



Ecosystem Restoration – A Holistic Approach

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Abstract – The Ecosystem restoration is highly need of the hour as survival of our future generation to some extent depends on if ecosystem is properly restored. In stratosphere, ozone layer (O₃) is rapidly depleting and thus forming holes in the ozone layer, pollution of troposphere (O₂), Pollution of Land by mindless application of toxic chemical fertilizers & pesticides, merciless dumping of trash in to all water bodies like ponds, lakes, rivers, canals and drains as well as in to Ocean, uncontrollable emissions in to air, excess radiation emanation from communication towers beyond tolerable limit, littering on roads and streets, mercilessly cutting of big age old trees -in mass numbers on the name of road widening projects etc. All the above caused maximum damage to the Ecosystem and the result is evident like Greenhouse effect, Global Warming, premature glacier melting in polar and hill regions (Cryosphere damage), torrential rains in unusual manner, drought etc.

Keywords – Use of Renewable energy, Afforestation, Rain water harvesting, Recycling of plastic waste, Biofuel, Biogas, Protection of Bio diversity and Organic Agriculture.

Introduction:

The major causes of damages to ecosystem like global warming, cryosphere melting (glacier melting in polar and hill regions), rise of sea level, climate changes like drought, scarcity of drinking water, formation of severe cyclone as well as torrential rain in short span of time, human caused hole in ozone layer which led to disruption in natural filtering of ultraviolet rays from sunlight. These are few to name that are very well known to everyone by this time. Now, it is a high time to think about and a **holistic approach** for ecosystem restoration needs to be implemented urgently are discussed.

Causes of damages to ecosystem and remedial measures in practice and further suggested to restore ecosystem:

AIR.

- The major contributors of emission of carbon dioxide (CO₂)
 - From fossil fuel-based power generation plants, factories like Cement & Steel etc., decaying & living organisms, and Volcanos.
- Water vapours blocks heat from escaping (H₂O),
- Methane gas released from wetlands, paddy fields, raising cattle and mining coal. (CH₄)
- Close to ground the ozone (O₃) acts as greenhouse gas formed due to running of automobile vehicles.

- Nitrous oxide is released by some types of factories and plant fertilizer and it damages the protective ozone layer at the top of the stratosphere. (N₂O)
- The emissions of CO₂ from the stacks of all coal fired power stations & from the Steel and Cement Industries need to be captured before letting into atmosphere, same shall be compressed into liquid carbon dioxide, injected into the selected & porous deep geological formations of abandoned oil /gas wells. (Carbon Sink/Carbon Sequestration)
- Merciless cutting of trees in all road widening projects, and as well as in development of other Infrastructure projects. (Trees = Major source of oxygen production on land for support of survival of all living beings)
- Excess radiation emanation from communication towers beyond tolerable limit caused extinct of certain species. Strict compliance of radiation norms from all communication towers needs to be ensured.
- Dry thunderstorms occur essentially in dry conditions, and lightning strike associated with it is a major cause of wildfires. These lightning strikes caused forest fires causes multiple damages. (1. Loss of aged trees, plants and all living being in the forest, 2. Mass emission of CO₂ from forest fire which adds further to global warming. 3. Subsequent Mass reduction in Oxygen production from such forest due to the loss of trees and plants in the wildfires.)
- (Note - Forest fire in California has devastated human life, many houses are engulfed in it. It is in every summer season.)

WATER.

- Compulsory re-possession of all types of water bodies like lakes, ponds, tributaries, rivers, distributaries, canals, field channels, drains etc. from the encroachments needs to be exercised and shall be restored to its original condition.
- Rain water harvesting practices from residential buildings, commercial buildings, Industrial buildings and from public infrastructures needs to be made compulsory. Wherever possible mass water harvesting infrastructures should be developed by the local bodies. This will help in increasing the ground water table substantially.



- Construction of more check dams/Regulators at many possible places needs to be done across all the rivers / rivulets in order to raise ground water table.
 - Educating users for importance of conserving water and its resources by using water for certain essential purposes and encourage saving of water by reduced usage.
 - Educating and encouraging mass towards disposal of plastic wastes. Collection of all existing **plastic waste** dumped in any types of water bodies needs to be ensured and thus preventing them to discharge into Ocean. Modern solar powered **Interceptors** with the aid of floating containment booms and conveyor belts may be deployed for this purpose.
 - Making suitable infrastructure for collection of household and biomedical waste. Law with strict punishments may be made for banning of merciless dumping/littering of all trashes including bio-medical waste into any types of water bodies like tributaries, rivers, distributaries, canals, dams, reservoirs, drains, oceans, lakes and ponds etc needs to imposed.
 - Interestingly to mention that heaps of plastic waste caused garbage patches in the oceans endangering marine life. The Great Pacific Garbage Patch caused by human is a serious matter of concern for environmentalists. Seriousness of the matter can be understood by the opinion of the specialists that cleaning up of this garbage patch may “bankrupt any country” that tries it.
 - Ocean’s contribution for the benefit of survival of human race & other living being is countless like sea foods, seasonal rains, wind and more over production of 65% to 70% of total demand of oxygen supply. Hence Protection of ocean, it’s flora and fauna is one of the very important and major steps of Ecosystem Restoration.
 - Making arrangements for mass education and making necessary legislation with strict punishments with the aim to protect all oceans from excess fishing, conservation and promotion of Coral Reef for the safe habitats of the marine biodiversity.
 - Conservation of existing salt tolerant mangrove forest and creating natural promotion of mangrove forest along coastal lines of ocean which is very important, as the same is providing comfortable habitat for crabs, shrimps and other marine species in addition to protection from sea shore erosion in coastal areas.
- LAND**
- A steady stream of organic waste, chemicals and antibiotics from shrimp farms can pollute groundwater or coastal areas. Salt from the ponds can also seep in to the groundwater and onto agricultural land. This has had lasting effects, changing the hydrology that provides the foundation of wetland ecosystems. Shrimp Culture completely needs to be avoided on land.
 - Dumping trash/Littering on streets, roads and public places like parks, beaches, railway stations, bus stations and especially in reserved forest areas needs to be banned. Enforcing the common public for compulsory practice of dumping trash in the common bins of respective categories like bio-degradable and non-bio-degradable needs to be done. Necessary legislation can be made and necessary programme for mass education can be launched.
 - Strictly, sorted out collection of both bio-degradable and non-bio-degradable waste from the source/residences/commercial complex needs to be ensured for saving time, man power for sorting and ensuring proper disposal.
 - Also, **zero discharge** concept of all industries needs to be strictly exercised by all respective pollution control bodies. The industries need to make their own arrangement of their solid and liquid waste processing like reduction/recycling/reusing/safe disposal. It needs to be assured that no tributary/river/distributary/canal/drain/reservoirs /ocean/water bodies will receive nothing from any industry to prevent pollution of water bodies.
 - All infrastructures required for Municipal liquid waste management needs to be installed in all villages, panchayats, towns and major cities throughout the Nation and shall be operated effectively. The treated sewage water can be used/recycled for flushing of toilets, farm forestry, horticulture, Industrial use as in non-human contact cooling towers, fish culture etc.
 - The three “R” (Reduce, Reuse & Recycle) concept especially for plastic waste management needs to be made aware among the common public by wide publicity.
 - For effective functioning of Solid Waste management systems, modern automated machineries, equipment and all relevant infrastructures needs to be installed and operated very strictly in all villages, panchayats, towns and major cities throughout the country.
 - Thus, Municipal solid waste of non-biodegradable type shall undergo for separation, sorting and **recycling for plastic**, ferrous & non-ferrous metals, paper, textiles, glass, special alloys, stainless steel, tyres/rubber **wastes** and e-scorp etc. Followed by the safe disposal of residual wastes needs to be done.
 - The biomass collection of municipal waste from perishable item markets, shops and from residential buildings, schools, colleges, temples etc. and the bio-degradable waste from poultry litter, Slaughter



houses, swine litter, cattle dung from farm and from the settled solids of waste water treatment plant shall be processed through well-established Biogas Plants.

- The Biogas/Biomethane plant uses combined heat and power (in internal combustion engines/combustion gas turbines, alternators) to produce electricity.
- Apart from production of electricity from biogas, the valuable by-product is bio compost which is good manure for organic agriculture. The main aim of converting **Biogas/Biomethane** into electrical energy and bio compost will help in reduction of greenhouse gas Methane, CH₄ which is many times potent of heat trapping compared to CO₂.
- CBG – The compressed biogas can also be completely used as an alternative, renewable automotive fuel.
- The Ethanol is a less polluting **biofuel**, and offers equivalent efficiency at lower cost than petrol. Availability of large arable land, rising production of food grains and sugarcane leading to surpluses, availability of technology to produce ethanol from plant-based sources, and feasibility of making both passenger and transport vehicles compliant to ethanol blended petrol up to 20% (E20) will alleviate Reduced usages of fossil-based fuel and thus reduction in atmospheric pollution.
- Planning and implementation of rapid phase out of fossil fuelled automobiles with the Electrical power-driven vehicles in all two and four-wheeler sectors for the transportation is needed. This action will only help in actual reduction of global warming.
- In a Rapid way, phase wise shifting from the conventional energy resources using fossil fuel and coal/coke for power production to implementation of tapping of Sustainable and as well as Renewable Energy sources like Solar, Wind and Tidal powers (also hydroelectric power) for the power production at least to the tune of 90% of gross power demand.
- Planning and phase wise implementation of high speed (800 to 900 KM / Hour) Mass Rapid Transit System using the concept of Hyperloop pods works in an evacuated tube over the rails of magnetic levitations, between long distanced major Cities. This will substitute the fossil fuel used Aeroplanes.
- The practise of mass floating solar power plant production over waters of existing lakes, big reservoirs of dams can be implemented for nearby towns which will reduce costly land use, prevent evaporation of water of reservoirs and water-cooled environment solar panel envisages more efficient power production.
- All types of automobile vehicles shall be compulsorily prevented from using on all Sundays (or) alternatively on any one agreed day of every week, except ambulance, milk van, carriers of perishable goods and the vehicles of Medical Officials. (Stop rotating all automobile wheels one day/week)
- All the urban bus terminals, all Railway stations of Mass Rapid Transit System (Electrical train service system) need to have **automated multi-level parking lot** for parking of both four & two wheelers. If not available, then it is required to be created by compulsory acquisition of land nearby at any cost. These parking lot will promote more usage of MRTS by the commuters by parking their personal automobiles at stations and thus led to at least partial **reduction in emission of greenhouse gas**.
- The carbon dioxide emission in the automotive vehicular traffic congestion/jam is much more than the emissions that produce during normal running. In metropolitan cities, after identifying the major 4 / 3 road junctions, implementation of infrastructures like Clover Leaf type interchanges and Trumpet type Interchanges by going compulsory acquisition of land in such junctions at any cost needs to be done. This will achieve free unobstructed flow of all directional traffic in such crucial junctions, and thus mitigate the traffic congestion/jam.
- Energy star certified home appliances can only be allowed to use.
- Automobile vehicle meeting emission norms & fuel-efficient vehicles only shall be allowed to use.
- Lights, fans, electronic equipment, AC and motors in home, office, school, college and in Industries shall be turned off when not in use and the same shall be practised ever to reduce electricity demand.
- Expediting the implementation of planting trees & maintain to achieve increased area of afforestation. Added to above, rewinding of forest animals needs to be done.
- Avoiding the conversion of forest land to other land uses, such as settlements, croplands, or grasslands will also enhance natural carbon sink.
- Promotion of Organic Agriculture/Horticulture using ecofriendly manures and drip irrigation system/using treated sewage water to conserve water wherever possible shall be ensured.
- Immediately mass tree cutting needs to be stopped for any road widening project. One must be wise enough to keep the existing row of trees as median of such road widening project and develop on other side of land for proposed road widening even at any cost of land.
- This suggestion is meant really to prevent forest fire: May be premature idea. The bigger balloon like weather balloons shall be floated in the forest at a height of 150 – 200 meters over the trees and



plants, with clusters of Lightning arrestors fitted at top of such balloon and shall be secured at ground with all directional anchors. The flexible conductors from lightning arrestors shall connect and run up to proper earthing/grounding tackles erected at ground. The height of 200 meters will cover a circle in the ground approximately for a radius of 200 meters. The area of trees covered under circle of diameter 400 meters in the ground will have protection from lightning strike. If this becomes successful can be extended to entire area of forest.

Conclusion:

It is up to the provocative of policy framing authorities and the administrators of all Government Machineries to implement whatever above feasible suggestions for Ecosystem restoration with a holistic approach, (in addition to measures which are already in practice) immediately for the sake of survival of future generations to come.

Acknowledgement:

My profound thanks to Er. O.K. Sharma, Veteran in Civil Engineering, my senior, who guided me to bring the best in this article.

References:

[1] Contents related to Ecosystem Restoration is Collected from various relevant web sites by using internet accesses.