

Climate Resilience is the Need of Hour

A- Introduction.

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B- Deciphering the terms "Climate Change" and "Climate Resilience"

C- Measures for Achieving the Climate Resilience:

1- Restoring the Green Sinks.

i- carbon sequestration.

ii- 25% vegetation required

iii- Case study of Pak. *write full*

iv- Billion tree Tsunami.

let's avoid this.

2- Sustainable Use of Energy Resources

i- Non-renewable resources

ii- Fossil fuels to go off by 2051.

iii- Water: a precious resource

3- Energy conservation

i- Turning off the lights

ii- Utilizing sunlight.

iii- Public transport: Metro

4- Upgrading Industrial Setups.

i- Filtering noxious gases

ii- Scrubbers

iii- Catalytic converters

iv- EPA's role.

full form?

5- Updated Disaster Management

i- Awareness and education

ii- Preparedness, Mitigation and Response.

iii- Example of Japan.

iv- Pakistan's Disaster Management - Flood Control

v- Cyclone Biparjoy

7- Provision of Alternate energy sources.

- i- Landfills - Methane gas.
- ii- Harnessing solar energy
- iii- Tidal energy
- iv- Hydroelectric energy - Tarbela dam.

8- Water conservation

- i- "Do not waste water".
- ii- Flood irrigation replacing Drip irrigation.
- iii- Water Taxation.
- iv- Pakistan's dwindling water resource: case study.

9- 3 Rs Strategy: Reduce, Reuse, Recycle.

- i- Use biodegradable products.
- ii- Plastic ban campaign.
- iii- Kitchen waste - composting.

10- Avoid Water Pollution.

- i- up-to-date agricultural practices.
- ii- Eutrophication.
- iii- Regular checking of ground water quality

11- Biodiversity Preservation.

- i- Habitat protection.
- ii- Sanctuaries.
- iii- Amazon forests.

12- Protection of ozone layer.

- i- Ozone Depleting Substances - Chlorofluorocarbons.
- ii- Ozone hole.
- iii- COVID-19 pandemic - blessing in disguise.

- 13- Global initiatives for Climate Resilience.
- i - Kyoto Protocol.
 - ii - Montreal Protocol.
 - iii - Paris Accord.
 - iv - COP 28 2023.

- D- Way forward for Attaining Climate Resilience.
- ^{No} i - More rhetorics. Take practical measures.
 - ii - Enhance ambit of Kyoto Protocol.
 - iii - Reduce carbon foot print.
 - iv - Afforestation.
 - v - Carbon sequestration beams.
 - vi - Hybrid seeds.
 - vii - Achieving SDGs. *write full form*

E- Conclusion.

Start is impressive

When the last fish has been caught; the last tree been felled down and the last stream poisoned will we realize that we cannot eat money. The inquisitive man quenched his thirst of curiosity with his unlimited inventions and achieved his milestones one after the other adding pearls to his crown; however, this mechanization vitiated the atmosphere as its byproduct. The carbon dioxide gas, released through the tools of industrialization, contributed to the phenomenon of Global Warming and climate change. According to a recent study, the current carbon dioxide levels have reached forty parts per billion from that of its pre-industrial era. The causes and consequences of the climate change are intensifying the conditions of the inhabitable planet - the Earth to support the life process and making it to lose its sustainable ecosystem. The vitiated atmosphere, polluted land, poisoned water and threatened biosphere are posing a great threat in themselves; and climate resilience - through both mitigation and adaptation measures - to slow down the pace of process of climate change is the need of the hour.

The climate change is the process which is ongoing since the solar system came into being. The phenomenon of Global warming keeps the atmosphere of the Earth warm and enables it to sustain life by providing moderate temperature. Initially, it was only contributed by the atmospheric gases, a blanket around the globe and few of the natural process namely volcanic eruptions which kept the planet warm. But then

the process of 'Extended Global warming' set in where anthropogenic contributions started to add to it and initiated a cascade of reactions ensuing in raised temperature of the Earth that manifested in melting of glaciers, acidification of seas, rising sea levels, and loss of biodiversity. This cascade of adverse reactions can be mitigated by climate resilience - a phenomena including both the mitigation and adaptation measures for averting further noxious impacts of climate change.

The green sinks are the major carbon sequestration sites of the ecosystem to naturally remove carbon dioxide from the atmosphere and incorporating it into the food cycle. Nevertheless, the aggressive industrialisation led to inordinate deforestation which according to a study led to the reduction of vegetative cover all across the globe and went below the belt criteria of 25% required forest cover. For example, it is almost 4% in Pakistan merely inadequate to remove the carbon from the environment. But, the globe witnessed the afforestation and reforestation drives emerging out of realization of restoring the green cover of the Earth. Pakistan did a commendable job in this regard through its project of a "Billion tree Tsunami drive" in order to aid our sole liveable planet with its purifiers.

Moreover, the sustainable use of energy resources that are available to the mankind is necessary. According to an estimate, if the fossil fuels available today are used at the same unhalted pace, are projected to go off the surface of the Earth by 2051. These fossil fuels including coal,

petroleum and natural gas are non-renewable energy resources and do not replenish themselves. They ought to be used judiciously so that they not only the globe maintains its sustainability but also the upcoming generations can utilize this potential. Further, water is also a precious resource of the globe and only 1% fresh water is available for drinking purpose; this ability of the planet to provide this valuable resource must be upheld through its meticulous usage.

Furthermore, the available energy must be conserved by turning off the lights and the fans when not in use. Similarly, switching off the heaters at the daytime and utilizing the potential of the solar energy, the sole source of energizer of everything on the planet. The sunlight can also be utilized by designing the offices and the homes in a way that they are well-lit in the daytime through solar radiations. Public transport usage should be promoted instead of taking out individual bikes, cars, buses on the roads. Also, walking a few miles on foot can not only provide health benefits but also aid in reducing the carbon footprint on the Earth. Metro bus is a good example in this regard.

Similarly, the clean energy can prove to be the saviour of the Earth. It can help the planet by averting its suffocated atmosphere. The renewable energy resources such as hydroelectric energy, solar energy, tidal power and geothermal energy give a breathing space to the oversaturated atmosphere with harmful gases and help in not adding to this adverse potential. The electrical

vehicles which are becoming the new norm are the step in right direction. Also, the Qaid-e-Azam solar park in Bahawalpur is meeting the energy needs by providing 1000 MW energy as well as giving the advantage of clean and green energy.

In addition to it, the industrial setups need to be upgraded for achieving climate resilience by filtering the harmful atmospheric gases that include carbon dioxide, sulphur dioxide, nitric oxide, ozone and particulate matters. These gases not only add to the global warming but also ~~also~~ ^{alter} the filtering capability of the atmosphere. The industries need to be installed with mandatory scrubbers, catalytic converters and air filters to filter as much of these noxious gases so that a minimal amount of them enters the atmosphere. Also, the Environmental Protection Act must check the industrial plan and design before granting it approval and make sure that these filtering gadgets are incorporate to save the breathing space of the human beings and other living organisms.

The global awareness regarding the monstrous phenomenon of the climate change and its horrible consequences need to be spread to enable the masses be educated regarding the whole process. Only this awareness would inculcate the responsibility in every individual to save the sanctity of the atmosphere of the Earth. The Earth campaigns and conferences all across the globe reinforce the need of ample measures to establish climate resilience to secure our own living habitat. The Earth Summit held in 1992 in Rio de Janeiro, Brazil witnessed

the massive participation of dignitaries and premiers of the state who were sent by their learned public to raise the issue and ^{address the} concerns.

Additionally, the disaster management cycles need to be updated and able to provide timely assistance. Their research and prediction cells need to be advanced enough to project the impending calamities. The local residents not only ought to be aware and educated with initial response delivery and evacuation but also made capable of building an infrastructure that is climate resilient. Like, Japan that faces multiple Earthquakes due to its geography of Pacific Ring of Fire but face hardly any casualty due to its resilient infrastructure that carries capability of bending to 45° . On the other hand, the earthquake of Pakistan in 2005 imparted huge loss due to collapsed buildings and weak infrastructure among other reasons causing loss of lives and psychological trauma to the ones left alive. Furthermore, the Disaster Management in Pakistan mainly revolves around floods management predominantly, its ambit needs to be enhanced. However, Pakistan managed "Cyclone Biparjoy" effectively.

Moreover, the alternate sources of energy and their adequate provision can avert the dependence on the non-renewable energy sources. The sanitary landfills can serve the dual purpose of dumping of the household garbage and the generation of the methane gas that can be utilized for cooling and heating purposes and also mitigates the carbon footprint. Also, the street lights powered by fossil fuel can be shifted to solar power, harnessing the solar energy all the day in a sunny day and lighting

up the streets and roads all night with no carbon byproduct in the whole process. Similarly, the high land areas with ample wind speed of 7.0 ms^{-1} can utilize the tidal power plants which can generate the tidal energy. It is particularly effective in coastal areas. The hydroelectric energy can also utilize the potential energy of water contained in dams and be used in the generation of electricity e.g. Tarbela dam.

Furthermore, water is a precious resource. It constitutes 70% of the globe as well as human body. Although it is abundant yet only a nominal portion - only 0.1% is available as freshwater in the form of ice, glaciers, fresh water lakes, streams and marshes - is available that is fit for consumption. The Holy Prophet (S.A.W) said: "Do not waste water even if you are standing ^{like at a humming} by the riverside stream". To ensure water conservation, the flood irrigation should be replaced by drip irrigation. Also, the use of water intensive crops needs to be discouraged. The inordinate use of water, for example, car washing or washing loads of water must be punished. The idea of water taxation should be imposed in order to not only make people realize its importance but also use it meticulously. The water resources of Pakistan have gone down to an alarmingly low level - 150% MAF reduction since 1947.

Similarly, adopting 3 Rs strategy can ensure upholding climate resilience. This 3 Rs strategy includes Reduce, Reuse and Recycle. It can be achieved by buying the materials having less packaging, using biodegradable products and reutilizing the items for some other purpose. It reduces the waste generation and

resultantly decreased need for waste dumping and disposal, helping the ecosystem of the Earth to maintain its sustainability. For example, the kitchen waste can be utilized in composting making it a rich fertilizer for the plants. "Banning Plastic Campaign" was also an offshoot of this strategy which helped in reducing the amount of this non-biodegradable element from the ecosystem.

Also, water pollution needs to be avoided by using up-to-date agricultural practices, using less amount of fertilizers and preventing water runoffs to avoid eutrophication of lakes and ponds. The surface runoffs can also be avoided by making green belts in the fields or planting shrubs in between the fields. The efforts should be put to avoid mixing of sewage water with the groundwater so that it does not cause water-borne disease in the human consumers namely cholera, dysentery and diarrhea. It can also be monitored by regularly checking the groundwater samples for biological oxygen demand, E-coli. and other contaminants.

Further, climate is a compound made up of amalgamation of various species. This variety is the beauty of the planet and must be maintained. The measures for habitat protection, restoration and prevention of damage must be adopted. For example, Amazon forest, a tropical forest rich of habitats witnessed global warming wreaking a havoc there through forest fires and charred infinite species and their habitats along with stacks of smoke adding carbon dioxide in its environment further adding fuel to the fire of the phenomenon.

of global warming. The anthropogenic activities have impacted these habitats directly or indirectly lengthening the Red list of endangered species more and more. For example, the panda, snow leopard and blind dolphin are now endangered species; at the verge of going extinct. Pakistan also hosts many protected areas and sanctuaries for its contribution in biodiversity protection endeavours.

Furthermore, the ozone layer - the only protective shield of the Earth that protects it from the harmful ultraviolet radiations of the sun. It can be achieved by reducing the use of chlorofluorocarbons in refrigerators and air-conditions that release chlorine molecules in the stratosphere and damage the ozone layer. It can be achieved by using energy efficient appliances, replacing the old appliances and turning them off when not in use. The ozone hole over

Antarctica is the reality of the world now and is manifesting itself as the consequence of ambitious endeavours of mankind at the cost of the environment. However, COVID-19 pandemic unfolded it as a blessing in disguise for this ozone hole, while on one hand, there was economic halt, the ozone hole saw its healing; giving a ray of hope that it can still be healed amidst loads of ozone depleting substances.

Keeping in view the disastrous impacts of the global warming and the climate change, the ones in high echelons started to take initiatives to mitigate the noxious impacts of this phenomena. The world adopted Kyoto Protocol in 1997 to initiate clean development mechanism

and Carbon Trading along with Joint Implementation. Then the world also adopted Montreal protocol in 1987 which was meant to reduce the ozone depleting substances. Kofi Annan, the erstwhile Secretary General regarded Montreal protocol as the success. Similarly, the Paris Climate Accord in 2015 also pledged to reduce the climate change. Further, the conference of Parties (COP) - 28 that happened recently in the United Arab Emirates ^{in Nov-Dec, 2023} and culminated in the historic climate fund along with resolutions of mitigating the carbon footprint and imparting climate justice.

The climate change is manifesting itself in an accelerated pace and some practical measures must be utilized adopted for avert this menace which otherwise is growing into a gigantic monster and capable of engulfing the whole globe. The climate accords and conferences till date have predominantly served as mere rhetoric. The world needs more practical solutions to manage this menace. The ambit of Kyoto protocol must be enhanced as the status of China and India although developing economies have contributed a huge chunk of carbon dioxide to the atmosphere but are in Annex II parties which constitute non-binding parties. The need of the hour is to revisit these categories. The measures of afforestation, reforestation must be taken up ambitiously which not only ~~restore~~ restore the scenic beauty of the green planet but also impart it a green sink carbon sequestration site.

Also, the research engineered hybrid seeds should be replaced by water intensive crops to

yield a productive crop along with decrease water utilization hence contributing to water conservation. Also, the science has bestowed on man the opportunity of carbon sequestering beans which are capable of carbon capture of although a nominal amount yet a good step in this direction. Similarly, the governments ^{and} the institutions all around the globe should pay attention to the Sustainable Development Goals addressing environment namely 15-17 to ensure a sustainable environment.

The worsening unravelling of the climate change are impacting the capabilities of Earth to support life. Its polluted atmosphere, vitiated land, ^{fitting} vitiated water and endangered biosphere pose a great threat to it and climate resilience ~~to~~ can be utilized to decrease its unhalted pace. We owe this planet to our future generations. Its resources are not inherited to us, they have to be passed on to the offsprings in a sustainable manner. Furthermore, the water and the air, two precious mediums of the Earth to support life must be kept as healthy as possible to ensure liveable and clean conditions on the the planet. The global pledges must be taken up in true letter and spirit and concerted efforts need to be put in to ensure a clean and green atmosphere. The globe is now realizing the horrors of upcoming adverse events and is taking adequate measures in the form of climate justice and climate funding for developing nations which is a silver lining in the cloud to protect the planet solely owning the capability to support life.