the balance of nature.

What can I do?

- *Inculcate traditional wisdom and knowledge.*
- *Creating a sustainable paradigm.*
- *Adopt Zero Waste Practices.*
- *Preserve Cultural Values.*



Lifestyle for Environment

Action to protect and preserve the environment

The concept of 'Lifestyle for the Environment (LiFE) was introduced by Prime Minister Shri Narendra Modi at COP26 in Glasgow on 1st November 2021 and launched on 5th June 2022 calling upon the global community of individuals and institutions to drive LiFE as an international mass movement towards "*mindful and deliberate utilisation, instead of mindless and destructive consumption*" to protect and preserve the environment. Climate change and environmental degradation are the global phenomena which are affecting each one of us. According to the United Nations Environment Programme (UNEP), approximately a 20 per cent reduction in global carbon emissions can be achieved if one billion people out of the global population of eight billion adopt environment-friendly behaviours in their daily lives. There are three pillars under Mission LiFE are:

Focus on Individual Behaviours: LiFE involves making conscious decisions in various aspects of our lives by avoiding single-use plastic; using LED bulbs, Reducing Air Conditioner temperature to 24 degrees, using public transport like metro, bicycles, e-bikes, e-cars; and being conscious about wastage of water; prefer locally available and seasonal foods, use of renewable energy. India's per capita carbon footprint is 60% lower than the global average. This is because the Indian lifestyle is still rooted in sustainable traditional practices by adopting **Reduce, Reuse and recycle**.

Co-create Globally is Scalable ideas for change on a global level. Creating awareness about adverse impacts of carbon-polluting industries, planet-friendly investments, implementing smart energy consumption etc.

Leveraging Local Cultures is adopting climate-friendly social norms, and beliefs and adopting environment-friendly household practices of different cultures worldwide to drive the campaign.

The painting depicts the suggested lifestyle one should adopt for the environment. **As per Planet People** adopt reduce, reuse and recycle, use bicycles for smaller distances (1) Plant more trees (2), and avoid using single-use plastic. These small actions from individuals will help in creating a conducive environment for species like birds and lions (4) and are beneficial for creating biodiversity.

What can I do?

- Use LED bulbs.
- Keep the Air conditioner temperature at 24° C.
- Purchase locally grown food.
- Keep a water bottle during travelling.
- Use cloth bags for shopping instead of plastic bags. Avoid single-use plastics.
- Take the stairs instead of the elevator wherever possible.
- Switch off appliances from plug points when not in use.
- Recycle and reuse old newspapers and magazines.



Marine ecosystem

Save life under water, to save life on earth

Marine ecosystems are the largest aquatic ecosystems on earth with high dissolved salt concentration compared to freshwater ecosystems. These comprise the deep-sea oceans (1), the open oceans, and the coastal marine ecosystems, each of which has unique biological and physical properties. The oceans cover more than 70% of the Earth's surface and make up more than 97% of the Earth's water. The distinctive biotic (living) and abiotic (non-living) characteristics of marine ecosystems are what sets them apart. Important abiotic factors include the amount of sunlight (2) received by the ecosystem, the amount of oxygen and nutrients dissolved in the water, proximity to land, depth and temperature. Biotic factors include plants, animals, and bacteria.

In some places, the ocean is even deeper than Mount Everest, especially at the Mariana Trench and Tonga Trench. A wide variety of organisms have evolved with the ocean in response to factors of the marine environment.

In addition to offering social and economic advantages to people, marine ecosystems help the natural world in a variety of ways. These ecosystems preserve biodiversity, control global temperature and water cycle, produce food and energy resources, and offer leisure and tourism opportunities. 90% of the earth's CO₂ is stored and cycled in the marine ecosystems in the form of inorganic carbon (3). As a result, ocean temperatures have risen and the oceans have become more acidic, harming marine species and habitats.

Healthy marine ecosystems are essential for the existence of life on earth. To conserve them, the United Nations has designated its 14th Sustainable Development Goal as "Life below Water", with an objective to focus on maintaining the coastal ecosystems and promote more sustainable economic practices for marine ecosystems. A transformation in how people view, manage, and utilise oceans, seas, and marine resources will be necessary if we are to preserve the quality of life that the oceans have given to humankind while maintaining the integrity of their ecosystems.

What can I do?

- Explore and learn about oceans and marine life.
- Create awareness on marine ecosystems.
- Reduce your plastic use, reuse and recycle.
- Conserve water by making small changes at home.
- Volunteer for clean-ups at the beach and in your community.



Medical waste

Waste management, health enhancement

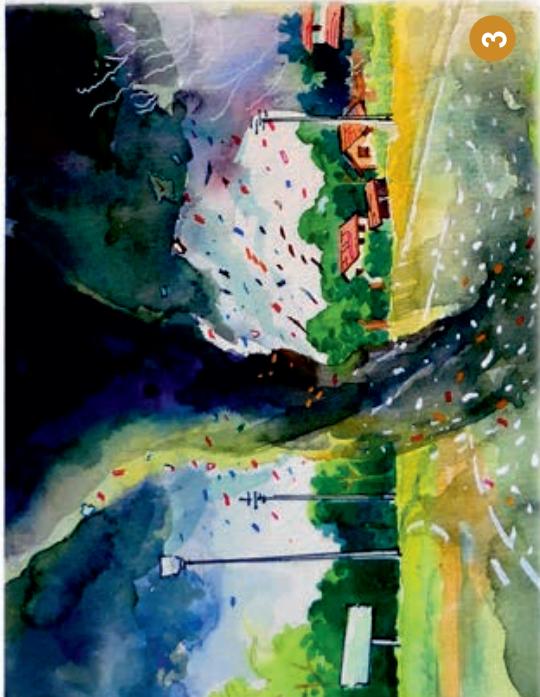
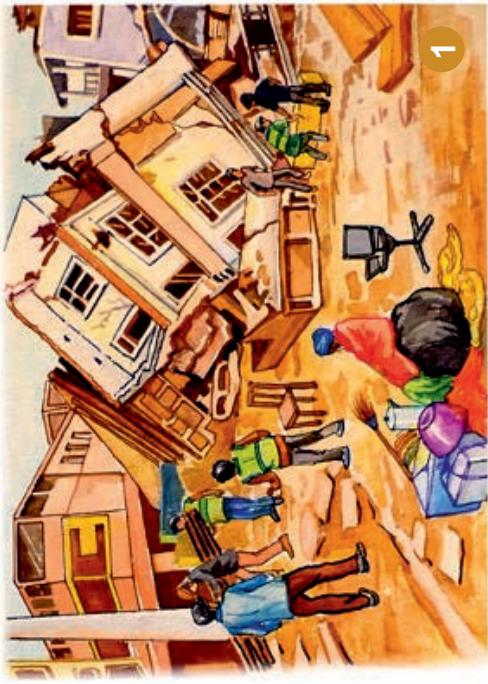
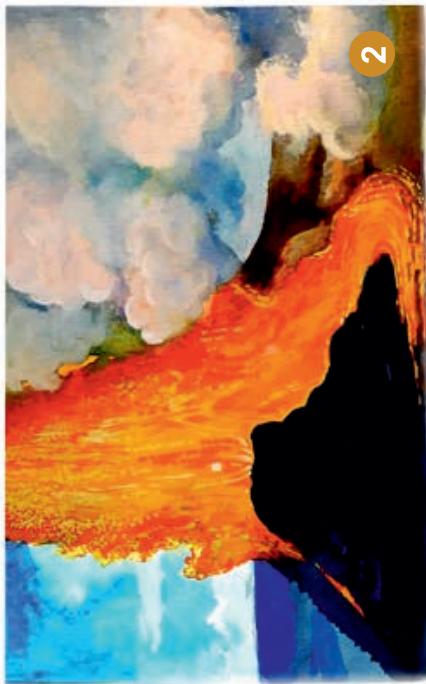
Medical waste is the waste generated by healthcare activities, encompassing a wide range of items such as used needles, syringes, soiled dressings, body parts, diagnostic samples, blood, chemicals, pharmaceuticals, medical devices, and radioactive materials. This waste can be categorized into two main types: about 85% is considered general and non-hazardous, while the remaining 15% can be infectious, toxic, or radioactive.

Waste production increased tenfold between 1900 and 2000. It is expected to double again by 2025, meaning that waste “**is being generated faster than other environmental pollutants, including greenhouse gases**”. There are many reasons for this development, involving a combination of population growth, rising wealth, increasing urbanization, shifts to purchasing methods that require packaging, and an increasing use of plastic.

In a developing country like India, the problem of bio-medical waste is becoming a challenge not only to the government but also to people who are directly or indirectly associated with it. The government of India has made proper handling and disposal of this category of waste a statutory requirement under “**Bio-Medical Waste (Management and Handling) Rules 1998**” which were promulgated on 20th July 1998, yet a large number of healthcare facilities are still found to be sorting the waste incorrectly.

What can I do?

- Proper Disposal of medical waste.
- Collection and segregation of hazardous and non-hazardous waste.
- Eco-friendly Choices/ Reusable Items: Choose reusable medical supplies whenever possible.
- Use Colour code containers for disposal of waste to ensure appropriate separation.



Natural disaster

Respect nature to stop disaster

Disaster is a serious disruption in the normal functioning of a community beyond its coping capacity. A natural disaster is thus any natural event both catastrophic or prolonged such as **flood**, **earthquake (1)**, **landslide**, **cyclone (3,4)**, **volcanic eruption (2)** etc. causing great damage to human lives or the natural environment, property or public infrastructure. The magnitude of damage depends on the sensitivity and resilience of the community to natural disasters. **However, in the modern era, the distinction between natural, human-made and human-induced disasters is quite blurry.** While natural events are inherent to the dynamic nature of the planet, their impact is amplified by human activities. Humans exert so much influence on the planet that they can potentially play a role in causing disasters.

Rapid urbanisation, deforestation, and environmental degradation often amplify the destruction caused by these disasters. India has had the third-highest number of natural disasters over the past 20 years (2000-2019), behind China and the United States. Climate change has made the occurrence of some natural events such as floods, droughts and cyclones more frequent and intense. **The rapid growth of human population and its concentration in areas prone to natural disasters have escalated the severity of such events.** Disaster has physical, social, economic and psychological impacts on human societies. Disaster management should address all aspects of disasters such as prevention, mitigation, response, recovery and preparedness. Early warning systems, real-time monitoring and capacity building of communities should be prioritised to minimise any potential loss from disasters. Populations sensitive and vulnerable to disasters should get more attention from the authorities.

What can I do?

- *Be proactive: The best way to address a disaster is by being proactive.*
- *Preparedness. To be alert to any impending disaster.*
- *Keeping emergency kits at home.*
- *Quick response: Disaster preparedness exercises at the community level.*
- *No construction activity in disaster-prone zones.*
- *Having adequate and appropriate mitigation and recovery strategies.*



Overconsumption

Consume less, make responsible choices

Overconsumption refers to the use of resources more than our planet can provide or using them at a much faster rate than it can replenish. As more people inhabit the earth, demand for resources like food, water, energy and space also grows. As Mahatma Gandhi once said, “*The world has enough for everyone's need, but not enough for everyone's greed.*” Extensive use of resources is stripping the earth of natural resources such as forests, fish, soil, minerals and water leading to the deterioration of the ecosystem and endangering the survival of countless species.

The economic consequences of overconsumption are also noteworthy. It may seem that buying more is a boon to the economy, but it is essential to consider the long-term effects associated with such buying. Industries like fashion, automobile, and manufacturing are some of the highest overconsuming and overproducing bodies depleting the earth of its resources. It has invariably reversed the demand-and-supply relationship.

The concept of overconsumption is tightly linked to waste generation. From the use of single-use plastics to electronic gadgets, the items we consume often end up as discarded waste. India faces a mounting waste management challenge, landfills overflowing and resulting in suffering of the natural ecosystem posing a direct threat to our rich biodiversity.

To combat the issue of overconsumption we need to make conscious and responsible choices. We can do so by supporting products with minimal environmental impact, reducing our energy usage, reducing our carbon footprint, and advocating policies that promote sustainability. Industries and businesses should employ the idea of circular economy and producing materials keeping longevity in mind.

By redefining our priorities and embracing sustainability, we can pave the way for a better future for generations.

What can I do?

- Reduce my consumption levels by adopting changes in my lifestyle.
- Reduce my usage of energy and water on daily basis, to achieve less carbon-footprint lifestyle.
- Being Environmentally Conscious: To reduce, reuse and recycle.
- Avoid purchasing of single-use items and hoarding unnecessary items.
- Supporting local businesses and buying only what I need.
- Conserve resources, and advocate for less energy and water use in my surroundings as well.



Plastic pollution

For a better future say bye-bye to plastic

Plastics are considered one of the most significant inventions of the 21st century. They have revolutionized modern life due to their durability, versatility, and cost-effectiveness, and become integral to everyday life. However, **plastic accumulation in the environment due to improper disposal adversely affects humans, wildlife, and their habitat.** Millions of tons of plastic waste accumulate annually, endangering habitats from the Arctic to the Antarctic. Plastic is often not recycled, and it ends up in landfills causing environmental pollution.

Plastics are classified by size into micro (less than 5mm), meso (5-25mm), and macro (larger than 25mm) debris. Microplastics pose the greatest threat as they are easily ingested by wildlife. **Meso and macroplastics are commonly found in beaches, rivers, and oceans(1).**

Plastic pollution adversely affects the environment and health and endangers diverse life forms(2), contaminates water bodies, and contributes to climate change. Animals can ingest or get trapped(3) in plastic, while microplastics, after breakdown, infiltrate marine life and the food chain, even reaching humans, raising concerns about potential health risks like cancer, etc. There are a number of things that can be done to reduce plastic pollution, such as: recycling plastic waste, reducing single-use plastics and throwaway culture, and developing new technologies to reduce plastic production and consumption. **The Indian government banned identified single-use plastic items manufactured, imported, sale and use of banned single-use plastic items from July 2022.** By adopting sustainable practices, supporting innovation, and fostering global collaboration, we can strive towards a cleaner and healthier planet for current and future generations.

What we can do? As responsible citizens, we must;

- *Minimize plastic use.*
- *Prioritize its reuse whenever feasible.*
- *Use reusable straws and utensils at home/parties/picnics.*
- *Bring your own coffee mug to coffee/chai shops.*
- *Refuse plastic bags at the grocery store.*



Pollution

Stop Polluting the Air and Water

Human activities can have direct and indirect negative impacts on the environment. For example, stone crushers emit suspended particulate matter (PM) and noise into the air. Vehicles emit (1) Nitrogen oxides (NO_x), Sulphur dioxide (SO₂), Carbon dioxide (CO₂), Carbon monoxide (CO), and a **complex mixture of unburnt hydrocarbons and soot, which contaminate the atmosphere** (2). Agricultural runoff and domestic sewage laden with pesticides and fertilizers pollute water bodies. Tannery effluents emit foul odour and hazardous chemicals.

Human activities contribute to environmental pollution, which is defined as the introduction of undesirable substances into the environment. Pollution categories are based on their nature including air, water, soil, noise, and light pollution. Agents that cause pollution are called pollutants. A pollutant can be a physical, chemical, or biological substance that is unintentionally released into the environment, directly or indirectly harming the whole ecosystem.

Pollution poses substantial threats to human well-being, wildlife (3), and the ecosystem, serving as a leading contributor to mortality and illness worldwide. Furthermore, pollution exacts a financial toll on the global economy, resulting in billions of dollars in expenses annually. It also contributes to a range of issues, including climate change, global warming, biodiversity loss, and resource depletion.

Pollution has dire consequences on both humans and ecosystems (4). It leads to respiratory diseases, cancer, and reduces life expectancy in humans. Ecosystems suffer through disrupted food chains, biodiversity loss, and habitat destruction, threatening the balance of nature.

What we can do? As an individual level, we can;

- *Adopting cleaner technologies.*
- *Advocating for sustainable practices.*
- *Reducing waste generation.*
- *Promoting eco-friendly habits.*



Population

Stabilise Population for Our Survival

Population refers to the total number of individuals living in a specific geographical area at a given time. It encompasses the residents of a particular region, country, or the world as a whole. Population size is a fundamental demographic indicator that plays a crucial role in various social, economic, and environmental contexts.

India stands as a vibrant nation, hosting a population exceeding 1.42 billion individuals, surpassing even China to become the world's most populous country. This surge, however, leads to a pressing issue of overpopulation, causing strains on resources, the environment, and social cohesion. The rapid population increase is becoming a fiscal and environmental challenge, altering the balance of India's resources and social fabric.

This rapid growth plays a direct role in climate change, amplifying our carbon footprint and straining resources. More people inevitably lead to heightened consumption and environmental impact, exacerbating the situation. **The gravity of this scenario cannot be ignored—our choices today are shaping an irreversible future.**

Present projections indicate that sustaining our current population would require 1.75 Earths under current conditions. Alarming as this is, the prognosis suggests the number could escalate to four earths by 2050, if the trajectory persists. **This is a complex challenge interwoven with poverty, cultural values, and societal norms.**

To address this, the solution lies in education, creating awareness, empowering women, and enabling employment opportunities. Success would, however, hinge on adopting these measures urgently and sustaining them into the future. Sustainable growth is feasible and not beyond our technical capabilities. The path forward requires collective commitment and purposeful action, echoing the simplicity of education, gender empowerment, advocacy, and employment opportunities as the keys to unlocking a prosperous future.

What can I do?

- Awareness.
- Promote Family Planning Services.
- Support Women Empowerment.



Rainwater Harvesting

Every drop saved is insurance for our future

Rainwater harvesting (RWH) is one of the oldest traditional techniques known for collecting and storing excess rainwater for reuse. It is also the most effective method to collect and store rainwater on the surface, below the surface (1), or on the sub-surface before the water flows away.

Today, everyone is concerned about the impending water crisis. Geologists believe that indiscriminate exploitation of groundwater in many areas of India, loss of soil moisture, geographic movements, and excessive dryness are the main reasons for the depletion of groundwater. This has alarming consequences, including subsidence and fissures in the ground, and can only be stopped when the buoyant force of groundwater is maintained and the water is recharged sufficiently.

Rainwater harvesting has become necessary to increase the storage capacity levels of groundwater, prevent groundwater pollution, prevent soil erosion, and avoid wasteful flow of water. The rainwater harvesting system consists of a catchment area, conveyance system, flush, filter and storage reservoir. The collected rainwater is channelled into the ground through handpumps, borewells (2) or wells (3), making ponds, making small water tanks (4) in homes, and making small dams on small rivers in various places, which helps in conserving this precious resource.

Rajendra Singh, the Waterman of India, earned the title by offering his life to this mission of water conservation. Starting with a single village in 1985, he led the construction of over 8,600 Johads and other water conservation structures to collect rainwater for the dry seasons. Similarly, Dr Anil Joshi has been working towards environmental sustainability and water resource management in Uttarakhand.

What I Can Do?

- *Install rain-water harvesting structures wherever possible.*
- *Use collected rainwater for gardening or washing purposes.*
- *Check for openings or leaks in water distribution pipes.*
- *Close taps properly and fix leaking taps, pipes & toilets.*
- *Install a Water-saving Toilet Flush System.*



Recycling

Reduce, Reuse , Recycle

Recycling is a model that creates closed loop systems where the production, consumption of materials & products is done in a way that the value derived from them is extended, and waste is minimised. At its core, recycling is all about decoupling resource consumption from economic growth, therefore all products have to be designed for durability and should be repairable, upgradeable, and durable in nature.

This is an innovative approach to economic management, a break from the traditional linear model of resource utilisation. The take-make-dispose model of the past cannot work anymore. Rising awareness about sustainability has made it imperative that society move away from exploitative to harmonious resource use. **This circular approach to production requires that a life cycle view of products be followed, wherein the continuous reuse, remanufacturing and recycling of products is kept in mind.** This not only conserves raw materials used in production but also reduces overall energy use and emissions per product.

We need to make a paradigm shift in our relationship to natural resource use. We can collaborate with stakeholders, governments, businesses, consumers and innovators. Governments can start by incentivizing circular practices, such as extended producer responsibility and tax incentives. Businesses can lead by innovating their production processes, and supply chains and implementing take-back programs for recycling their products. Consumers can become mindful of their consumption habits, embrace the sharing of resources, and actively choose products designed for repairability and durability.

What can I do?

- *Promote the habit of recycling in household and community.*
- *Actively try to reduce your plastic consumption.*
- *Avoid purchasing fast fashion goods.*
- *Spread awareness about the circular economy.*

Renewable Energy Sources



Renewable Energy

Fossil fuels including coal, oil and natural gas are the common conventional sources of energy and together contribute more than 60 % of the world's electricity production as of 2019. Since it is widely recognised that fossil fuels are non-renewable, need millions of years to form or replenish, and cause significant environmental degradation, the world is now shifting towards renewables. **The energy extracted from natural resources that can be replenished at a rate higher than its consumption is known as renewable energy.** Currently in India, at 122 GW, renewable energy accounts for only 12.3% of total energy excluding hydro and nuclear energy, as per a report by Central Electricity Authority (CEA).

Renewable sources of energy include solar (1), hydro (2), wind (3), biomass (4), geothermal(5) and tidal energy. Among them, solar is the most plentiful. As per United Nation's estimate, the rate at which the Earth absorbs solar energy is around 10,000 times higher than the rate at which people consume energy. Solar energy can be transformed into electricity with the help of technology and utilised for a variety of purposes, including lighting, cooling, heating, etc. **Wind energy harvests the kinetic energy of air by using wind turbines either situated on land or offshore.** Geothermal energy is the heat generated within the earth crust that can either be directly used for heating or to generate electricity. Biomass such as cow dung, wood, agricultural residues and other organic waste is used to produce bio energy.

Renewables produce less emissions helping in preventing further global warming. The benefits of renewable sources of energy for individuals, large communities, or the planet as a whole is undeniable and seems promising to overcome the drawbacks of fossil fuels.

What can I do?

- *Promote renewable sources of energy*
- *Behavioural change – to be more energy efficient*
- *Make use of energy saving appliances*
- *Switching to renewable sources of energy*
- *Reducing car use and dependency on fossil fuels*



Soil Pollution

No healthy soil, no healthy food, no healthy life

There are a number of natural and manmade factors that cause changes in soil structure which leads to soil pollution. Climate Change, volcanic eruptions or forest fires are some natural causes of soil pollution, although soil pollution is mainly due to human activities. The major causes of soil pollution are agriculture (improper/excessive application of **chemical fertilisers, Insecticides (4), weedicides and fungicides (5)**), industrial activities, mining activities, e-waste, medical waste, inadequate and poor management or inefficient disposal of waste.

Heavy metals are also considered as one of the most polluting elements in increasing soil pollution. **Soil contaminated with lead, mercury, cadmium, arsenic and nickel becomes highly toxic to human beings.** Some of the most hazardous soil pollutants are xenobiotics – substances that are not naturally found in nature and are synthesised by human interventions. This is a Greek term 'xenobiotic' 'Xenos' (foreigner), and 'Bios' (life). Several xenobiotics are carcinogens in nature.

The first step in the assessment and management of contaminated soils is to identify the pollutant. **Reclaiming such soils requires soil treatment according to the pollutant through physical, chemical and biological methods.** Organic manures made from agricultural waste, kitchen waste, wood waste, sewage waste, and dung waste are to be preferred.

Soil Health Card Scheme was introduced in 2015 and was meant to provide soil health status of the farmer's land and advise them about the dosage of **Nitrogen (1), Phosphorus (2), and Potassium (3)**, along with other soil amendment measures required. Similarly, the 'per drop more crop scheme' seeks to educate farmers about soil moisture conservation and improving soil fertility.

What I Can Do?

- Will decompose the e-waste and medical waste coming out of the house in a proper way.
- As an agriculturist, will encourage farmers to reduce the application of chemical fertilisers, pesticides.
- Promote organic and natural farming.



Urbanization

Future human habitation

Urbanization is the concentration of people and resources in a given area (1). This process has been shaping landscapes, communities, and the economy for centuries. The World Bank estimates that by 2050, almost 70% of the global population which is 6.8 billion people will be living in urban areas.

An urban system can be a source of emancipation, it provides economic opportunities along with better access to education and healthcare. Cities are engines of economic growth, they create possibilities for entrepreneurship, promote investment, and can lead to innovation and technological advancement.

Urbanization, however, also places significant demands on natural resources and ecosystems (2). The expansion of urban areas leads to deforestation, habitat destruction, and pollution (3), they also cause an increase in carbon emissions which leads to climate change. It can put pressure on land and biological resources, cities represent 65% of global energy consumption and cause 70% of our global greenhouse gas emissions. Urbanization can also cause social problems because of the accelerated demand for affordable housing, transportation, and employment, creating conflicts among people.

Though growing urbanization, is inevitable, we have to adapt to providing healthy ecosystems to the residents in the urban areas. Promoting energy-efficient buildings, practicing the cultivation of green spaces, also ensuring proper water and waste management are some ways through which we can move towards a greener and better urban world.

What can I do?

- *Support social development in improving urban localities.*
- *Spread awareness about the pollution of air, water, and soil in urban areas.*
- *Invest in green practices and support organic farming in peripheral areas.*
- *Participate in decision-making for urban development.*



Water

Every Drop Matters

Water is one of the most essential natural resources needed for the existence of life. It can be found almost everywhere on earth, from the rocky crust of the globe to the cells of a living organism. The earth is referred to as 'The Blue Planet' or 'The Water Planet' as it covers 71% of its surface with water. It constitutes 97% salt water, which is found in the seas and oceans, and 3% fresh water, found in lakes and rivers of which only 1.2 % is truly accessible to support life of people, plants, and animals.

Water is critical for energy and food production, socio-economic advancement, maintenance of healthy ecosystems and for human survival. It is significant to the global economy. The freshwater is utilised in agriculture, household activities, food production, manufacturing and sanitation. Fishing in water bodies has always been a significant source of food. Oil, petroleum, natural gas, and other commodities are traded over long distances via the oceans and rivers.

With the increasing global population, urbanisation, industrial revolution (1), the water is getting polluted (2) and is diminishing over time. According to the World Health Organisation, over 2 billion people live in water-stressed countries and have no access to clean water that leads to diseases such as cholera, diarrhoea, dysentery and many more.

Providing clean water is vital for reducing the global burden of disease and enhancing population health. More than ever, the world needs to change how it provides water and sanitation services to billions of people and manages its water resources. Since this dilemma impacts every nation in the world socially, economically, and environmentally, immediate action is required to address it.

What can I do?

- Keeping the tap closed when not in use.
- Make sure to use collected rainwater for gardening or washing purposes.
- Do not run more water than necessary while washing and cleaning clothes, utensils, etc.
- Fit aerators on your taps and showers.



Wetlands and Mangroves

Preserve the kidneys of nature

Wetlands are areas of land that are saturated with water, either permanently or seasonally. They are unique ecosystems characterised by water-loving vegetation and diverse wildlife, including birds, fish, and amphibians. Wetlands can be found in a variety of landscapes, including coastal regions, river floodplains, and inland depressions. Wetlands include lakes, floodplains, estuaries, marshes, swamps, fens, bogs, tidal flats, mangroves, and even man-made systems such as ponds, canals, tanks and saltponds.

Wetlands store one-third of the terrestrial carbon, making it one of the most carbon-intensive ecosystems on the planet. Wetlands are also known as the 'kidneys of nature' as they effectively filter water and remove pollutants. Wetlands provide numerous ecological services. They are also important habitats for migratory birds. India has a large number of wetlands and around 75 of them are wetlands deemed to be of "international importance" under the Ramsar Convention (Convention on Wetlands) as of 2022.

Mangroves are among the most iconic wetlands species found in the intertidal areas of marine coastlines and estuaries in tropical and subtropical regions. These mangrove forests support a rich biodiversity and act as bio-shields against climate extremes. The total area of mangrove forests in the world is around 1,47,000 km² in 2022 according to the Global Mangrove Alliance. As per 'State of Forest Report 2021', India has about 4992 km² of mangroves.

Wetlands have been and still are under huge stress due to unplanned, unsustainable practices and processes in urbanisation, agriculture and industrialization leading to shrinkage in their area, and extent, and a decline in the hydrological, economic and ecological functions they perform. Many of the wetland areas have degraded and require urgent attention and effort for their rejuvenation, conservation and protection.

What can I do?

- Reduce use of chemicals – fertilisers, pesticides, insecticides or fungicides, instead use organic manure.
- Use safe, sustainable and eco-aware methods of waste disposal.
- Buy organic, eco-friendly and sustainable products.
- Report illegal encroachment of wetlands to authority.
- Raise awareness about wetlands.

NOTES

2024

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