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# ENVIRONMENT

*Chennai Metro's Environment news, views and announcements*

## MD'S MESSAGE

World Environment Day is celebrated across the globe on the 5th of June every year with great excitement and enthusiasm. It is a day for environmental action that creates and spreads awareness, encouraging people to adopt sustainable practices to minimize or avoid adverse environmental impacts. The call for this year is to Beat Plastic Pollution. The theme stresses on getting rid of single-use plastic, an issue about which the whole world has started acting now. In 2018, India imposed a ban on the usage of Single Use Plastic.

The impact of these single plastics on our environment are catastrophic. A new report by the United Nations Environment Programme (UNEP) shows that we can reduce 80 percent of plastic pollution by 2040 – if we act now to reuse, recycle, reorient, and diversify away from plastics.

In this regard, I seek your cooperation to curb Plastic pollution. Let us work together to break our addiction to plastics and go for zero waste management and build a circular economy in our organization.



Thiru. M.A. Siddique  
Managing Director

I commend the Chief Advisor (Environment) and his team for bringing out this newsletter on Environment related issues. This surely will create awareness about the importance of having a clean and green environment and will encourage the implementation of green initiatives and sustainable practices. CMRL is committed to the cause of the environment and the CMRL family believes in working together to achieve the aim of having a green, clean, and pollution-free environment.

Our day-to-day activities generate tons and tons of waste in our environment. Waste management becomes a problem of concern with rising populations, especially in developing countries like India. Country cannot be clean until we manage the waste efficiently. This waste does not add only to contamination but also becomes a public health menace. We should encourage the use of waste as a resource, which has to be reworked, reused, and upcycled. This will minimize the consumption of materials, as well as minimize and mitigate significant damage to the environment. Nowadays, there are many advanced technologies introduced to handle waste.

The essential thing to help reduce our impact on the environment is to practice the 5 R's. Most of us are familiar with the 3 R's of Reduce, Reuse, and Recycle, but now there are two more to add to the mix: Refuse and Repair. It makes sense to approach them in order, with the most effective option we can take first: Refuse.



Thiru. T. Archunan  
Director - Projects

Recycling also gets a lot of attention, but it's the least effective in the 5R's. We need to be doing more refusing, whether it's excess packaging, goods or products that won't last, or just simply something that we don't need.

Waste has become a big challenge for the environment and humans in modern times. It is important we all should take steps for Refusing, Reduce, Reusing, and knowing about Recycling. And we should know what we actually need and what we just want.

I compliment the efforts of the Chief Advisor (Environment) and his team in developing this newsletter.

**FEELING IS  
MORE IMPORTANT AT YOUR WORKPLACE  
BEFORE TAKING UP THE TASKS**

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Human Race in the process of development in the past century created more concrete jungles rather than keeping balance in the ecosystem. The cascading effect of losing greenery and water bodies has shattered the process of keeping balance with the natural phenomenon. Rapid industrialization and urbanization resulted in degraded landscapes with a few green dots and caused climate change in the biosphere. As an outcome, many parts of the country are becoming drier, wetter, or hotter. Climate change can be addressed by adopting sustainable green infrastructure practices which are very much needed in the urban society. Now cities planner have altered their urban planning and infrastructure design and they are incorporating nature-driven solutions as a counter to conventional infrastructure practices by harnessing blue elements (seas, rivers, lakes, ponds, marshy lands, green belts, wetlands, and forests).

Cities which occupy only 2% of the Earth's surface area are a key contributor to climate change. They consume the maximum energy (78%) of the world's energy and produce 60% of Greenhouse emission Blue - Green infrastructure planning includes inventorying green assets and ensuring the protection of natural water bodies.



Dr. Rajeev K Srivastava  
Chief Advisor (Environment)

In CMRL, we are trying to create an Ecologically vibrant unit that not only helps in mitigating the challenges of pollution but also provides numerous ecosystem goods and services. Ecological vibrant unit is the composition of mostly indigenous species of different canopies. This unit will not only serve the mute population of birds, amphibians, snakes, and insects but also help in recharging the groundwater. This unit will also enrich the mother earth in a sustainable way. Lessons learned from this concept will be taken forward.

**IT IS THE RESPONSIBILITY OF EACH AND EVERY CITIZEN TO REDUCE THE SELF-CARBON FOOTPRINT BY CREATING MORE GREENERY EITHER HORIZONTALLY OR VERTICALLY.**

## GREEN WORLD AWARD - 2023

CMRL bags a prestigious environment award - Green World Award 2023 from the Green Organization, London, United Kingdom. CMRL was awarded a coveted International Green World Award in front of an international audience at a ceremony held in Miami, United States on 24th April 2023. The Green World Awards are one of the top environment awards campaigns on the planet.

The Green World Award represents the CMRL's recognition and commitment to its positive impact on the environment.



# GREEN WORLD AWARD - 2023 (CONT...)

CMRL has adopted various environmentally friendly initiatives and also a sustainable model which aims to minimize the environmental impacts during construction and operations on the environment while providing a reliable, comfortable, safe, and fast traveling experience to our passengers and the people of Chennai.

As a result, this contributes in improving energy efficiency and water management i.e. reducing energy consumption, carbon emissions, and overall operational costs. In turn, these initiatives contributed to reducing greenhouse gas emissions.

CMRL also focuses on environmental initiatives, such as improving air quality, environmental resource conservation, more utilization of solar energy, and developing Ecologically vibrant plantations to improve the ecosystem.

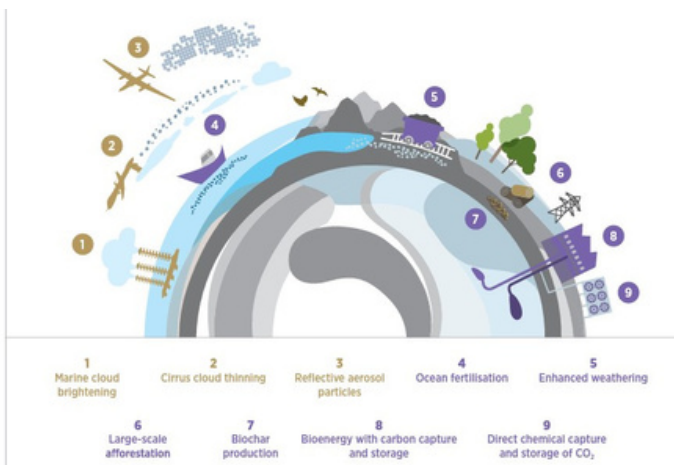
The event organizers appreciated the initiatives and efforts made by CMRL in winning this award in the Carbon Reduction category which is the hardest of all award categories. This award is considered the biggest environmental awards campaign worldwide, recognizing governments, ministries, companies, organizations, and communities across the private and public sectors.

## SOLAR RADIATION MANAGEMENT

Article by Mr. Saravanan P  
AM Environment

### IS CLIMATE ENGINEERING A SOLUTION?

Despite extensive efforts, greenhouse gases continue to be emitted in vast amounts, with potentially devastating consequences around the world. This is why targeted interventions in the climate system, known collectively as 'climate engineering', are receiving increased attention. Proposed approaches are often divided into two groups: those intended to remove



Source: IASS fact sheet

carbon dioxide from the atmosphere and those intended to reduce the amount of solar energy that reaches the Earth's surface or is trapped in the atmosphere. Like all aspects of science, it is quite ambiguous regarding how positive or negative the impact of SRM will be. Therefore it is prudent to gauge both aspects before concluding.

### METHODS OF MANAGEMENT

- Space Sunshades, using mirrors in space, placing vast satellites at Lagrange Point 1, space parasol, etc.
- Stratospheric aerosol injection – methods involving the injection of sulfate aerosols into the stratosphere.
- Marine Cloud Brightening (spraying a fine seawater spray in the air), seeding of high cirrus clouds with heterogeneous ice nuclei.
- Surface-Based Options like whitening roofs, growing more reflective crops, etc.

# Eco-friendly Wastewater Treatment System by using Canna Indica Plants

Article by Mr. P. Sivaraman  
NKAB - Environment Monitoring Specialist

The compact wastewater (Bath Water) treatment system uses in treatment. This technology offers a sustainable, easy-to-operate, and cost-effective solution. Reliable treatment performance is achieved by interactions between water, plants, microorganisms, filter media, and oxygen. The system is most suitable for small communities. The system reduces water content, minimizes solids, and provides sufficient storage time to stabilize biosolids prior to disposal.

## TECHNOLOGY:

It is a natural filtration system that can be used to treat and improve water quality prior to discharging into the environment. It utilizes the ability of a reed to transport oxygen to the soil, hence encouraging microorganisms to digest the contaminants in the effluent. It is the most suitable technology to treat wastewater in a confined area.

## REMOVAL OF NUTRIENTS, COD, BOD, TDS

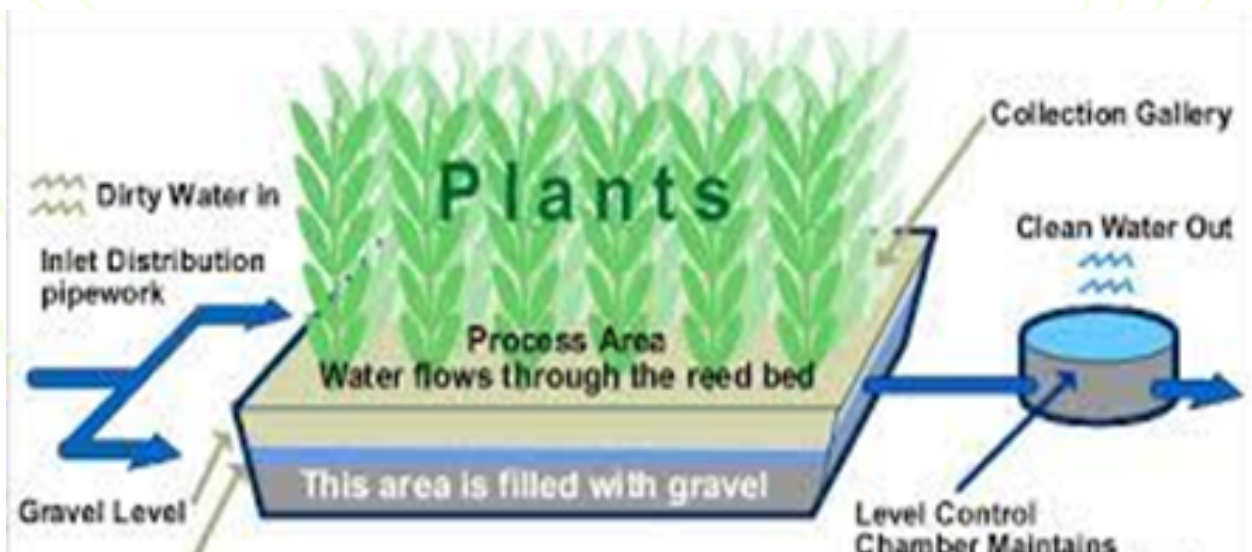
Several studies utilized *Canna indica* revealed that it is effective at removing total dissolved solids (TDS), several chemical pollutants such as biochemical oxygen demand (BOD) and chemical oxygen demand (COD), nutrients such as total phosphorus (TP) and total nitrogen (TN).

## PROCESS:

This system is most common in all countries to treat household wastewater. The common plants (*Phragmites communis*, *Canna indica*, a second cousin of the common marsh plant) dewater solids in a confined area. The beds can be of any shape to accommodate existing land conditions and areas. Specially designed ponds with underdrains covered by a sand and gravel mixture are constructed and filled with reed plants.

Raw wastewater from the house flows into a collection tank for primary treatment to remove large solids, grease, and oils. The partially clarified effluent from the collection tank passes through an effluent filter to trap any large solids that remain and then flows into the reed bed.

Once inside the reed bed, the wastewater undergoes a complex series of natural treatment processes as it moves laterally through the root zone from one end of the bed to the other. The wetland plants leak small amounts of oxygen out through their roots, creating small, oxygenated sites within an otherwise anaerobic environment.



"Grasses in Marshy land also play the similar role in purifying the water"

This mix of aerobic and anaerobic conditions creates an ideal environment for the growth of microorganisms on the surface of the gravel and plant roots. These micro-organisms are largely responsible for the pollutant removal that occurs in a reed bed, as they feed on and break down organic matter and nutrients and compete against pathogenic organisms. Earthworms have also been found to inhabit reed beds and assist with the breakdown of organic matter and solids



### WHAT DOES IT DO?

It performs three basic functions:

- (1) dewater the sludge,
- (2) transform it into mineral and humus-like components, and
- (3) store sludge and decompose.

Dewatering is accomplished through evaporation (as in a normal sludge drying bed operation); transpiration through the plant's root stem, and leaf structure; and filtration through the bed's sand and gravel layers and the plant's root system. Leachate is channeled back to the treatment plant through the underdrain.

Treatment Plant installed at C3-TU-02 Vanagram Casting Yard

They are highly effective when properly designed and can be used in combination with ponds and wetlands to produce near-river quality water.

### DURABILITY:

The lifetime expectancy of these beds is between 5 and 15 years depending on the strength and quality of the effluent being applied to them. Those receiving strong effluents with a high level of suspended solids will block up more rapidly. The media in blocked beds of this type has to be fully replaced.



As a part of Environmental Sensitisation CMRL organized One day of Environmental Awareness Training for Contractor's Environmental Managers and Engineers. The Wrap-up session was addressed by Managing Director / CMRL and supplemented by Director - Projects.

# WATER SCARCITY

**Article by Mr. D G Jayaprasand  
NKAB- Natural Environment Specialist**

Water is essential for agricultural production and food security. It is the lifeblood of ecosystems, including forests, lakes, and wetlands, on which our present and future food and nutritional security depends. Yet, our freshwater resources are dwindling at an alarming rate. Growing water scarcity is now one of the leading challenges to sustainable development.

The 'water we eat' daily through the food we consume is much more than what we drink. Did you know, depending on the diet, we need 2 000 to 5 000 liters of water to produce the food consumed daily by one person? Evidence suggests that two-thirds of the world population could be living in water-stressed countries by 2025 if current consumption patterns continue. To achieve a #ZeroHunger world by 2030, we need to take action now.

Here are just four areas where we can work to save this precious resource

## 1. AGRICULTURE

Agriculture is both a significant cause and a casualty of water scarcity. Farming accounts for almost 70 percent of all water withdrawals and up to 95 percent in some developing countries. We will have to use our natural resources more wisely as time goes on, and when it comes to water, there is no exception. For example, the choice of crop greatly impacts the amount of water that is needed. Did you know that pulses crops have a small water footprint meaning that to produce 1kg of lentils, we only need 1250 litres of water?

## 2. CLIMATE CHANGE

Water scarcity is expected to intensify as a result of climate change. It is predicted to bring about increased temperatures across the world. More frequent and severe droughts are having an impact on agricultural production while rising temperatures translate into increased crop water demand. In addition to improvements in water-use efficiency and agricultural productivity,

## 3. FOOD LOSS AND WASTE

Wasted food equals wasted water! When we waste food, we are also wasting the resources that went into producing it. Each year, one-third of all the food produced is either lost or wasted – that translates into a volume of waste water that is equal to around three times the volume of Lake Geneva. We can all make small changes in our daily life to reduce our food waste, from using our leftovers to shopping only for what we need.

## CONCLUSION

The issue of water scarcity is at the very core of sustainable development. It comes down to the fact that we simply can't grow the food we need if we don't have enough water! We need to change our habits and act now to protect this precious resource. It is one of the most important ingredients to achieve a #ZeroHunger world!



**"Save water, save the planet, Saving a drop a step to save the planet."**

# ENVIRONMENT MONTH GREENING WITH GREENPEACE



The Chief Advisor's (Environment) strategic vision, expertise, and commitment have played a pivotal role in fostering partnerships toward a common goal of environmental awareness.

Through strategic planning and joint efforts with the CMRL Operation team and Station Managers, Greenpeace has successfully organized engaging events such as Khamba Composting and the Bin Ball Game to promote sustainable practices and waste segregation. Additionally, the distribution of saplings and seed balls has empowered individuals to contribute directly to reforestation and environmental restoration.

The art installation highlighting plastic pollution served as a powerful visual reminder of the urgent need to address environmental challenges and protect the planet for future generations.



Through our partnership with Greenpeace, a global environmental organization that operates independently and campaigns for various environmental causes. It was founded in 1971 in Vancouver, Canada, and has grown into an international organization with offices and supporters around the world.

Furthermore, our engagement with Green Peace coincided with the celebration of World Environment Day, adding significance and momentum to our collaborative efforts. Leveraging this auspicious occasion, we jointly conceived an innovative concept "Environment Month," a comprehensive initiative aimed at promoting environmental awareness to the Metro Commuters throughout the entire month at multiple metro stations in CMRL.



This campaign encouraged the metro commuters to make sustainable choices and advocate for policies that prioritize waste reduction and alternatives to single-use plastics.

The partnership between CMRL and Greenpeace demonstrates the power of collaboration in driving positive change and promoting environmental consciousness. It serves as an inspiring example of how organizations can work together to achieve a common goal of sustainability.



# GREEN INNOVATIONS AND SUSTAINABLE PRACTICES IN CMRL

- Waste testing Concrete cubes were used for making seating arrangements for workers. Also for making Water tank bed and for making Bunds in the plantation area.



- Wooden pallets were reused as fencing material in the office garden.
- Waste coconut tree trunks were used for the beautification of gardens.

- Paint/waste bins reused for plantation.
- Solar street lights of 120 w installed in the office area.
- Empty paint boxes were reused to collect the welding buds (Hazardous waste)
- Shoe stands were made with metal scraps



- The Entry Gate was made using waste Steel scraps. & Guide Wall Stopper.
- Fire Extinguisher stand, Fire points, Sign boards.
- Welding Machine weather protection cover, Barricades were also made using Metal Scraps.

# ENVIRONMENT DAY CELEBRATION AT CMRL



»»» World Environment day badge contains seeds inside the badge.



»»» Waffle Tea Cups for Saving Water



»»» Handbook on SDG's distributed to employee's



»»» Plastic Awareness program conducted among the Sri Chaitanya School Childrens



Waste papers generated in the project were exchanged to recycled note pad's.



➤➤➤ Plastic Awareness Rally in public roads at karampakam



➤➤➤ Jute Bag distribution among the employees



➤➤➤ Quiz competition among the employees and works and prize distribution



➤➤➤ Plantation Drive at Army hospital planted more than 300 saplings.



➤➤➤ Paper pens distribution which contains seeds



➤➤➤ Banana leaf distributed to save water

# ENVIRONMENTAL AWARENESS - 2023



Dr. Rajeev Srivastava, Chief Advisor (Environment), CMRL delivered a guest lecture on Environmental Protection and its Importance at Classical Tamil Research Institute, Chennai as a part of Environmental Day Celebrations. The event was organized by M/s HCC - KEC JV.

Jointly with Greenpeace, CMRL celebrated Environmental Day at multiple metro stations, as a part of environmental sensitization to the metro commuters.



Environmental Awareness session conducted by Mr. Saravana Kumar DM /Environment to the Staff working at Metro Stations and Office premises.

For any queries/comments or submission of articles in this newsletter, kindly contact Dr Rajeev Srivastava, Chief Advisor (Environment) or send an email to [srivastava.rajeev@cmrl.in](mailto:srivastava.rajeev@cmrl.in) / [saravanakumar.r@cmrl.in](mailto:saravanakumar.r@cmrl.in)