

Animalis

Volume 2 , Issue 2

BUDDING STAR



Think global and act local

Gaurav Naik

An alumni of GPCOE, Gaurav Naik, was always fascinated with the on-field activities of the department involving into biodiversity night trails, bird watching, field trips and out of the state zoological tours. The extensive work during college and University, made him understand the challenges being faced by the biodiversity around and in general too. Ignited by the learnings and experiences gained while serving as the General Secretary of Goa University Students Council, led him to be associated with the 'No-Single Use Plastic' campaign by Arannya Educational and Research Organisation. Sensitising the local masses about the need to conserve biodiversity and maintenance of cleanliness has been his prime focal points since then. "From what I have understood so far, I very genuinely feel that if we all just mind our garbage and sewage well, and keep our surroundings clean, then 60 % of our public-environmental-problems would vanish. 30% of the remaining environmental challenges can be fixed by collectively recharging ground water locally and the remaining 10% by our habit reformations... So let's think global and act local", says Gaurav.

Gaurav has been instrumental in formulating the 'garbage sentinel scheme' in village panchayat Tuye and has also conducted research on the micro-plastic pollution in the backwaters of his area as Goa University M.Sc. dissertation. Recently, clearing Goa University Ph.D Entrance Test, he plans to take his research work a level up and aims to dig further into the topic and come up with practical methodologies for public to keep the environment clean, green and fresh for future.

CONTENTS

Budding star–Gaurav Naik*Editorial Board*– Earth Overshoot Day*Expert opinion* –Environmental changes in antartica and its biological Responses, (Dr.Binish M B & Dr.Anoop Kumar Tiwari)*Open Forum* – Carbon Credits, (Nikhil Prakash)*Vision Board* – Climate changes and Fisheries, (Malavika B. R)*Q & the Answer* – (Samrudh Hegde)

EDITORIAL BOARD

Teacher-In-Charge: Ms.Kavitha Nair*Student-Editor* : Teja Chodankar (Fo.y .B.Sc.B.Ed)*Co – Editor* : Neil Fernandes (T.Y.B.Sc. B.Ed)*Co – Editor (Alumni)* – Ratnesh Shirodkar and Aamir Jakati

EARTH OVERSHOOT DAY: UNDERSTANDING THE URGENT NEED FOR SUSTAINABILITY

Ms. Kavitha Nair

The date of the year from which human's demand of natural resources exceeds what earth can regenerate in a year is called as "Earth overshoot day". In 1970 the day came in the month of December, whereas in 2023 it's declared on 2 Aug, 2023, globally. Whereas Country wise Overshoot days varies and are predicted as USA- 13/3/2023, UK - 19/5/2023 and India as NONE.

Earth Overshoot Day is a crucial concept developed by the Global Footprint Network, an international research organization focused on ecological foot printing. This concept measures the total resources consumed and waste generated by humanity in comparison to the Earth's capacity to regenerate those resources and absorb the waste.

(Planet's Biocapacity/ Humanity's Ecological Footprint) x 365 = Earth Overshoot Day(EOD)

Over the past few decades, Earth Overshoot Day has been arriving earlier in the calendar. Ecological overshoot occurs for a limited time before ecosystems begin to degrade and possibly collapse. Impacts of ecological overspending is already visible in soil erosion, landslides. Desertification, reduced crop productivity, deforestation, rapid Species extinction, and increased carbon level in the atmosphere.

Overshoot is driven by Four key factors:

1. How much we consume,
2. How efficiently products are made,
3. How many of us are there, and
4. How much is the production from nature's ecosystems for our consumption.

Efforts to move EOD is the cumulative responsibility of each citizen of the world. The EOD can be moved ahead by our simple practices as sourcing locally grown food, Air drying clothes than use of Electric dryer, And the never-failing mantra of reuse, repair, repurpose and recycle.

Whereas at a larger scale, The Global Footprint Network has listed Five ways to " Turn around our natural consumption trend" to restore Earth's " Ecological Debt":

1. Take care of planet's Biodiversity and let nature thrive
2. Design and manage cities sustainably
3. Use our energy resources judiciously
4. Control the population
5. Choose how we feed ourselves (WWF campaign – Good for you, Good for your planet)

#Movethedateofearthovershootday

Antarctica excites the human imagination, be it the massive scale, environmental extremes, huge icebergs, incredible mountain ranges, landscapes, or its fascinating wildlife. At the same time, it is central to Earth's climate and oceanic circulation systems. The west coast of the Antarctic Peninsula has been one of the planet's fastest-warming areas during the last 50 years. This warming is not limited to the land but is also visible in the Southern Ocean. Since 1955, upper ocean temperatures to the west of the Antarctic Peninsula have grown by more than 1°C. It has now been shown that the Antarctic Circumpolar Current is warming faster than the rest of the world's oceans. Climate change research in Antarctica is critical because it allows scientists to correctly forecast future climate change and offer information to governments and policymakers.

The warming of the Antarctic Peninsula is altering the physical and biological environment of Antarctica. The distribution of penguin colonies has shifted as sea ice conditions have altered. Plant colonisation has expanded due to the melting of perennial snow and ice coverings. A long-term drop in the quantity of Antarctic krill in the Southern Ocean's SW Atlantic region may be linked to diminishing sea ice cover. The Peninsula's ice cover has seen significant alterations. Several glaciers have receded, and ice shelves that once surrounded the Peninsula have been seen to retreat in recent years. The Antarctic has around 20 million breeding pairs of penguins. Certain penguin species in Antarctica are decreasing, whereas others are not. Adélie penguins, well suited to sea ice conditions, have fallen in some places and have been replaced by open-water species such as chinstrap penguins at several sites. Farther south, emperor penguins, which breed on sea ice around mainland Antarctica, have seen a 50% fall in population in certain areas.

The British Antarctic Survey published findings in 2004 indicating that Antarctic krill populations are diminishing. Krill are vital to the Antarctic food web, and their reduction might endanger whales, seals, and penguins, all of whom consume krill. Krill depletion has been related to a substantial decrease in sea ice. Sea ice is an important feeding site for most krill in the Southern Ocean. According to the study, krill populations have decreased by nearly 80% since the 1970s. Reduced sea ice throughout the winter is most likely to blame and may explain decreases in various penguin species. Krill feed on algae found beneath the sea ice, serving as a "nursery." The Antarctic Peninsula, a critical breeding area for krill, has seen a significant decline in sea ice.

Although Antarctica is thousands of miles away from most of us, the effects of climate change are not limited to the ice continent's coasts. Scientists are concerned that the water now held in land ice (including ice sheets but not ice shelves) may melt and contribute to sea level rise. Satellite observations dating back to the early 1990s show that the sea level is increasing at a pace of 3mm per year and that the sea level has been rising for over a century. However, the Intergovernmental Panel on Climate Change (IPCC) cannot accurately identify what impact melting ice sheets will have on sea levels in the future millennia. Sea level rise will likely be greater than the IPCC predictions.

Despite a predicted recovery in ozone levels in the stratosphere above Antarctica during the next century, the impacts of greenhouse gas increases will likely dominate more, driving additional strengthening and pole ward shifting of the westerlies and the warming of Antarctica. Society and political leaders must have access to the most up-to-date scientific data and knowledge on the expected magnitude and effect of global climate change. Trustworthy observations of historical and present climate are required to attribute observed changes to either natural environmental occurrences or human action. Much international effort is being put into utilising and upgrading complex climate models to provide better forecasts of future change.

There is significant negative influence of climate change on fisheries throughout the world. It is evident now, for instance in the Caribbean. Fisheries is one of the food producing sector, and its contribution to blue economy it is required to give importance for its wellbeing.

The increase in the temperature recently due to increased greenhouse gases like carbon dioxide, methane, nitric oxide which is produced by human activities like burning of fossil fuels etc has lead to decrease in dissolved oxygen. The decreased oxygen level has lead to fish kills and reduced living space for many high value fishes like tunas and bill fishes as they are now forced to move up. The increase in temperature has caused the sea level to rise and increase in storm surge and associated losses. It has become favourable for eutrophication and related poisoning like paralytic shell fish poisoning and is a significant health hazard. The blooms of sargassum can smother other biomass also. Ecologically sensitive areas like coral reefs harbours important fish communities and many people are dependent on it for their livelihood ,but the change sea surface temperature causes problems like coral bleaching. The increasing co2 level has resulted in ocean acidification which affects growth.



Change in climate has caused the sea to become unpredictable and there is high risk in the safety of fishermen going into the sea as well as it can damage gear infrastructure, operational cost. Fishes being cold blooded their feeding, breeding ,migration is highly influenced by climate in which they live so there will be change in species abundance and spatial distribution and the catch will be affected. Marine heat waves like blobs are formed in ocean and can cause stratification and decrease in availability of nutrients to surface which will cause decrease in production. etc. As the productivity is affected the fishing community have to shift to alternative livelihood and also export and GDP will also be affected.

Various management measures are requires to understand climate change and its adaptation measures which include improving governance, proper communication to people about impact of climate change on fisheries and related capacity building, limiting the use of fossil fuels, protecting vulnerable environments, by usage of VHF radio signals we can forecast thus safety to people at sea can be improved using early warnings. Marketing can be improved and value addition can be used for promotion of non-commercial species landed. It is also important to promote sustainable catch .Harbours and processing plants should be prone to adverse climate like increase in sea level as well as there should be more insurance available to the needy. Along with government private companies can also support to build the sector as well as in giving new ideas.

Carbon credit is a tradable permit or certificate that represents the right to emit a certain amount of carbon dioxide or other greenhouse gases into the atmosphere. Carbon credits aim to reduce greenhouse gas emissions by creating a financial incentive for organizations to reduce their carbon footprint.

Carbon credits are typically issued by governments or other regulatory bodies and can be bought and sold on carbon markets. Companies that emit fewer greenhouse gases than their allotted amount can sell their unused carbon credits to other companies that emit more than their allotted amount. By creating a market for carbon credits, organizations are encouraged to find ways to reduce their emissions and invest in sustainable practices.

How Carbon Credit Works?

Carbon markets allow for the selling and buying of carbon emissions with the objective of reduction of global emissions of greenhouse gases. Carbon markets can reduce the emissions reduction over and above what the countries are doing on their own. It can be explained with an example. The emission of greenhouse gases in a factory in India can be achieved in two ways.

- A country that hasn't been able to reduce emissions can provide technology or financial support to that factory in India to claim the reduction of emissions as its own.
- On the other way, that factory in India can make investments and offer sales of emission reduction which is called Carbon Credits. So other parties that are struggling to meet their target can purchase these Carbon Credits and show these as their own.

Types of Carbon Credits

1. Voluntary Emissions Reductions (VERs): VERs are a type of carbon credit that is generated through voluntary actions taken by individuals, organizations or governments to reduce their greenhouse gas (GHG) emissions. VERs are not regulated by any governmental agency and are generated outside of mandatory emissions reduction schemes, such as cap and trade systems.

- VERs are typically sold to companies or individuals who wish to offset their own carbon emissions. By purchasing VERs, the buyers are supporting projects that reduce greenhouse gas emissions, such as renewable energy projects, energy efficiency initiatives, or reforestation projects. The reductions achieved by these projects are then quantified and verified, and the resulting carbon credits are sold to the buyer.

The current global scenario of carbon credits is mixed. There is increasing awareness of the importance of reducing greenhouse gas emissions and combatting climate change, which has led to a growing demand for carbon credits. This demand is driven by both companies that want to offset their own emissions and individuals who want to reduce their carbon footprint.

However, the carbon credit market has been criticized for being too complex and opaque and for not delivering the promised emissions reductions. Some experts argue that carbon credits allow polluters to continue emitting greenhouse gases without actually reducing their emissions, leading to a phenomenon known as "greenwashing." Additionally, the lack of a global carbon price and inconsistent regulations across different countries and regions has made it difficult to create a transparent and effective market for carbon credits.

Despite these challenges, there are several initiatives underway to reform the carbon credit system and make it more effective. These include efforts to establish a global carbon price and standardize the way carbon credits are traded and verified. There is also growing interest in using carbon credits to finance sustainable development projects in developing countries.

Carbon credits linkage with EPR in India

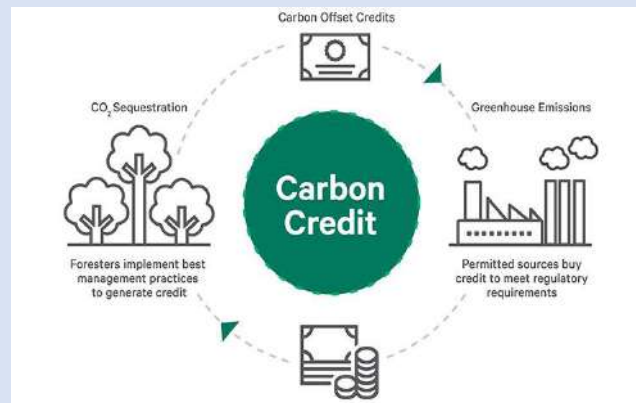
Carbon credits and extended producer responsibility (EPR) are two different approaches addressing environmental challenges, but there is a potential linkage between them in India. EPR is a policy framework that aims to make manufacturers and producers responsible for the disposal of the products they produce at the end of their useful life. It requires producers to take back the products and manage their disposal or recycling in an environmentally sustainable manner.

In India, the implementation of EPR is still in its early stages, but the government has set up a framework to implement EPR for plastic waste, e-waste, and batteries. The idea is to create a circular economy where waste is minimized and resources are reused. Carbon credits, on the other hand, are a market-based mechanism aimed at reducing greenhouse gas emissions. The concept of carbon credits is gaining importance in India, and the country has set several ambitious targets to combat climate change.

There is a potential linkage between carbon credits and EPR in India in the waste management sector. Waste management can generate carbon credits, particularly if it is done in a sustainable and environmentally friendly manner. For example, if waste is recycled or used for energy generation, it can reduce greenhouse gas emissions and generate carbon credits. EPR can help to incentivize producers to adopt more sustainable waste management practices, which can in turn generate carbon credits.

Furthermore, carbon credits can provide a revenue stream for waste management projects, which can help to make the implementation of EPR more financially viable. This could lead to a more sustainable waste management system in India, which could reduce greenhouse gas emissions and create a circular economy.

In conclusion, while carbon credits and EPR are different approaches to address environmental challenges, there is a potential linkage between them in India. The implementation of EPR can incentivize producers to adopt more sustainable waste management practices, which can in turn generate carbon credits. This could create a more sustainable waste management system and contribute to India's efforts to combat climate change.



Conclusion

Thus, carbon credits present a viable option for the reduction of greenhouse gases from the atmosphere but as suggested it is not a panacea for all the environmental problems. The present scenario of climate change with changing lifestyle demands a rethink of all the ways of life with innovation as 8 Rs in form of ***Reduce, Reuse, Recycle, Refuse, Repair, Re-gift, Recover and Rethink.***

Nikhil Prakash
Research Associate
Environment and Waste Management Division
India Habitat Centre (IHC), Lodhi Road, New Delhi

Q and the Answer is an attempt to gap the bridge between “in the syllabus” and “out of the syllabus” of various domains of biological science. In This issue, we tread on the terrain of Sustainable living and the questions posed by students will be answered by Mr Samrudh H Dessai.

Mr Samrudh Hegde Dessai is Co-founder of AlterEnergyz, a Goa-based solution provider for Solid & Liquid Waste Management and Renewable Energy requirements. The agency works towards a greener and more sustainable tomorrow.

Q.1 How truly do we the people of Goa practice Sustainable Living?

Long before '**Sustainable living**' became the buzzword, the people of Goa were already practising it. Although modern lifestyles have affected the Goan diaspora too, a large part of the Goan community continues to practice sustainable living in many villages and even cities. Many are constantly in the process of looking for activities that have a minimal effect on the environment, while at the same time creating a healthy life.

In earlier times, people in Goa were involved in agriculture, fishing and various other occupations, which were directly connected with the environment. Their lives were also intertwined to nature. If you carefully observe the practices and traditions adopted by the people in the past, you will notice that they had a deep sense and love for nature.

Here are some of the environment-friendly and sustainable ways that the people of Goa adopted in the olden days. Goa is blessed with an abundance of coconut trees. These trees not only make Goa scenic but Goan people adapted to live in harmony with this abundance. Besides finding use in the preparation of oil, food or a refreshing drink, the entire parts of the coconut tree, were used for different purposes throughout its life cycle.

Palm Leaves would be used to weave into crisscross patterns and would be used to construct “Mollams” (For use as fans, mats for separating husk from rice etc). They would also be used to make raincoats, (Currently all of which are made of plastic



Weaving 'mollam' at the 'Ostoreachem Fest' held in Goa recently

Coconut Shells (Also known as Kottis) and Coconut Husk (known as Sonnas) were used as firewood. They were still being used in evenings to drive away insects.

An ancient practice that was adopted by many people was that of smearing floors and walls of houses with cow dung. This practice was today's equivalent of an Air conditioner helping to keep room temperatures bearable during hot summers. At the same time, insects would be kept at bay. And, that's why you would find that many houses that would adopt this practice, here, in Goa. Many Houses in Goan villages still continue this practice however the percentage has reduced significantly over years.

Dry cow dung cakes were also burnt as fuel for cooking. Thus, cow dung had many uses in the home.

Most of the Goan houses have a garden surrounding within their compound walls made of stones boundaries. These gardens would have beautiful flower plants and fruit bearing trees like Guava, chikoo, jamun etc. Besides giving the garden an appealing look, it would provide children sufficient natural fruits during Season. This practice of having gardens in their surroundings gave people a reason to grow plants, to begin with. The women of the household would spend hours decorating, cleaning and setting up their gardens. This practice encouraged people to care for plants, and grow more and more plants.

Besides this, Goans followed many sustainable practices like Rain water harvesting in backyards, Waste water being used for plantations, Cotton bags woven from old cloth as grocery bags etc

These old and traditional ways are no longer in vogue, and people are constantly searching for new and easily available forms of sustainable living, all the while forgetting how beneficial these olden-day practices can be. Despite all the changes in lifestyles, most Goans are still concerned about sustainable Living and are one of the first to adapt to new sustainable practices suited to current times.

Q.2 Recently I read the news article that EV can cause more damage to the Environment than fossil fuel vehicles. Please Elaborate.

The EV Industry is still in the early stages of its evolution and hence such debates are bound to take place for some time till it gets established. One of the primary reasons the EV cars were introduced into the market is the concern over green house gas emissions. The principle scientific logic was decreased air pollution due to the elimination of exhaust pipe which will combat this issue. The fact remains that EV cars produce almost 3 times less emissions than fossil vehicles when compared to life cycle emissions. (From Production till disposal).

However, the green credentials of an EV depend on how power is generated to produce or power these vehicles. If the electricity is generated through renewable energy such as solar or wind, it will be free of emissions. If you charge your car with electricity that comes from a local power plant that's powered by fossil fuels, well then, it won't be emission-free.

In most European countries, you can choose charging points that use renewable electricity. 93% of the EU population has the option to use 100% renewable electricity to charge their vehicles. However, in India, most of the power is still produced from fossil fuels (Primarily Coal) which emits carbon dioxide. India is taking very accelerated steps to move towards meeting its targets in meeting energy demands through renewable energy. So there is a some concern whether EV are currently not so much environment friendly compared to Fossil fuels.

Environmental effects addressed by EVs

- Improved air quality by lowering emissions.
- Fewer Green house Hases and Air pollutants.
- Less Noise Pollution compared to Petrol/Diesel Cars.
- Cleaner Streets making towns better place for pedestrians and cyclists.
- The Electricity Costs required to charge EV are 40% less than needed in fossil fuels.

Problems yet to be addressed by the EV industry

- Emissions released during production of parts including supply chain.
- Emissions and pollutions issues to be addressed during mining of minerals required for EV including Lithium which is used for batteries.
- Disposal of EV batteries is an issue the industry needs to address immediately to make it completely green and environment friendly.

Potential solutions to overcome the existing challenges

- The increased use of solar and other renewable energy sources can be one of the probable solutions that would help power the electric grids used for charging EVs.