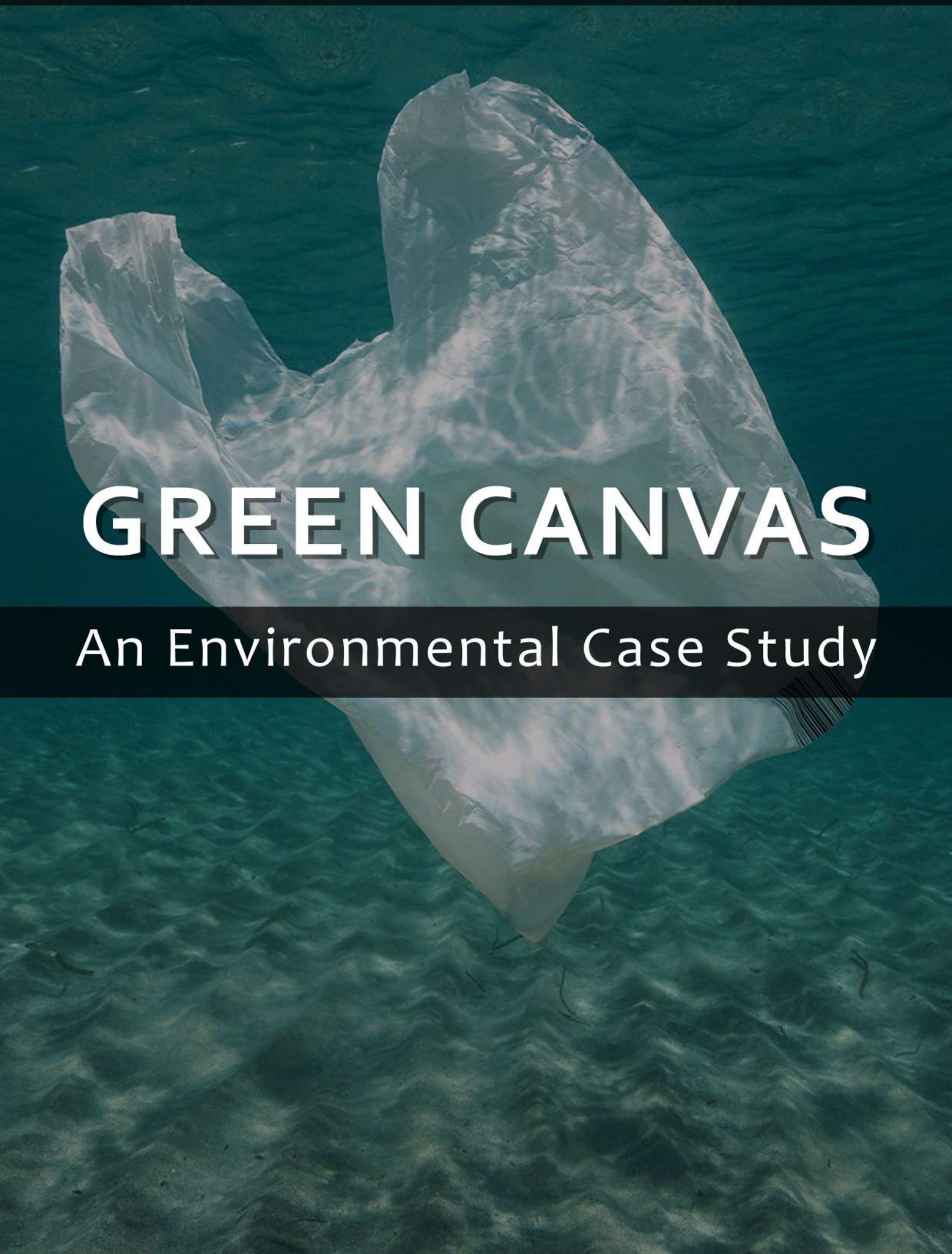
megalith
DEPARTMENT OF CIVIL ENGINEERING
Indian Institute of Technology
kharagpur



# GREEN CANVAS

## An Environmental Case Study

# INTRODUCTION

An ocean is a body of saline water that composes a large part of a planet's hydrosphere. These vast water bodies cover about 70% of the earth’s surface and hold about 97% of the planet’s water. Oceans are the lifeblood of planet Earth, and offer countless benefits to our planet and all the creatures that live here. They produce more than half of the oxygen in the atmosphere and support the carbon cycle. They regulate our climate, provide medicinal products, and are a great source of proteins. Thus, better management of ocean resources is crucial to ensuring global food security, as without them, life could not exist.

Marine pollution occurs when harmful effects result from the entry into the ocean of chemicals, particles, industrial, agricultural and residential waste, noise, or the spread of invasive organisms. Eighty percent of marine pollution comes from land. Air pollution is also a contributing factor by carrying off pesticides or dirt into the ocean.

Despite their importance, oceans are facing unprecedented threats as a result of human activity. Every year, an estimated 8 million tonnes of plastic waste ends up in the world’s oceans. Ocean is getting warmer with decreasing pH, and is losing oxygen. At the same time, climate change is damaging coral reefs and other key ecosystems.

# HISTORY AND CURRENT STATUS

Although marine pollution has a long history, significant international laws to counter it were not enacted until the twentieth century. Marine pollution was a concern during several UN conventions on the Law of the Sea beginning in the 1950s. Most scientists believed that the oceans were so vast that they had unlimited ability to dilute, and thus make pollution harmless.

The London Convention, got signed in 1972, did not ban marine pollution, but it established lists for substances to be banned or regulated by national authorities. Also, it was applied only to waste dumped from ships, and thus did nothing to regulate waste discharged as liquids from pipelines.

As of now, nearly 80 percent of the world's wastewater is discharged without treatment. Many organizations, governments, businesses, universities and civil society groups around the world works to promote the protection and sustainable management of our precious marine and coastal environments.

A study recently published in the *Proceedings of the National Academy of Sciences (PNAS)* found that at least 88 percent of the Earth's ocean surface is polluted with plastic debris. Organizations like *The Ocean Clean-up* are doing remarkable contributions in terms of building sustainable ocean clean-up devices. One of their main focuses is about researching plastic, trying to figure out if it can be decomposed without causing any pollution.

## INDIAN APPROACH

According to a study published in the journal Science on February 13, 2015, it is estimated that India dumps 600,000 tonnes of plastic waste into the oceans, annually. With a coastline of 7,500 km, India faces a huge challenge in cleaning up its seas and meeting its commitment to eliminate single-use plastic in the country by 2022. To help take on this mammoth mission to fight marine litter, India has recently announced two collaborations with Norway and Germany. And the Union Ministry of Earth Sciences began work on a comprehensive study to identify the source of litter, especially plastic waste that flows into India's coastal waters. The exercise is the first step towards framing a National Marine Litter Policy with the objective to clean up the oceans, which is in line with UN Environment's global '*Clean Seas Campaign*' that India joined on World Environment Day 2018.

## CAUSES AND EFFECTS

**Major causes of ocean pollution are –**

- Surface runoff from farming, sewerage containing chemicals, industrial wastes discharges and urban runoff directly pollutes the water bodies.
- Dumping of radioactive waste off the coasts also pollutes oceans.
- Ship pollution resulting due to oil spills and Ballast water.
- Inland mining as well as deep-sea mining is another source of marine pollution.
- Climate change is raising ocean temperatures and levels of $CO_2$ in the atmosphere, which in turn, acidifies the oceans.

**Adverse effects of ocean pollution are –**

- Due to excess of chemical nutrients, eutrophication occurs reducing the quality of water. Also, ocean trash can be broken into smaller pieces by sun exposure and wave action, after which it can find its way into the food chain.
- Dumping of radioactive waste can cause disease in marine life and affect humans through food chains.
- Oil spill floats on the surface of the water and prevents sunlight from reaching marine plants and affects the process of photosynthesis.
- Minerals, such as copper, discharged in the course of the mining, can interfere with the life history and development of coral polyps.
- Acidification of oceans might lead to dissolution of calcium carbonate structures that can affect the shell formation in shellfish and also the corals.

# PROBLEM STATEMENT

From the past decades, environmentalists have been working on the deteriorating health of the oceans and the water bodies. The consequences of the deteriorating rivers and oceans are a threat to humanity. The existing organizations are not able to come up with 100% effective way to shun this between the infrastructure growth as well as conserving the environment at the same time. We at **MEGALITH** expect from our participants to find the major causes and its effect, concerned issues, and in result, suggest some new feasible innovative ideas or solutions including cost factors and other related aspects for the solution to this problem. Your solution will be judged on the basis of your innovative ideas and how far that will be achievable including cost factors and other environmental aspects. Detailed calculations and estimations can be added to support your idea.

**What is expected from the students:**-

- Examine major causes of marine pollution and its adverse effects on ecosystem.
- What are the methods to measure intensity of marine pollution? How can they be improved.
- What are the proposed solutions for mitigation/elimination of marine pollution? What are the difficulties in their implementation?
- How the latest techniques (such as AI, GIS, etc) can be employed for Marine pollution mitigation management?
- Describe in brief the current situation of marine pollution in India. Suggest any new initiative and reforms on existing government policies in order to achieve the desired results.

# RULES AND REGULATIONS

- Teams must consist of a minimum of **2** and a maximum of **5** participants.
- The event is open for participation from students of all departments.
- The event will be conducted in two phases: - Online submission of abstract - Final presentation by shortlisted teams at IIT Kharagpur.
- Shortlisted teams from abstract submission round have to present their ideas in the form of PowerPoint presentations during Megalith 2020 at IIT Kharagpur.
- The abstract should be submitted with a minimum font size of 11 and single line spacing and must **not exceed 5 pages**.
- The abstract should be supported with valid references.
- Relevant statistics can be added to support your claim (you may add one extra page to include stats, image and hyperlink them wherever required).
- Mail your submissions to greencanvas@megalith.co.in with subject as GREENCANVAS_2020 on or before **31st JANUARY 2020, 11:59 PM.**
- All the teams are requested to provide contact numbers, Email IDs and name of the college of each member along with the attached submission file in the mail.
- The results of first-round shall be given to the above-listed e-mails and mobile numbers.
- The decision of judges shall be final and binding.

# CONTACTS

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