Tripura ENVIS Hub

Tripura State Pollution Control Board

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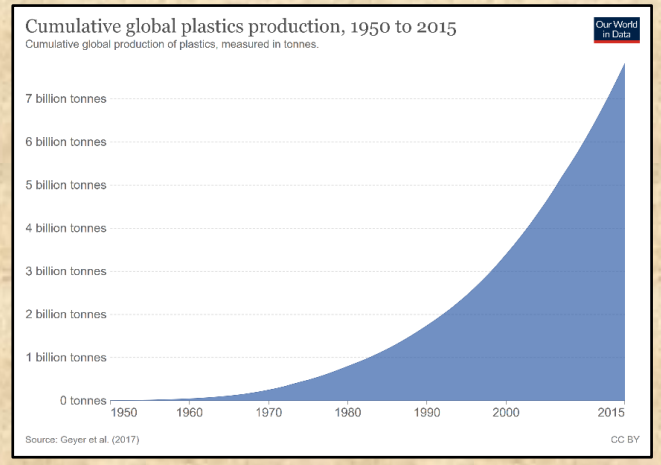
Plastic and Plastic Waste

Plastic is a lightweight, hygienic and resistant material which can be moulded in a variety of ways and utilized in a wide range of applications. Unlike metals, plastics do not rust or corrode. Most plastics do not biodegrade, but instead photodegrade, meaning that they slowly break down into small fragments known as microplastics. The fragmentation of large plastic items into microplastics is common on land such as beaches because of high UV radiation and abrasion by waves, while the degradation process is much slower in the ocean due to cooler temperatures and reduced UV exposure.

Single-use plastics, often also referred to as disposable plastics, are commonly used for plastic packaging and include items intended to be used only once before they are thrown away or recycled. These include, among other items, grocery bags, food packaging, bottles, straws, containers, cups and cutlery.



The first synthetic plastic — Bakelite — was produced in 1907, marking the beginning of the global plastics industry. However, rapid growth in global plastic production was not realized until the 1950s. Over the next 65 years, annual production of plastics increased nearly 200-fold to 381 million tonnes in 2015. More than 99% of plastics are produced from chemicals derived from oil, natural gas and coal — all of which are dirty, non-renewable resources. If current trends continue, by 2050 the plastic industry could account for 20% of the world's total oil consumption.

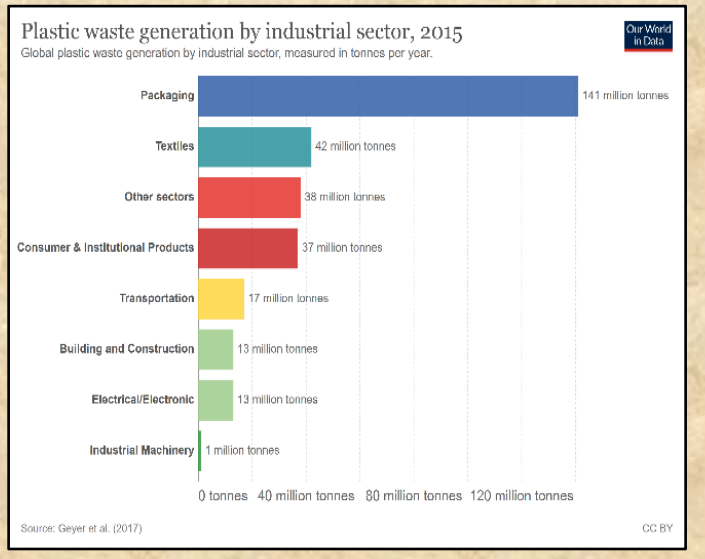
There are two main categories of plastics- Thermoplastics & Thermosets.

Thermoplastics: Thermoplastics are a family of plastics that can be melted when heated and hardened when cooled. These characteristics, which lend the material its name, are reversible. That is, it can be reheated, reshaped and frozen repeatedly. The most common Thermoplastics are:Polyethylene

Terephtalate (PET), Polypropylene (PE), Low Density Polyethylene (LDPE), High Density Polyethylene (HDPE), Polystyrene (PS), Expanded polystyrene (EPS), Polyvinyl-chloride (PVC), Polycarbonate, Polypropylene (PP); Polylactic acid (PLA) and Polyhydroxyalkanoates (PHA).

Thermosets: Thermosets are a family of plastics that undergo a chemical change when heated, creating a three dimensional network. After they are heated and formed, these plastics cannot be re-melted and reformed. The most common Thermosets are: Polyurethane (PUR), Phenolic resins, Epoxy resins, Silicone, Vinyl ester, Acrylic resins, Urea-formaldehyde (UF) resins. Main polymers used in the production of single-use plastics:-

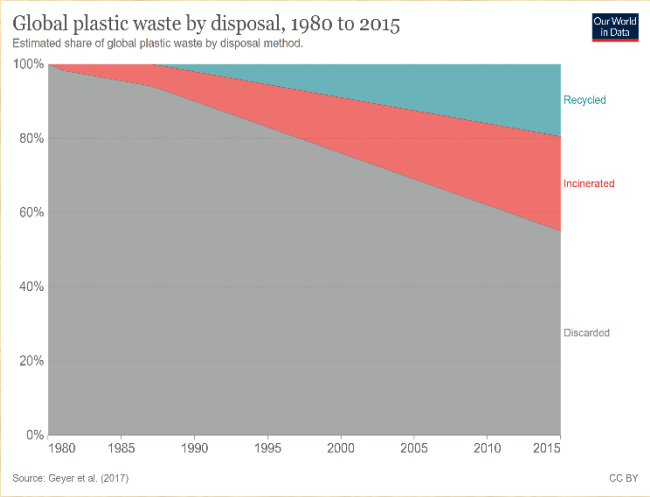
i. Low Density Polyethylene (LDPE): Bags, trays, containers, food packaging film
ii. Polystyrene (PS): Cutlery, plates and cups
iii. High Density Polyethylene (HDPE): Milk bottles, freezer bags, shampoo bottles, ice cream containers
iv. Expanded polystyrene (EPS): Hot drink cups, insulated food packaging, protective packaging for fragile items
v. Polyethylene Terephtalate (PET): Bottles for water and other drinks, dispensing containers for cleaning fluids, biscuit trays
vi. Polypropylene (PP): Microwave dishes, ice cream tubs, potato chip bags, bottle caps



Only 9% of all plastic waste ever produced has been recycled. About 12% has been incinerated, while the rest — 79% — has accumulated in landfills, dumps or the natural environment. Cigarette butts — whose filters contain tiny plastic fibres — were the most common type of plastic waste found in the environment in a recent global survey. Drink bottles, bottle caps, food wrappers, grocery bags, drink lids, straws and stirrers were the next most common items. Many of us use these products every day, without even thinking about where they might end up.

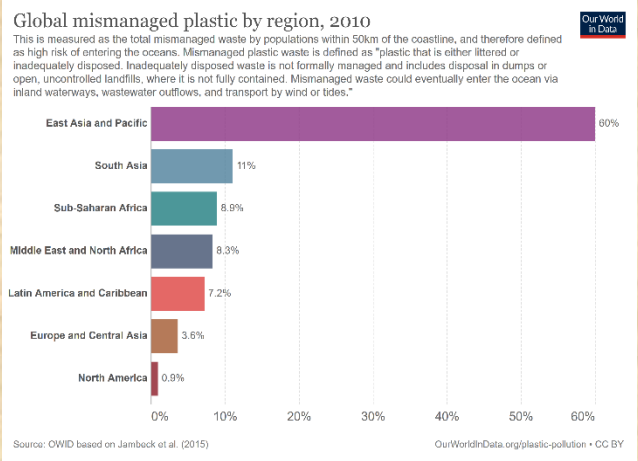
India generates 15 million tonnes of plastic waste every year but only one fourth of this is recycled due to lack of a functioning solid waste management system. This leads to burden on the landfills and poor socio-economic conditions of the waste pickers, mostly women.

A global material balance study on plastics points out that 79 per cent of the total plastics produced in the world enters our environment as waste. Only 9 per cent of the total plastic waste in the world is recycled. A Central Pollution Control Board (CPCB) report (2018-19) puts the total annual plastic waste generation in India at a humungous 3.3 million metric tonnes per year. Even this data, frightening as it is, might be an underestimation. While India's plastic waste problem is not as huge as that of the rich world, it is definitely growing. Richer states like Goa and Delhi produce as much as 60 grams and 37 grams per capita per day respectively – against a national average of 8 grams per capita per day.



According to a recent report, the most common finds during international coastal cleanups are, in order of magnitude, cigarette butts, plastic beverage bottles, plastic bottle caps, food wrappers, plastic grocery bags, plastic lids, straws and stirrers, glass beverage bottles, other kinds of plastic bags, and foam take-away containers. Single-use plastics took most of the spots in this Top Ten and it is not hard to imagine the rankings for waste found inland would be similar.

It is estimated that between one to five trillion plastic bags are consumed worldwide each year. Five trillion is almost 10 million plastic bags a minute. Single-use plastic bags and Styrofoam products are widely used because they are strong, cheap and hygienic ways to transport goods. Plastic groceries bags consume less energy and water to produce and generate less solid waste than paper bags, taking up less space in landfills. However, some of the characteristics that make them commercially successful – price, durability and resistance - also contribute to making them environmentally unsafe and difficult to recycle. While it is still unclear, some studies suggest that plastic bags and Styrofoam containers can take up to thousands of years to decompose, contaminating soil and



water, and posing significant ingestion, choking and entanglement hazards to wildlife on land and in the ocean. Due to their light weight and balloon-shaped design, plastic bags are easily blown in the air, eventually ending up on land and in the ocean.

Plastics in the environment pose significant hazards to wildlife both on land and in the ocean. High concentrations of plastic materials, particularly plastic bags, have been found blocking the breathing passages and stomachs of hundreds of different species. Plastic bags in the ocean resemble jellyfish and are often ingested by turtles and dolphins who mistake them for food. There is emerging evidence that the toxic chemicals added during the manufacturing process transfer from the ingested plastic into the animals' tissues, eventually entering the food chain for humans as well. When plastic breaks down into microplastic particles, it becomes even more difficult to detect and remove from the open oceans. Therefore, the most effective mitigation strategy is to reduce their input.

In addition to people's negligence, the large presence of single-use plastics in the environment is symptomatic of poor or failing waste management systems. One of the key issues in management of plastic waste has been the lack of credible, actionable data and information. It is now high time we should come together to prevent further deterioration of the environment and phase out the single use plastic items from our day to day life. To make the world a sustainable place to live in we must "Say No to Plastic".

Awareness against Single Use Plastics in schools

Plastic pollution is one of the biggest environmental challenges of our time, with statistics showing that there will be more plastic in the oceans than fish by 2050. Plastic Carry Bags are being extensively used due to its excellent Barrier properties, Water Proof Characteristics, Transparency, light in weight and cost effectiveness etc. The low cost, convenience and lightness of these products have revolutionized the packaging of goods. However, the catastrophic environmental cost of this convenience is now becoming increasingly clear. In this regard the Government of Tripura issued banning order on use, sale, import, storage of plastic carry bags w.e.f. 1st January, 2014.

Tripura ENVIS Hub under the guidance of Tripura State Pollution Control Board has taken the initiative to generate awareness among the school students of the state. Because students are the future generation, therefore spreading awareness among them will help in curbing of single use plastic

in days to come. Hence Awareness drive on “harmful effects of single –use plastic on environment and human Health” were conducted at various schools in Agartala city like Ramkrishna Mission Vidyalaya, Sri krishna Mission to begin with.

An elaborate slide presentation consisting of the harmful effects of Single use plastic with special emphasis on plastic carry bag along with banning orders issued by the Central & state government was made. Around 150 students along with teachers from each school have participated in the awareness programme. The eco-friendly alternatives of single use plastic product were also discussed.

In order to develop more interest among the students about Environment and its importance resources, Tripura State Pollution Control Board has distributed booklets, calendars and leaflets in various schools like Auxilium Girls’, Holy Cross, Ramkrishna Mission Vidyalaya etc . Below are some of the images captured during the awareness drive in the schools.

Seminar on Eco-friendly Idol Immersion in Tripura

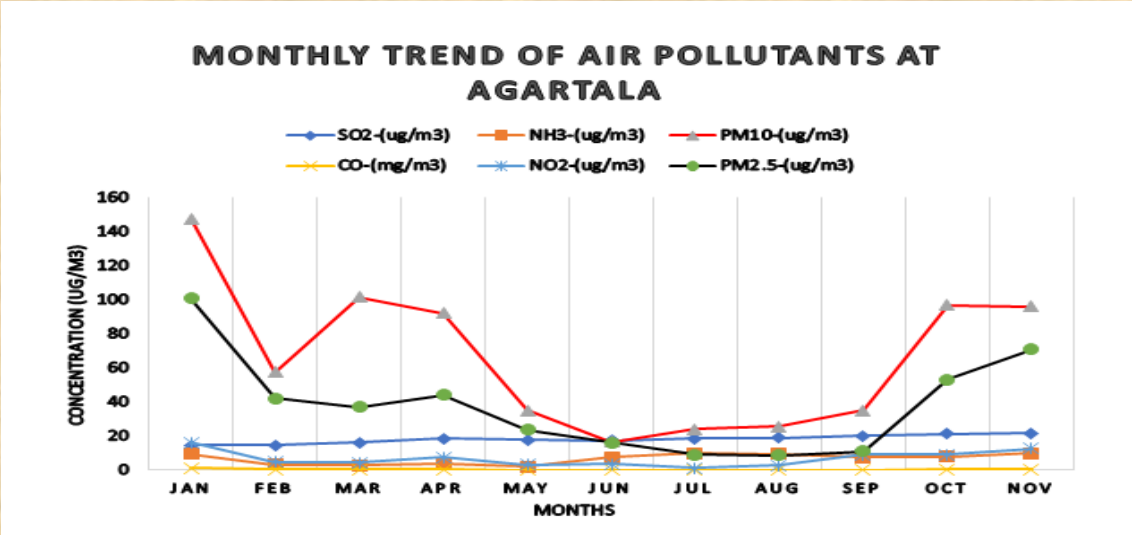
India is a country of numerous festivals. Many of the festivals are organised to celebrate gods and goddesses by Hindus. Ganesh Chaturthi, Bijaya Dashami, Lakshmi Puja, Kali puja are some of the many festivals that are celebrated by the people in community mode. Idols are made of different sizes and these are decorated with colours, clothes and ornaments, and kept in decorated pandals for 3-4 days or longer for members of the community to offer prayer and for worshipping. Idol making involves use of natural as well as artificial or synthetic materials. After celebrations, idols are immersed in water bodies like rivers, ponds and lakes. In the past, Idol worshipping used to be on a limited scale when idols were made of natural materials only. With the passage of time and increase in population, community based idol worshipping spread far and wide, and became very common. As a result large scale use of synthetic materials found use in idol making. These become the source of water pollution. Some of the major pollutants used in idol making are plaster of paris in place of natural clay and synthetic colours in place of natural colour. These synthetic material cause harmful effects in the water quality for use by humans and animals.

In view of the alarming proportion of water pollution very year due to idol immersion several parts of the country, Hon'ble high courts and National Green Tribunals have issued judgements against use of synthetic or artificial material in idol making. Central Pollution Control Board has issued elaborate guidelines to regulate idol making and eco-friendly methods of idol immersion. Compliance of these guidelines are mandatory in all the states of the country.

Tripura State Pollution Control board has prepared guidelines for implementation in the state of Tripura. For this purpose a meeting was organised on 18/11/2021 at the conference hall of the TSPCB with numbers of the prominent puja committees and idol makers to take their views and seek their cooperation in the implementation of the guidelines.

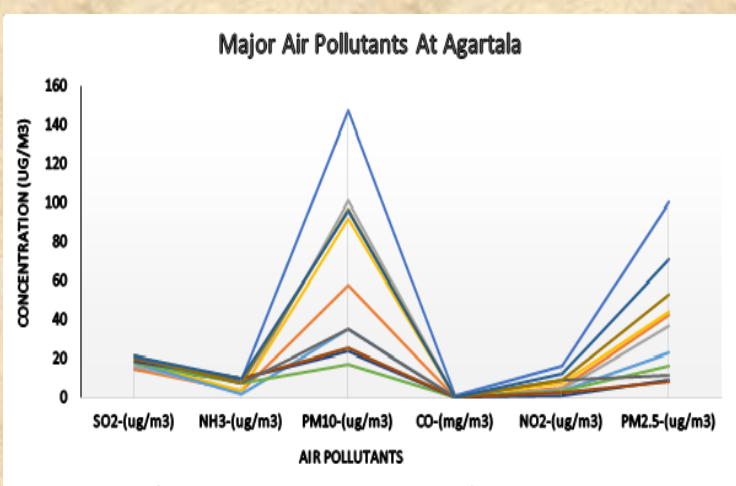
Air Pollution at Agartala: $PM_{2.5}$ and PM_{10}

The Continuous Ambient Air Quality Monitoring Station (CAAQMS) of the Board is providing real-time air quality data of the central part of the Agartala city. In the year 2021, monthly average of different parameters recorded for 11 months from January-November showed increasing concentrations of particulate matters (fine dusts) in the air during winter months (November-January) with the maximum concentration of PM_{10}µg/m^3 recorded in January 2021. The same trend is noticed for $PM_{2.5}$ as can be seen in the accompanying graph.



All the gaseous compounds (SO_2, CO, NH3 & NO_2) were found to be within the permissible limits, with the maximum concentration was recorded for Sulphur dioxide (SO_2) and the least concentration was recorded for Carbon monoxide (CO). These data suggested that gaseous emissions produced by automobiles and industries are so far safe to the air quality of the Agartala city.

Tripura State Pollution Control Board has already initiated several measures for the abatement of rising concentration of particulate matters by taking tough actions against the source industries like stone-crushing units, brick kilns & construction activities. It is hoped that the measures taken so far will yield positive results in coming days.

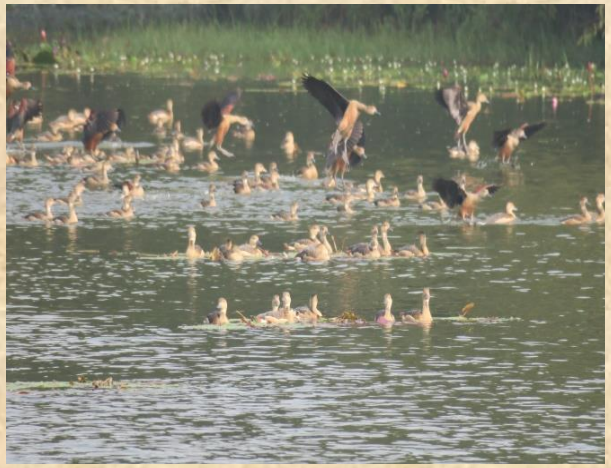


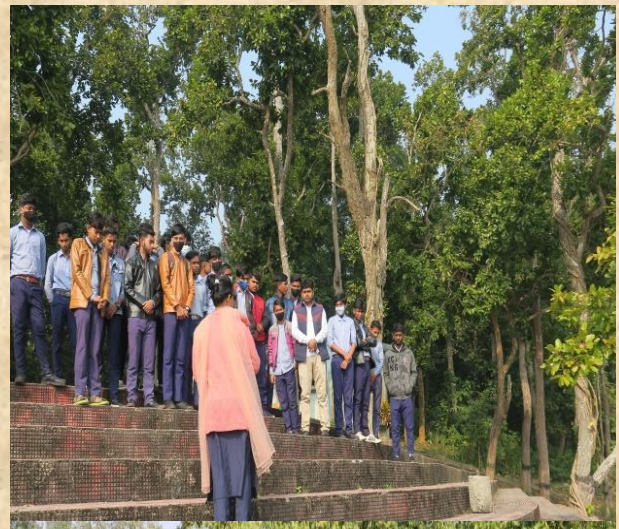
Nature Walk –A day with the Nature

Tripura ENVIS hub under the guidance of Tripura State Pollution Control Board organized a Nature Walk in the Sepahijala Wildlife Sanctuary on 22nd December 2021 for Eco Club students under the Azadi ka Amrit Mahotsav.

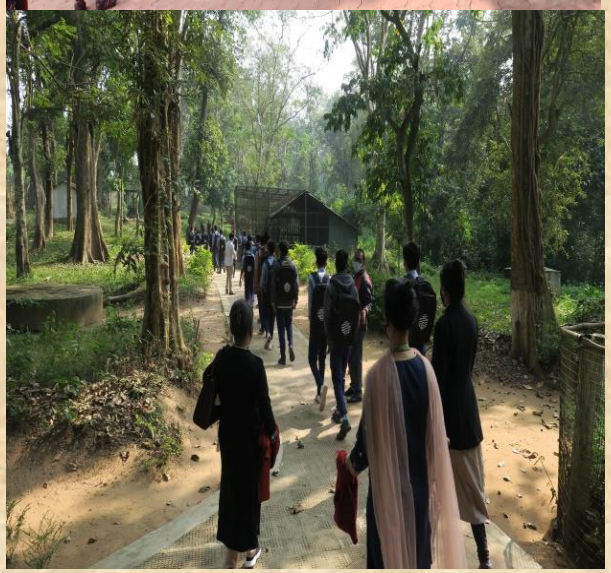
The Sepahijala Wildlife Sanctuary is a bio-diversity rich place consisting of lush green flora and rich fauna. The Sanctuary also has an aquatic body named “Amrit Sagar” which attracts many kinds of migratory birds during winter. The Nature Walk consisted of tracking from the Water body “Amrit Sagar” to the ethno-botanically important Botanical Garden followed by the Butterfly Garden and Zoological Garden. During the Nature Walk, students were informed about the Ramsar Site Convention and importance of conservation of Ramsar Sites and other Aquatic Bodies. They were provided information regarding the Rudrasagar Lake-The Ramsar Site of Tripura and its importance in recharging of ground-water and sustenance of livelihood of humans, animals and birds.

The students were told about the environmental and economical values of timber and medicinal plants, and recreational value of trees and vegetation through useful discussions carried out during the trail in the Botanical Garden. The students were also taught about the importance of butterflies as agents of pollination during the time spent in the Butterfly Garden located in the Botanical Garden. Further, Quiz on various Environmental Resources of the State was also clubbed in the visit. The day ended with the inspirational message to the Eco club students to protect and preserve the environment and its resources in order to ensure a healthy future of all living organisms.









Photos: Nature Walk with Eco Club students in the Sepahijala Wild Life Sanctuary

Distribution of 1000 saplings to Brick Kiln Cluster

The Tripura State Pollution Control Board, Tripura ENVIS Hub and Tripura Bricks Manufacturing Association jointly organized 'Sapling Distribution and Plantation Programme' in the Mohanpur Brick Cluster in the West Tripura District on October 02, 2021 to celebrate 'Azadi Ka Amrit Mahotsav'. The programme was graced by Prof. B. K. Agarwala, Chairman, and Sri Bishu Karmakar, Member Secretary of Tripura State Pollution Control Board and Sri Sujit Choudhury, Secretary and Sri Paritosh Saha, Vice President of Brick Manufacturing Association along with other officials of Tripura State Pollution Control Board, Tripura ENVIS Hub and owners of various brick kilns at Mohanpur. On this occasion 1000 saplings were distributed among the 20 brick kiln owners.

The Chairman, Tripura State Pollution Control Board and other speakers expressed their concern about the pollution that is being generated from the brick kilns. It was agreed that a green belt around each brick kiln should be created so that the air pollution can be minimized in the area. They emphasized that all the saplings should be taken care of and ensure 100% survival rate of the plants that have been provided to them. Prof. Agarwala also thanked the Forest Department, Government of Tripura for free supply of saplings and supporting the noble cause.

Sapling Distribution & Plantation Drive

Special Cleanliness Drive

A clean and green environment is a basic ideology in sustainable development. Similarly, the use and littering of single use plastic items have become a menace for the urban society. A whole lot of diseases can be traced back to unhygienic environments and irresponsible waste disposal. Clogging of drainage system in the urban areas is a common sight which leads to accumulation of water on roads during rainy season and rise in population of mosquitoes and diseases associated due to them. The importance of cleanliness is known to all, yet people try to keep their homes clean while they somehow just forget that they are responsible for the cleanliness of the surrounding environment as well, that they are responsible for any waste they generate and that just getting rid of it from their house won't help. It could be due to lack of knowledge or due to sheer laziness or due to irresponsibility. Sometimes all it takes is a reminder.

Therefore, a Special Cleanliness Drive with special focus on single use plastic items was organized around the Agartala City on October 10-11, 2021 to clean the environment, to make the general public aware about the necessity of Swachhata in our society and environment, and apprise the people about the methodology of handling waste responsibly. Proper segregation of waste at source was demonstrated during the drive to display proper waste management methods. Many hotspots were chosen for conducting the drive which included bazars and places of mass gathering.

Special Cleanliness Drive

Essay competition

Tripura State Pollution Control Boar organized an online essay writing competition on the theme "Ill Effects of Single Use Plastic on Environment & Health" for creating awareness among students Tripura ENVIS hub took active part in conducting the competition. For this purpose, an advertisement was published in the daily local newspaper on 25/08/2021. The competition was divided into three group namely: Grp-I (Clas:VI to VIII), Grp-II (Clas:IX to X), Grp-III (Clas:XI to XII). More than 1000 students from different schools participated in the online competition. But only 520 eligible students were found eligible as per the conditions of the competition. Their essays were evaluated by committees of subject experts and language experts. After thorough evaluation, winners of the three groups were declared through official website and local newspaper. They will be given prizes in a public programme.

Winners of Group I	*Winners of Group II*	*Winners of Group III*
1.Aistick Apyayan (Holy Cross School, Durjoynagar, Agartala)	**1. Suhani Majumder** (Don Bosco School, Nandanagar, Agartala)	**1.Sneha Saha** (Shishu Bihar H.S. School, Minister Quarter Ln, Krishna Nagar, Agartala
2.Bidhrita Sutradhar (Shishu Bihar H.S. School, Minister Quarter Ln, Krishna Nagar, Agartala)	**2.Diptanu Debnath** (Sabroom English Medium H.S.School, Sabroom Rd, Office Tila, Sabroom)	**2.Ankita Das** (Kabi Nazrul Vidyabhavan H.S (+2 Stage)school, Teliamura, Tripura
3.Srijita Majumder (Belonia Govt. English Medium H.S. School, Belonia, South Tripura)	**3.Ankit Paul** (Khowai Govt. Class XII School, Khowai, Tripura)	**3.Munni Dhar** (Raitwisa H.S. School, Kumarghat (Unakoti)

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