



ENVIS-IITM NEWSLETTER

Indian Institute of Tropical Meteorology, Pune

Atmospheric Pollution & Climate Change

(The project of Ministry of Environment, Forest & Climate Change, Govt. of India)

CO₂ FOOT PRINT



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Editorial

Climate change is one of the biggest challenges we're facing as a species. Human activity over the last 200 years has meant that we're standing on the brink of an environmental disaster. Yet we're told that there are still things we can do to minimize the damage. Reducing carbon footprint is one such action. Carbon Footprint is the total amount of greenhouse gasses released into the atmosphere as a result of an individual's, organizations, or nation's actions. Amazingly, just 100 companies are responsible for 71% of all global greenhouse gas emissions. But that doesn't mean that individuals don't also have a carbon footprint. Our actions and lifestyle choices all have some impact on the environment. By lowering our carbon footprint, we can help contribute to the overall reduction of greenhouse gas emissions. In our fight against climate change, everyone making small adjustments can lead to big results.

Dr. B. S. Murthy


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Indian Institute of Tropical Meteorology (IITM), Pune
Environmental Information System (ENVIS) Resource Partner
(Ministry of Environment, Forest & Climate Change, Govt. of India)

WORLD OZONE DAY 2021

Key Note Address
"Tropospheric Ozone from Global to Local Scale: its threats in India and possible controls"
Prof. Oliver Wild
Lancaster University, UK

Online Quiz Competition
Get chance to win attractive prizes by participating in Online Quiz Competition based on Educational Webinar

16th September 2021
04:00 - 05:00 PM (IST)

REGISTER HERE <https://forms.gle/Jm78dZnnRS85kVeJ7> **Webinar:** <https://youtu.be/0Wj1u17zpY> For details visit our Website: <http://iitmenvis.nic.in> | E-mail: iitm-env@nic.in

Carbon Footprint

Today's human society has a very critical task of balancing pace between his own development and non-destruction of his only liveable home i.e. planet Earth. After industrial revolution, human society is mainly dependent on carbon based fossil fuels for fulfilling energy needs. Although, there are increased efforts of utilizing renewable energy, but still it has not become a mainstream source of energy for world's major economies.

As name suggests, fossil fuels are made from fossilized animals and plants buried underground for thousands of years. Depending upon the time duration, heat and pressure received underground it takes a form of oil, coal or natural gas. The fossil fuels are found in the earth crust and are mined at various locations to fulfil our energy needs.

As fossil fuels are originated from animals and plants they are organic in nature and contain compounds of carbon, hydrogen, nitrogen, sulphur & oxygen. When we burn fossil fuels in electricity generating plants, industries, transportation vehicles for energy; along with heat as energy it releases various greenhouse gases such as carbon dioxide, oxides of sulphur-nitrogen, carbon monoxide, methane, etc. The concentration of these gases has increased rapidly, resulting in the increase of the global mean temperature after industrial revolution.

Carbon footprint is way of calculating the total carbon dioxide or equivalent of carbon dioxide emitted in manufacturing of any product, any process, a product/ services utilized by individual/organisation/society in specified time. Many researchers also consider the other GHGs (Green House Gases) and its equivalents of carbon dioxide emitted based on relative global warming potential (See Table 1).

Table 1: Global Warming Potential & Atmospheric Lifetime of major GHGs

Green House Gas	Chemical Formula	Global Warming Potential , 100 year time horizon	Atmospheric Lifetime (Years)
Carbon Dioxide	CO ₂	1	100*
Methane	CH ₄	28	12
Nitrous Oxide	N ₂ O	265	121
Chlorofluorocarbon-12 (CFC-12)	CCl ₂ F ₂	10,200	100
Hydrofluorocarbon-23 (HFC-23)	CHF ₃	12,400	222
Sulphur Hexafluoride	SF ₆	23,500	3,200
Nitrogen Trifluoride	NF ₃	16,100	500
Source: Fifth Assessment Report (Intergovernmental Panel of Climate Change)			
*No single lifetime can be given for carbon dioxide because it moves throughout the earth system at differing rates. Some carbon dioxide will be absorbed very quickly, while some will remain in the atmosphere for thousands of years.			

Industries and researchers study carbon foot print of building construction, transport, organisation such as schools & colleges, manufacturing facilities, logistics, supply chain etc. Carbon footprint is proved to be a useful tool to accomplish the goal of reducing carbon emissions to make the world a more sustainable place.

India is the third-largest emitter of greenhouse gases and accounts for 2.46 billion metric tonnes of carbon or 6.8% of the total global emissions. The average carbon footprint of every person in India was estimated at 0.56 tonnes per year– with 0.19 tonnes per capita among the poor and 1.32 tonnes among the rich. Not surprisingly, the national capital region of Delhi has the highest annual carbon footprint in the country. Delhi's annual CO₂ emission of 69.4 million tonnes is equal to the CO₂ emission of Bengaluru, Hyderabad and Chennai put together.

India sticks to the Paris pledge to reduce its carbon footprint by 33-35% from its 2005 levels by 2030 and is aiming to outperform those goals. These efforts were on to increase the use of natural gas by four times in this decade and to double the oil refining capacity in the next five years. To reduce the carbon footprint India has given priority to renewable energy like solar power. Prime Minister has set a target of generating 450 Gigawatts of renewable energy by 2030 which is five times the current capacity and two and half times the Paris pledge.

Calculating Carbon Footprint

Our day-to-day activities are moreover dependent on electricity which is mostly coming from coal-based power plants, Diesel and Petrol for our vehicles, and LPG for cooking in our kitchen. All of the energy we use is derived from these fossil fuels which are GHG intensive.

The following methodology helps you to calculate your carbon footprint resulting from the use of Electricity, Petrol, Diesel, and LPG.

Step 1- Data collection;

Electricity: Collect data on your annual electricity bills. You can find the number of power units (In India, one unit = 1KWh of electricity) consumed in your home from the monthly electricity bills issues by State Electricity Board/ Distribution/Collection companies. Take monthly consumed units and then multiply them by 12 (No of months in a year).

Petrol/Diesel: Add the number of litres of petrol/diesel you used in your car/motorcycle in a year. If you do not remember the exact value right now, please add average values.

LPG: Generally one LPG cylinder has around 14 kg of liquefied petroleum gas. Multiply the number of cylinders used in a year by 14 and add the resulted value in the calculation.

Step 2 – Calculation;

- 1) **Electricity:** Input value (in KWh/Yr) X 0.85 (Emission Factor) = Output value in (Kg of CO₂)
- 2) **Petrol:** Input Value (In Litres/Yr) X 2.296 (Emission Factor) = Output value in (Kg of CO₂)











- 3) **Diesel:** Input Value (In Litres/Yr) X 2.653 (Emission Factor) = Output value in (Kg of CO₂)
- 4) **LPG:** Input Value (In Kg/Yr) X 2.983 (Emission Factor) = Output value in (Kg of CO₂)

Your Carbon Footprint: Add (1+2+3+4) = (5) Output value in (Kg of CO₂)

The final Carbon footprint should be in tons of CO₂ (tCO₂). Divide the final value (no. 5) with 1000 so that you get a total carbon footprint in tons of CO₂.

A variety of different tools exist for calculating the carbon footprints for individuals, businesses, and other organizations available online, few such websites are mentioned below,

Table 2: Carbon Footprint Calculator

Sr.no.	Source	QR Code	Link
1			https://www.tatapower.com/sustainability/sustainability-initiatives/customer/calculate-carbon-footprints.aspx
2			https://www.nature.org/en-us/get-involved/how-to-help/carbon-footprint-calculator/
3			https://www.iso.org/standard/66453.html
4			https://www.knowyourcarbonfootprint.com
5			https://ghgprotocol.org/calculation-tools#sector-specific-tools_id

Ways to Reduce Carbon Footprint

It is clear that our use of fossil fuel adds up to the carbon footprint. In our daily activities, if we can reduce our direct or indirect consumption of fossil fuel; we can reduce our carbon footprint. Many of the alternative ways are not new to us but in altered consumerism we forgot those practises. Few of them are listed below,

- 1) Prefer walking or cycling to nearby market, garden, workplace and public transportation for travel. In most instances, you can walk a mile in less than 20 minutes. This is a great way to add exercise to your busy schedule.
- 2) Organisations can review their travel policy and avoid unnecessary air travel for meetings instead choose virtual platforms for meetings, no private vehicle day, purchasing energy efficient vehicles, coordinate carpooling in company etc.
- 3) Keep good maintenance of your vehicle, keep tyres properly inflated and get regular tune-ups.
- 4) Turn off the lights, fans and other electrical devices when not in use, organisations can install motion sensing devises which can switch on/off the lights, fans by detecting the activity in storages, toilets etc. to minimise the electricity consumption.
- 5) Organisations can conduct regular energy audits and implement the suggestions of consultant to reduce usage of electricity.
- 6) Operate Air Conditioner (AC) at optimum temperature and keep regular maintenance. Always remember to check energy rating of device before purchasing.
- 7) Eat more food that is grown or made locally and less red meat. Taste the difference, feel better and support the local economy.
- 8) Food waste occurs at every stage of the food system and accounts for eight percent of total greenhouse gas emissions. Therefore, food recovery is not only an environmental crisis but also a business one.
- 9) Your business doesn't have to be a restaurant or grocery store to reduce food waste. An office that caters to local fares can still reduce their overall waste. By purchasing from other businesses that support local farmers and the community, you are indirectly reducing food waste by minimizing transportation in the food system. Additionally, creating an office compost program will recycle food waste into fertilizer.
- 10) Save Water: Aside from avoiding wastage of water, a significant amount of energy is consumed to treat drinking water and process wastewater. Along with reducing consumption of water it is necessary to take measures to reduce pollution and efficient recycling.
- 11) Reduce, Reuse and Recycle: The 3R principle play very important role in reducing the load on the landfills and related emissions of greenhouse gases.
- 12) Choose effectively packaged products to reduce plastic waste. Minimize printing by transitioning to digital records or place convenient bins cartridges can run out as fast as you put them in, so be sure to recycle all ink cartridges, especially when you are unable to cut back on printing documents.

These are few practices and not the final list of activities, which can reduce our individual as well as organisational carbon foot print. According to different culture, daily life styles, economic conditions, organisational area of work it can have many additions.

Career Opportunities: Environmental Sciences

“Environmental Science is a broad and generalized field with endless job opportunities.” Environmental Science is that branch of study where you can find several ways to protect our environment with the reliable use of resources. So, it offers a plethora of job opportunities for environmental scientists as well as for environmental biologists, environmental engineers, environmental modelers and environmental journalists. Environmental scientists are employed by the mines, fertilizer plants, textile and dyeing industry, food processing units, etc.

Educational Degree Courses:

Students can opt for a certificate, diploma, bachelor, masters, and Ph.D. courses in this field. For UG courses, students must have passed the 10+2 examination with science stream and for PG courses; students should have a bachelor's degree in the related field.

Educational Degree Courses:

- Bachelor of Science (B.Sc.) in Environmental Science
- Bachelor of Environmental Management
- Master of Philosophy in Environmental Sciences
- Master of Science (M.Sc.) in Environmental Management
- Doctor of Philosophy in Environmental Science
- Doctor of Philosophy in Earth Science

Job Titles:

After holding a degree in this field you will get a variety of careers to choose from. They can easily work in government and private organizations and many other industries. You can also opt to teach jobs in colleges or universities.

In this sector one can be employed by various organizations are such as Pollution Control Board, Water Authority, and Urban Planning. Many private organizations like Food processing industries, Refineries, Distilleries, and Fertilizer plants are also offering various job opportunities for the graduates in this field. Few are listed below,

- Environmental Scientist/ Researchers
- Environmental Consultant,
- Sustainability Manager
- Environment-Health- Safety (EHS) officer
- Environment Journalists
- Waste Water Engineer
- Waste Management Consultant

People in Environment



PAPPAMMAL



PADMA SHRI
2021



SHYAM SUNDAR
PALIWAL



PADMA SHRI
2021



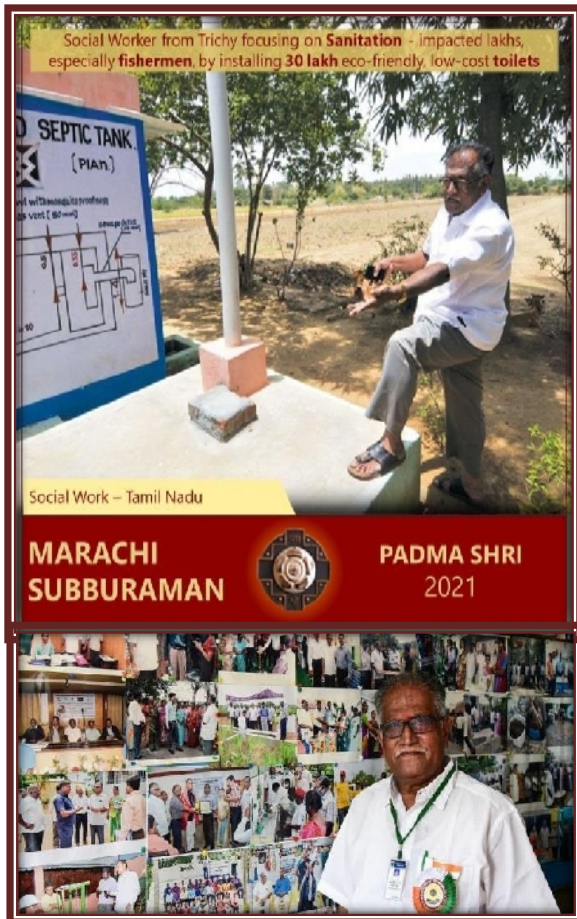
Pappammal is from a family of agriculturists. She owns a 2.5-acre farm in her village in Coimbatore, and in the past, grew lentils such as horse gram and green gram with organic farming. Now, she mostly grows bananas. Over the years, she has worked closely with Tamil Nadu Agricultural University. “Her farm in Thekkampatti emerged as a model farm for the students of home science and agriculture and she played host to students during their village stay programmes,”

The government honoured her with the Padma Shri for being a role model woman farmer and her remarkable contribution in promoting women in agriculture. She was particularly noted for her social engineering skills – organising women in agricultural extension programmes and for being an passionate organic farmer while also adapting modern technologies and introducing new farm practices.

Shyam Sunder Paliwal, is a former Piplantri village council head in Rajasthan’s Rajsamand.

His mantra for development has been the girl child, water and trees, their protection and conservation. He lost his daughter in 2006 & in her memory he began a campaign of planting 111 saplings to celebrate the birth of every new-born girl. The *panchayat* opens a fixed bank deposit account in the name of the new-born as part of the campaign. The parents of the girls are supposed to nurture the saplings and also sign an affidavit saying they would not marry off their daughters before 18 or practising female foeticide. The campaign has also involved building check dams on the pastures on nearby hills to recharge the groundwater level under Paliwal leadership and turned Rajsamand into an oasis full of trees.

For such a recommendable work Shri Shyam Sunder Paliwalji has been awarded India’s fourth-highest civilian award, Padma Shri in the social work category this year.



Shri. Marachi Subburaman, 71 years, born in Inungur Pudupatti village in Kulithalai, Subburaman, the first graduate from his village. He is the founder of Society for Community Organisation and People's Education (SCOPE) in 1986. He is first person from Tiruchi, Tamil Nadu to receive Padma Shri for social work.

SCOPE is working on providing toilets and reducing open defecation in rural areas and also empowering women with income-generation skills. SCOPE is also the recipient of the best NGO Award for clean villages in 2005 and the Nirmal Gram Puraskar Award for Best NGO in Sanitation in 2006.

It has installed more than 20,000 closed system Eco-San flush-less toilets in Tamil Nadu alone, and over one lakh units across 26 states in the country. The bio-waste is recycled as agricultural manure.

Environmental Mobile Application

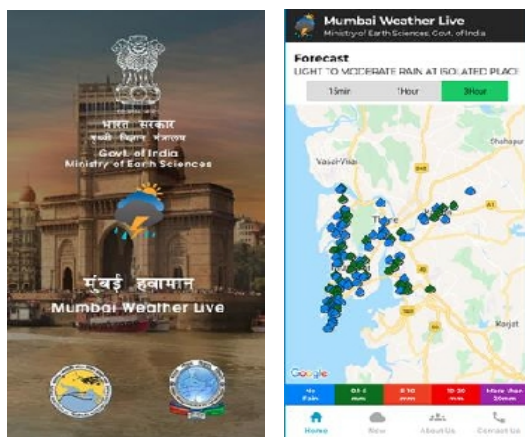
1) SAFAR Air



About:- The SAFAR (System of Air Quality and Weather Forecasting and Research) is a project of Ministry of Earth Sciences, Govt. of India and developed by scientists at Indian Institute of Tropical Meteorology (IITM), Pune. It has distinction as India's first ever Air Quality Forecasting system SAFAR for 4 major (Delhi, Mumbai, Pune and Ahmadabad) Metro cities.

It gives near real time status of quality of Air (in terms of Air Quality Index-AQI), weather, UV index for 4 cities along with next 2 days forecast. In latest version /Update of the Mobile App, it has been made in English, Hindi, Marathi and Gujarati Language.

2) Mumbai Weather Live

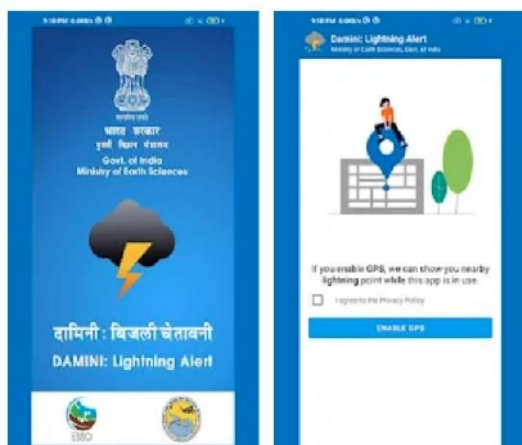


About: - Mumbai, country's financial capital with about 12 million people, experiences severe weather like; heavy rainfall events during south west monsoon season. As Mumbai receives an average of ~230 cm in monsoon season with high spatio-temporal variability, rainfall needs to be monitored in real time with dense network of rain gauges.

IITM, Pune initiated an effort to collate measurements from Indian Meteorological Department (IMD), SAFAR-Mumbai (IITM) and MCGM and made available in Mumbai Weather Live apps.

The App is for monitoring the rainfall in all Mumbai locations and live 15 min rainfall will show with temperature, humidity, and wind speed and wind direction.

3) Damini : Lightning Alert

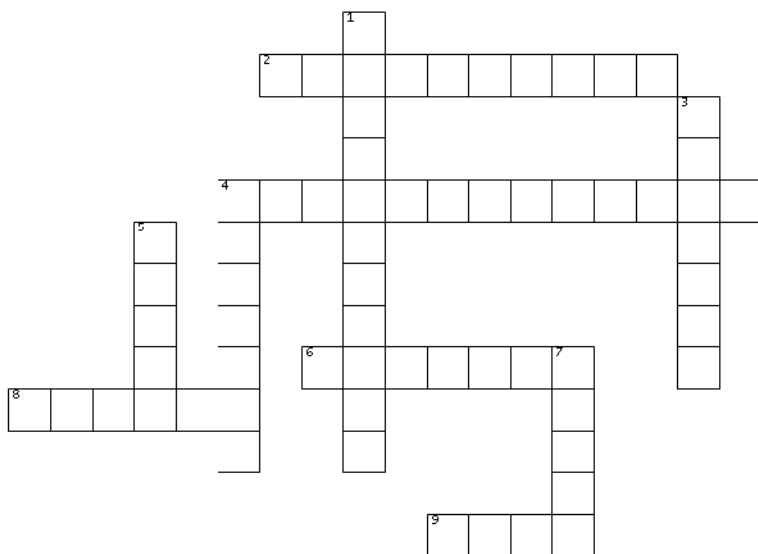


About:-

Damini Lightning apps is developed by Indian Institute of Tropical Meteorology, Pune and ESSO. The apps is monitoring all lightning activity which are happening in specifically for all india. and alert you if lightning is happening near you by GPS notification. under 20KM and 40KM. Details description of instruction, precautions is provided in apps while in lightning prone area.

Does and Don't for in specific situation is strictly followed when lightning happen near you for your safety purpose.

Cross Word Puzzle



ACROSS

2. Ground (soil or rock and included ice and organic material) that remains at or below 0°C for at least two consecutive years
4. Planting of new forests on lands that historically have not contained forests
6. Gas has 28 times Green House potential than Carbon Dioxide
8. The fraction of solar radiation reflected by a surface or object, often expressed as a percentage
9. Major source of emission for PM10

DOWN

1. Ozone is considered as pollutant at
3. A period of abnormally dry weather long enough to cause a serious hydrological imbalance
4. A suspension of airborne solid or liquid particles
5. Gas molecules present in stratosphere, protect us from harmful UV rays coming from sun
7. Will host COP27 Climate Summit in 2022

*Answer on second last Page

Upcoming events

International Day for the Preservation of the Ozone Layer 2021

World Ozone Day is observed on September 16 every year to spread awareness among people about the depletion of Ozone Layer and find possible solutions to preserve it. This Day offers an opportunity to focus global attention and action on this vital environmental issue.

This year the theme of ozone day is “Montreal Protocol - Keeping us, our food and vaccines cool”. The Montreal Protocol started life as a global agreement to protect the ozone layer, a job it has done well, making it one of the most successful environmental agreements to date. Today, the hole in the ozone layer is healing, in turn protecting human health, economies and ecosystems.

But, as this year’s World Ozone Day seeks to highlight, the Montreal Protocol does so much more – such as slowing climate change and helping to boost energy efficiency in the cooling sector, which contributes to food security.

