



A SOCIETY FOR RESEARCH, AWARENESS & SOCIAL DEVELOPMENT

# NEWSLETTER

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## Save the Environment (STE)

Save the Environment (STE), founded and registered on 19th November 1990, is a Kolkata based NGO which aims to create awareness, inspire rural communities and works towards a better, sustainable environment-friendly technology. It is lead and run by researchers, social workers, students with a mutual aim to 'Save the Environment'. STE has collaborated with various organisations in the past 29 years such as All India Institute of Hygiene & Public Health, AIHH&PH and India Canada Environment Facility, DRDO Ministry of Defence, Department of Science & Technology (DST), Indian Institute of Management (IIM), Ahmedabad to mitigate the effects of arsenic and provide arsenic-free drinking water. The first step towards this objective was taken in 1977 when an arsenic removal plant was set up in

West Bengal, later 60 community type filters and 5,000 domestic filters were installed and till date over 1,00,000 people have benefitted from these plants. With the help of DST Arsenic/Iron removal plants were set up in various parts of India, 24 Parganas (N) & Nadia districts in West Bengal, Balia district in Uttar Pradesh, Bhagalpur District in Bihar and Agartala in Tripura. Furthermore, a special clinic (2001) and a vocational training centre (2003) set up for people who already were suffering from the ill-effects of arsenic and a hospital for the same will be coming up soon. Not only this, a step towards conservation of rainwater in rural areas was taken up by STE in 2003. To conclude, STE not only uses the common methods to save what's left of the environment but also STE members use their scientific expertise to convert unusable environment resources to usable ones.





# STE Annual Awards 2019

## (NOMINATION AND APPLICATIONS ARE INVITED)

**LAST DATE 31<sup>st</sup> August 2019**

Annual Awards of STE are the tangible symbol to signify eminence of contributions made by a person or institution. This boosts the enthusiasm of the contributors that have contributed in different field of science and social service with their excellence, expertise and approach towards achieving certain goals for the society. Recognition of such extraordinary activities is eventually very important to boost their confidence and to honour them for what they have done for the science and society. STE confers following categories of awards and honours to such eminent personalities.:

### 1. STE Dr. APJ Abdul Kalam Award

The award is in the memory of our former president of India late Dr. APJ Abdul Kalam. This award is conferred every year to the senior scientist of DRDO/ ISRO ( working or retired)who has significantly contributed towards the science and technology in India. (*Eligibility*: Any Indian Citizen above the age of 55 years) Nominations will be from STE.)

### 2. STE Dr. Praloy o Basu Life Time Achievement Award

The award is constituted in the memory of late Dr. Praloy O Basu, Founder Secretary of STE. This award is conferred every year to any citizen of India, who has made the difference to the society by his/her contributions in terms of education/ policies/ S & T/Social Service and others. (*Eligibility*: Age above 45 years Nomination from STE)

### 3. STE Fellowship Awards

STE Fellowship award is conferred to the Indian senior scientists /Academicians for their outstanding achievements in various fields of science & Technology and Education. Total Number : 05 (*Eligibility*: Any one above the Age of 50 can apply)

### 4. STE Young Researcher Awards

The awards are conferred to the young Indian researchers to encourage and boost their enthusiasm. Total Number : 15 (*Eligibility*: Any one in the Age between 25 to 40 years can apply.)

### 5. STE Water Awards

The awards are conferred to the Indian nationals who have made the difference in the area of water by any means. TotalNumber:10 (*Eligibility*: Any one can apply in this category and age is no bar)

### 6. STE Best Ideas / Innovations / Technology for Environment Awards

The awards are for the Indian Nationals to generate / develop the innovation towards serving the environment. Total Number : 5 (*Eligibility*: Any one can apply Age no bar)

### 7. STE Best Teacher Award

This award is given to the teachers of Indian nationality for promoting science and technology among the school students. Total Number : 5 (*Eligibility*: Teachers –teaching Science for Classes 9-12 can apply).

### 8. STE Women Awards

This award is constituted to recognize the Indian women scientists/ Academicians for their contributions in the field of science and environment. Total Number: 5 (*Eligibility*: Any woman above the age of 40years can apply).

### 9. STE International Awards

This award is to recognize NRIs who have brought fame to the India by contributing towards Science & Technology / Environment / education/ Society. Total Nubmer : 2 (*Eligibility*: Any on born in India but working abroad can apply. Age no bar).

### 10. STE Green Excellence Award

This award is given in recognition of excellence in contemporary research contributing to environmental safety and protection. (*Eligibility*: Any one can apply Age no bar).

### 11. STE Merit Award

This award is presented to personnel who have accomplished distinguished research achievements. (*Eligibility*: Any one can apply Age no bar)

For more information, please log on to our website: [www.stenvironment.org/ste-awards/](http://www.stenvironment.org/ste-awards/)

## SCIENCE FOR A BETTER TOMMORROW...

### AIR POLLUTION IN INDIA – AN OVERVIEW

#### Dr. Kshipra Misra

President, Save The Environment, Kolkata  
Former Additional Director  
DIPAS, DRDO, Delhi, India

#### Introduction

1. It is well known now that air pollutants have serious impact on human health, agricultural productivity, biodiversity and climate change. Air pollution is the biggest threat and a growing risk factor to the health of 1.39 billion population of India, spread across rural as well as urban areas. As reported in Washington Post recently, more than a million people in India die every year on account of poor air quality – which is more than the number of deaths caused by tobacco use.
2. There is a vast heterogeneity in sources and pollutant profile in India. For example, the nature of cooking fuel used is different in the rural and the urban households. Similarly, vehicular density also differs across villages and cities. Climatic and geographical differences across India too contribute to regional and seasonal variations in air pollution.
3. Studies have well established that children and elderly people are more vulnerable to air-pollution exposure. The impact of severe air pollution on new born babies, infants and children under the age of five is alarming. As per the WHO report, 10 per cent of children under the age of five are dying every year in India. People from the lower socio-economic category are much more susceptible to the adversities of air pollution due to various reasons including malnutrition, poor hygiene, occupation, housing, fuel, etc.
4. In India, like other countries, air pollution is mainly concerned with the levels of both primary pollutants [such as particulate matter PM10 and PM2.5, gaseous pollutants (CO<sub>2</sub>, CO, SO<sub>2</sub>, NO<sub>x</sub>, NH<sub>3</sub>, VOCs,), toxic metals, CFCs, odors, radioactive pollutants, POPs, etc.] and secondary pollutants like O<sub>3</sub> and peroxy acetyl nitrate. While there is strong epidemiological evidence of the adverse health impact of air pollution in India, there are challenges that preclude high-quality research on the health effects of air pollution.
5. At present, the data evidencing impact of air pollution on health is primarily based on cross sectional or time series studies conducted in large cities through primary research. Challenges, however, remain in conducting such studies with secondary data due to several reasons including (i) non-availability of quality health-outcome data from the public and private sector, thwarted by poor uptake of any standardised electronic health-records framework and (ii) sparse coverage and questionable reliability of air-quality data collected by government agencies. The lack of data makes it further challenging to conduct long-term studies on

the health impacts of air pollution, particularly of the ambient air. The past records of air-quality data for most of the cities, particularly PM<sub>2.5</sub>, go back only a few years, with many missing data points.

6. While the evidence-based research on the health aspects of air pollution needs to be strengthened further, there have been significant efforts in recognising the importance of developing a policy framework in this area. The Ministry of Health & Family Welfare, Government of India constituted in the year 2014 a steering committee of experts on air pollution. The committee's report clearly outlined the targeted actions to mitigate the adverse health outcomes caused by bad air quality.
7. Against this backdrop, this article seeks to provide an overview of the type of pollutants, sources, monitoring mechanism and efforts to overcome the health consequences of bad air quality in India.

#### Geographical variation

8. India is a country with wide diversity of the climatic conditions depending on the geographical location, and hence, there are also differences in the degree of atmospheric pollution, as enumerated below.
  - In East India, the air is comparatively cleaner except in Kolkata, West Bengal due to the various reasons as will be explained in the subsequent paragraphs.
  - In the western region, most of the developed cities have some pollution, but Mumbai being the largest and most populous city (in terms of human as well as vehicular population) has the maximum air pollution in that region. However, the levels of all the air pollutants are still less compared to Delhi. It may be attributed to the presence of humid and temperate weather condition and also the coastal wind, which sweeps away the pollutants.
  - Most of the South India has a warmer climate, less dusty and surrounded by ocean which makes the region less polluted. Air in the two major cities, Chennai and Bengaluru is no doubt dirty and the main cause is large vehicular population.
  - Most of the North Indian and Central States, except the hilly regions like Himachal Pradesh, Jammu & Kashmir and Uttarakhand, definitely have bad air quality. However, Delhi is the worst affected as it is surrounded by States like Haryana, Punjab, Rajasthan and Uttar Pradesh that have high pollution, which adds to Delhi's air pollution either due to natural factors (e.g., dusty winds from Rajasthan) or man-made ones (e.g., stubble burning), specially during the winter season, which is relatively severe in North India.

#### Sources

9. The major sources for air pollution in India may be divided into the following two broad categories: industrial and man-

made. Unfortunately, with the data currently available, a precise attribution of pollution to the two categories remains a moot point, as the relative contribution of each varies from place to place.

**a. Industrial**

Several industries such as chemical, petrochemical, pharmaceutical and others are contributing to air pollution, though most of them are situated on the outskirts of the main cities, where too pollution is monitored very closely by the regulatory agencies.

**b. Man-made**

Some of the notable and most common man-made sources of pollution are the following:

i. Stubble burning in the paddy fields in the States of Haryana and Punjab in India, particularly during the month of October, significantly deteriorates the air quality.

ii. Vehicular pollution in the cities is one of the major sources of particulate and gaseous pollutants in the air, due to increasing use of private vehicles. All the metropolitan cities like Delhi, Kolkata, Chennai, Bengaluru, Hyderabad and Pune are the worst affected. As per the data published in Lancet, in 2017, the number of registered vehicles in Delhi was 10.5 million, of which 3.1 million were cars and 6.6 million motorcycles and scooters, with the rest consisting of trucks, goods carriers, three wheelers and buses.

iii. India is a developing country, constantly expanding and improving its infrastructure, and the cost of this is the soot and cement (smaller particles) and grit/ wood (larger particles) which are released into the air.

iv. Every year during the months of October-November, the Hindu festival of Diwali is celebrated, mainly in North India, and the entailed use of lot of fireworks and crackers continues to deteriorate the air quality, despite active public campaigns and court interventions, prior to the festival, to restrict the use of polluting fireworks.

**Initiatives of Government of India (GoI) to overcome the air pollution**

10. There are ongoing efforts by the GoI to reduce the impact of air pollution, specially the particulate matter. Incidentally, data clearly show a declining trend in the concentration of PM2.5 in Delhi during 2016 to 2019. Central Pollution Control Board (CPCB), Delhi, being the main controlling government agency has taken a major step towards spreading the pollution awareness, reduction of pollution, and collection of authentic data on air pollutants. The following are some of the highlights of the various actions taken by CPCB:

- In July 2016, CPCB issued a 42-point action plan to various Non-Attainment Cities for improving the air quality. About 94 such identified cities were

instructed to prepare detailed action plans for improving the air quality, depending upon the prevailing local environmental and other related conditions. CPCB has been organising workshops and seminars in various locations in different States across the country to disseminate the prepared guidelines. Sixty one such cities have already submitted their action plan for which the states concerned have been instructed to implement the same at the earliest. Since most of the polluted cities are located in and around Delhi and Indo-Gangatic plain, the States of Utter Pradesh, Bihar and West Bengal are further being sensitised to take-up urgent action for cleaning the air in the cities of their jurisdiction. Other important measures taken by GoI include:

- i. A comprehensive action plan by Ministry of Environment, Forest and Climate Change (MoEFCC);
- ii. Ban on use of pet-coke in Delhi and National Capital Region (NCR);
- iii. Strict vigilance over coal-fired power plants;
- iv. Strict action against construction activities;
- v. Regular field monitoring by CPCB team since September 2017;
- vi. Expansion of air monitoring stations in Delhi and NCR;
- vii. Upgradation of Central Control Room in CPCB;
- viii. Integration of data on air quality from stations of Indian Metrological Department (IMD); and
- ix. Central Government Scheme to encourage in-situ management of crop residue and reduce the stubble burning by farmers, etc.

- Besides, MoEFCC has launched a National Clean Air Programmme (NCAP) in April 2018 with the following main objectives:

- i. To implement the mitigation measures for prevention, control and reduction of air pollution;
- ii. To optimise and update the ambient air quality monitoring network across the country to ensure a comprehensive and reliable data; and
- iii. To enhance the public awareness, capacity building measures for inclusive public participation and skilled technicians and improved infra structure to reduce the air pollution.

11. The programme aims to reduce particulate matter (PM) by 20-30 % by the end of 2024 (from 2017 levels). India has

also joined the Climate and Clean Air Coalition (CCAC) and the NCAP has adopted strategies for reducing the short-lived climate pollutants (SLCP), which include methane, ozone and HFCs, which would be an additional contribution of India towards controlling global warming. Various national agencies such as Indian Institute of Technologies (IITs), universities, research institutes, The Energy Resource Institute (TERI) and other government bodies are very closely associated with this programme through award of various projects by the Government. Some projects are being carried out in collaboration with International agencies as well.

12. The CPCB has installed 779 monitoring stations in 339 cities across 29 States and 6 Union Territories (details are available on the website of the CPCB). The monitoring for four identified pollutants, viz., PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>2</sub> is being carried out with the help of State Pollution Control Boards and National Environmental Engineering Institute (NEERI), Nagpur. The data is recorded round the

clock with 4-hourly sampling of the gaseous pollutants and 8-hourly for PM. The meteorological data such as wind speed, humidity and temperature are also monitored regularly.

13. Since these monitoring stations utilize expensive imported technologies, the efforts are underway to develop cost-effective indigenous monitoring systems, including sensors (for both PM and gases). The two Indo-US projects have been sanctioned jointly by Department of Science and Technology, Indo US Science and Technology Forum (IUSSTF) and Intel under the GOI research programme of Real Time River-Water Monitoring and Air Monitoring:
14. Besides these two projects, there are several other agencies too, as mentioned above, which are engaged in research activities related to air quality monitoring. Needless to say, there is lot of scope for research work in this area, given the vast expanse of India with wide range of monitorable variables.

## CHENNAI: A CITY THAT OSCILLATES BETWEEN FLOOD AND DROUGHT

**Shereen Bajaj**

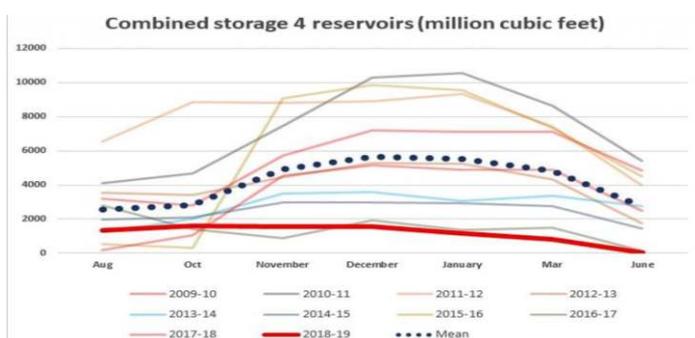
Assistant Editor, STE Newsletter

On 19th June 2019, Day Zero of Chennai was officially declared. Though Day Zero have no meteorological reference, it literally implies no tap water supply. The only way to water supply could be through government or private tanks. The major reason for such a situation is critically low water level in reservoirs. The water crisis in Chennai was among one of the major urban global water crises. In Chennai, everyday routine work was halted Image1- Fluctuation in storage capacity of the four main reservoirs in Chennai over the past decade. and the economy of the city was affected. Most of the businesses, restaurants, hotels and schools were forced to shut down. Gravely, only four years back, in December 2015, Chennai was hit by a flood causing a similar blow to the everyday routine as the drought created. Post-flood, monsoon has been a deficit in Chennai exhausting resources from the four chief reservoirs (Poondi, Cholavaram, Redhills and Chembarambakkam). These water sources which supply drinking water to Chennai reached approximately 0.1% of their capacity in

2019 (Image 1). Another reason for water crisis is the presence of household wells and private water tankers which overexploit groundwater level leading to deeper dug wells in search of groundwater and limited recharge during monsoon season. The worst affected areas were slums and lower-income societies, they received as little as 30 litres of water each day. From July 7, 2019, that is 18 days after the crisis began, Chennai Metro Water Supply and Sewage Board (CMWSSB) tankers started distributing 10



**Image 2: Chennai water crisis. People lined up near water tanker to draw water for their daily needs.**



**Image 1: Fluctuation in storage capacity of the four main reservoirs in Chennai over the past decade.**

million litres of water every day (Image 2). Even during the time of crisis, private water tankers were charging five times higher (4000-5000 rupees) than CMWSSB tankers (700-800 rupees) making it impossible for the poor to afford water. Fortunately, after 196 days of no rain, on June 20, there Image 2- Chennai water crisis. People lined up near water tanker to draw water for their daily needs. were light showers in a few regions of Chennai. This slightly helped with the situation through partially filling ponds and bore-wells. After June 20, 2019, Chennai received rainfall enough to supply drinking water for 150 days. However,

unfortunately, Chennai does not have a reliable rainwater harvesting system leading some areas such as Kancheepuram and Trivular as water deficit. The situation got better by August-end and Chennai received 17% more rain than usual. Monsoon brought 344.4mm rainfall between June 1 and August 25; 50 mm more than what was expected. Though June, July and August were extremely tough for Chennaiites yet on the bright side 2019 water crisis motivated people to harvest rainwater and save as much water as they can. To prevent similar crisis again, appropriate planning and limits to using resources not only in Chennai but throughout India to avert water crisis and sustain water reservoirs is need of the hour. Previously, due to post-2000 drought in Chennai it was mandatory for buildings to have rainwater harvesting system; but due to lack of maintenance, this measure was of little benefit. The water crisis in Chennai has taught a lesson to prevent a similar crisis in future. In near future, initiatives by the Government and also the public are needed. As little efforts everyday by everyone can make a notable result over the period for better sustenance.

## References

- <https://www.downtoearth.org.in/blog/water/chennai-water-crisis-a-wake-up-call-for-indian-cities-66024>
- <https://www.downtoearth.org.in/blog/water/chennai-s-water-crisis-a-lesson-for-indian-cities-65606>
- [https://en.wikipedia.org/wiki/2019\\_Chennai\\_water\\_crisis](https://en.wikipedia.org/wiki/2019_Chennai_water_crisis)
- <https://www.forbes.com/sites/marshallshepherd/2019/07/01/why-chennai-is-running-out-of-water-in-2-satellite-images-and-an-explanation/#74fbdf1829b4>
- <https://www.newindianexpress.com/cities/chennai/2019/jul/01/c-hennai-to-get-cauvery-water-by-train-from-july-7-1997661.html>
- <https://timesofindia.indiatimes.com/city/chennai/its-raining-in-chennai-this-is-your-chance-to-save-some-water/articleshow/69965652.cms>
- <https://timesofindia.indiatimes.com/city/chennai/southwest-monsoon-makes-a-splash-in-chennai/articleshow/70849416.cms>

## MAN-MADE GARBAGE ISLAND

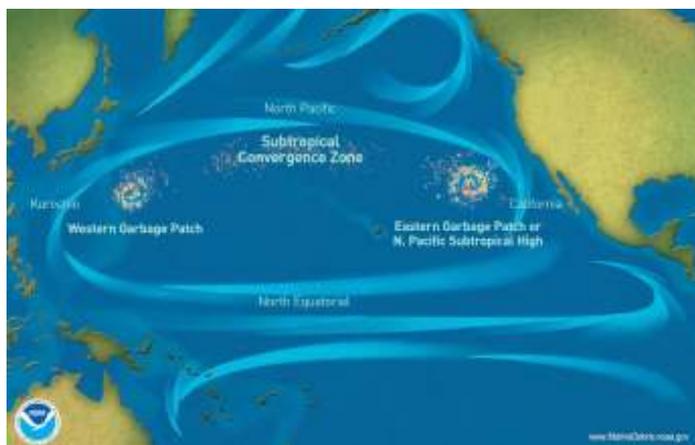
**Shereen Bajaj**

Assistant Editor, STE Newsletter

“It is just one straw”, said eight billion people. A lot of harm can be done when 8 billion people assume that their one straw could not harm. Anything man-made such as glass, plastic, fishing gear when tossed in large water bodies such as oceans, seas, great lakes either intentionally or unintentionally that material is considered as marine debris. It is a global problem since there is no water body left untouched by this human act and its subsequent harmful impacts. One famous Image 3- Formation of the great Pacific garbage patch by convergence of the east and west garbage patch. example of marine debris is the North Pacific garbage island. Charles Moore discovered it in 1977 on his way back home to Los Angeles from Hawaii after competing in the Transpacific Yacht Race. Curtis Ebbesmeyer, a Seattle oceanographer, named it the Eastern Garbage Patch (EGP). It covers about 1.6 million square kilometers of surface area. For a better comparison, it is twice the size of Texas, thrice the size of France.



**Image 2: Source: Forbes**

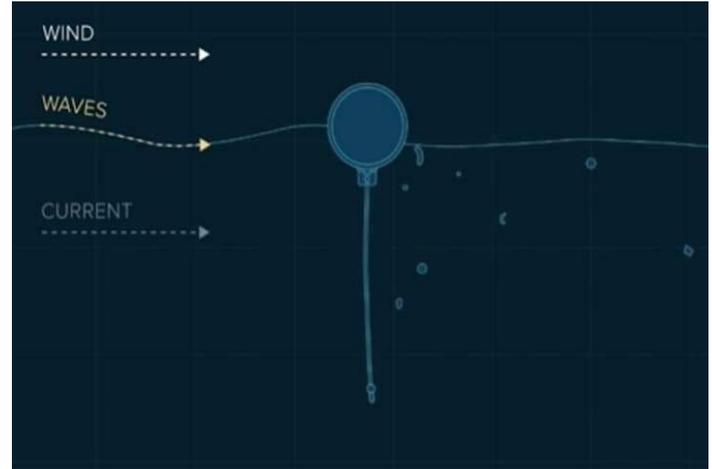


**Image 1: Formation of the great Pacific garbage patch by convergence of the east and west garbage patch.**

North Pacific garbage island, also known as the Pacific vortex, is an exemplar of marine debris. It is a garbage island formed by two mini garbage patches located on either side of the world (Image 3). One in the west, near Japan and the other in the east formed between Hawaii and California (both in the USA). These two mini debris islands converge in the Pacific Ocean because of North Pacific Subtropical Gyre. Gyre means rotating currents; it can either be in the atmosphere or ocean. North Pacific Subtropical Gyre is one of the five major ocean gyres. It consists of four currents rotating clockwise. The four currents are- California current, North Equatorial current, Kuroshio current, and North Pacific current. Center of the gyre is very calm and stable because of its circular motion. It does not let any debris ever get out of it. Thus, forming a circular moving garbage patch. The major reason why this garbage patch has been expanding over the years is that it is made up of non-biodegradable materials chiefly plastic. Plastic remains on the surface of the water because it is less dense than water. But over time, because of photodegradation, it breaks down into tiny particles called microplastics. Photodegradation is a



**Image 3: Interceptor in Klang River, Malaysia. It helps to prevent plastic release from river to oceans.**



**Image 4: Floating system used by The Ocean Cleanup to remove floating plastic from ocean.**

process in which sunlight breaks down plastic into smaller fragments. Microplastics are less than 5mm in length. Microplastics constitute 94% of the patch formed out of over 1.8 trillion pieces of plastic. Although abundantly present in the ocean, these microplastics are so small that even satellite images are not able to capture them. A recent discovery showed that about 70% of the garbage sinks to the bottom of the ocean. And as expected the plastic patch blocks sunlight from reaching the plankton and algae; thus, hindering their growth. This patch is hazardous not only for plants but also for marine animals since they mistake plastic for food. An estimated 100,000 marine animals are strangled, suffocated, or injured by plastics every year. About 46% of the garbage island is fishing nets. Animals get tangled in fishnets and cannot extract themselves out. Such interaction is known as ghost nets and can be fatal for the organism.

Tackling this country size problem, a Dutch-based organisation, the Ocean Cleanup has stood up to clean up plastic from water bodies. They aim to reduce floating ocean plastic upto 90% by 2040. They are developing advanced technology rather than relying on conventional methods. Moreover, they are trying to avoid the problem in the first place by not letting plastic release from the rivers into the ocean. They have placed 'interceptors' in the world's most polluted rivers (Image 4). It selectively picks plastic and entirely relies on solar energy for power. For their ocean cleanup, they are developing a passive ocean cleanup technology, that moves along with the currents, just like plastic. Their floating system includes a 2,000 foot U-shaped floating barrier with a 10ft skirt which prevents the collected plastic from returning to the ocean (Image 5). They believe that this system can clean 50% of the Great Pacific garbage patch in just five years, and

at a fraction of the cost. However, marine experts cast serious doubt on the effectiveness of this project. They believe it could do more harm than good to marine life especially small organisms such as phytoplankton. Another concern is that since most of the plastic sinks; this system would fail to catch any plastic which is deeper than 10ft in the ocean. Every technology has its pros and cons and one have to find a balance between the two. For now, we can try and limit the application of plastics in every form, particularly single-use plastic. Avoid throwing plastic and rather recycle them. On top of everything “Say no to plastics”.

#### References

- <https://oceanservice.noaa.gov/hazards/marinedebris/>
- <https://marinedebris.noaa.gov/discover-issue/types-and-sources>
- <https://www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/>
- <https://www.nationalgeographic.com/news/2018/03/great-pacific-garbage-patch-plastics-environment/>
- <https://theoceancleanup.com/great-pacific-garbage-patch/>
- <https://www.discovermagazine.com/environment/the-worlds-largest-dump-the-great-pacific-garbage-patch>
- <https://edition.cnn.com/2018/03/23/world/plastic-great-pacific-garbage-patch-intl/index.html>
- <https://www.britannica.com/topic/Great-Pacific-Garbage-Patch>
- <https://theoceancleanup.com/about/>
- <https://www.telegraph.co.uk/science/2018/08/07/device-clean-up-great-pacific-garbage-patch-could-harm-wildlife/>

**“To a Thirsty man, a drop of water is worth more than a sack of gold.”**

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**“Thousands Lived without Love, but not without water. So SAVE WATER.”**

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**“When we save a river, we save a significant part of an ecosystem, and we save ourselves as well because of our dependence—physical, economic, spiritual,—on the water and its community of life.”**

## PLASTIC- WASTE FOR US, FOOD FOR MUSHROOMS

**Shereen Bajaj**

Assistant Editor, STE Newsletter

As Jennifer Nini said, single-use plastic is a ticking time bomb for the environment. Avoid it wherever and whenever possible, though it is for this now with man-made garbage islands and landfills site it's not too late to stop. Surprisingly, nature has a solution to this obstacle as it has to all the other problems. In Ecuadorian Amazon Rainforest in 2012, during exploration as a part of Annual Rainforest Expedition and Laboratory by Yale University *Pestalotiopsis microspora*, a plastic eating mushroom and rare species of mushroom was discovered (Image7). Not only can it eke out an existence on plastic by ingesting polyurethane and converting it into an organic compound, but also it is anaerobic, that means it can grow in landfill sites. In controlled conditions, it takes a few weeks for the process to start and can be winded up in a few months. Another unusual trait of this mushroom, discovered by Katharina Unger of Utrecht University is that it is edible as well. This mushroom can work as a solution to world's two major problems- plastic and food scarcity. Another advantage of these mushrooms is that they can effortlessly be grown in homes in a coImage 7: *Pestalotiopsis microspora*, a plastic eating mushroom. Image 8: Conversion of plastic to edible products in “Fungi Mutarium”(FU) mposting system. *Pestalotiopsis microspora* presents a better alternative than dumping and burning plastic. Remarkably, 50 more such plastic-eating fungi have been found in the past two years. Even if there isn't any use of these mushroom apart from eating plastic; they can easily be decomposed atleast and are expected to take lesser time to decompose than plastic.



**Image 1: *Pestalotiopsis microspora*, a plastic eating mushroom.**

Livin Studio, in collaboration with Utrecht University, developed a prototype called Fungi Mutarium (FU). The prototype uses a mould made of agar as a nutrient base for fungi. Agar is used to give the desired shape to “FU”. Agar is mixed with starch and sugar and acts as a nutrient base for fungi. These moulds are called “Fungi Mutarium” (FU). They are U-shaped with a bud-like structure protruding from the base of 'U'. The shape of "FU" is inspired by mushroom and provide abundant space for the fungi to grow. UV-treated plastic is then kept in the mould. After a few



**Image 2: Conversion of plastic to edible products in “Fungi Mutarium”(FU).**

months, no trace of plastic is left in the agar mould only edible fluffy white mycelium. Conversion of synthetic waste into an edible product without storing any toxic product is the unique characteristic of this project (Image 8). They believe there is a way to fasten this process maybe by changing in temperature, humidity or creating a perfect microclimate for fungi. Next step is to identify apart from *Schizophyllum commune* (colloquially named Split Gill) and *Pleurotus Ostreatus* (commonly called as Oyster Mushroom) how many more species can be of use in this prototype. If this works for mass disposal of plastic waste then it is really a big help to mankind. However, as habitant of the planet earth, it is our duty to restrict the use of plastic or any of such non-biodegradable product.

### References

<http://yupthatexists.com/pestalotiopsis-microspora-plastic-eating-mushroom/>

<https://www.indiatimes.com/technology/science-and-future/this-plastic-eating-mushroom-can-solve-our-plastic-pollution-by-turning-waste-into-food-366344.html>

<https://leapsmag.com/plastic-eating-mushrooms-let-you-have-your-trash-and-eat-it-too/>

<http://www.livinstudio.com/fungi-mutarium>

<https://www.sciencealert.com/this-device-turns-plastic-waste-into-safe-edible-mushrooms>

**"Even if I knew that tomorrow the world would go to pieces, I would still plant my apple tree." — Martin Luther**

**"One touch of nature makes the whole world kin." — William Shakespeare**

**"Someone's sitting in the shade today because someone planted a tree a long time ago." — Warren Buffett**

## TREE PLANTATION & CLEANLINESS DRIVE AT NORTH AVENUE CITY CENTRE – DURGAPUR

**Dr. Anuja Bhardwaj**  
Editor, STE Newsletter



Save The Environment (STE) is an NGO founded in 1990 and has been working since then for betterment of the environment and living standards of rural India. The organization has been already working in various projects concerned with arsenic removal from drinking water. In 1997, STE installed its first arsenic removal plant and since then has successfully provided arsenic free drinking water to more than 1,00,000 people in India. To contribute further, it aims to spread awareness among the society about the health hazards associated with environmental pollution and the various ways by which it can be mitigated. Planting trees is a cost-effective way to address urban pollution. Considering this fact, STE members took an initiative to stimulate the residents of North Avenue, Bengal Ambuja, City Centre, Durgapur, Kolkata

for a cleanliness drive and tree plantation session as on 3 August, 2019. The organization believes that it is equally important to educate the future generation about the importance of a healthy environment. Hence, the activity involved all age groups including the elders and young generation. Various saplings were planted including medicinal as well as air purifying plants in the vicinity of the colony by the locals. The event was notable as everyone participated vibrantly and children passionately put up several questions regarding the environment and pollution. STE members explained all the queries posed by the children and gave them tips to keep their environment clean and green. The STE team is grateful to all the participants from North Avenue, Bengal Ambuja, City Centre, Durgapur, Kolkata for their contributions in this event. In near future, STE expects that more of such interactive sessions and awareness programs involving field operations can be organized to accelerate the concerns about several environmental health hazards in other parts of India also.





If you believe in our ideology and wish to step up for the environment, we welcome you to join our organisation and together we can save the environment.

**Visit- <https://stenvironment.org/>**

Follow the link, choose the kind of membership that suits you and fill-up the form.

**Dr. Anuja Bhardwaj**  
*Editor, STE E-Newsletter*

**Ms. Shereen Bajaj**  
*Assistant Editor STE E-Newsletter*

**SAVE THE ENVIRONMENT (STE)**  
(A SOCIETY FOR RESEARCH, AWARENESS & SOCIAL DEVELOPMENT)

*Head and Registered Office:*

74B, Pasupati Bhattacharjee Road, Kolkata-700 041 Phone: 33-40616024  
E-mail: [save1990env@yahoo.co.in](mailto:save1990env@yahoo.co.in); [info@stenvironment.org](mailto:info@stenvironment.org) Website: [www.stenvironment.org](http://www.stenvironment.org)