



Dr. Harshvardhan Inaugurates Exhibition On Swachhata Hi Seva

Posted On: 27 SEP 2017 4:30PM by PIB Delhi

Minister for Science & Technology and Earth Sciences and Environment, Forest and Climate change, Dr. Harshvardhan inaugurated an exhibition on Swachhata Hi Seva, organized by Ministry of Science & Technology and Ministry of Earth Sciences and coordinated by Council of Scientific and Industrial Research (CSIR).

The exhibition highlighted the technologies and products developed by these science ministries which are being used for Swachhata Abhiyan of Government of India. The exhibition comprised of demonstration of models, and technologies explaining scientific and technological intervention brought in by these ministries.

CSIR showcased the technology of Terafil and tiles made from plastic waste. Terafil is a low cost burnt red clay porous media (disc/candle), used for filtration & treatment of turbid raw water into clean drinking water for domestic/ community applications. It can be fixed with any container for purification of water. It operates without electricity, spent water and sludge management.

Tiles made from waste plastics were demonstrated. Novel features of these tiles include its high mechanical strength, flame retardancy, UV protection and anti-static response. These tiles can be used in designing of structure like Smart Toilets that will be beneficial for the villages and large section of the society.

Several posters depicting the technological intervention made for Swachh Bharat were also displayed. CSIR undertook the study of special properties of Ganga water which include medicinal and anti-bacterial properties. Rich and diverse population of bacteriophages against various type of bacteria were observed in Ganga water. CSIR monitored sediment and water quality of river Ganga from Gomukh to Gangasagar at 70 locations and also 35 locations along river Narmada and river Yamuna for comparative study.

CSIR demonstrated, how mobile van developed by its Laboratory monitors air quality and provide instantaneous data relating to vehicular emissions. Data helps to identify the areas with high level of air pollution and suggest remedial measures to contain air pollution. CSIR also displayed technology for eco-restoration of mine through use of biotechnology.

CSIR has developed Phytoid Waste Water Treatment technology. The technology involves a constructed wetland exclusively designed for the treatment of municipal, urban, agricultural and industrial wastewater. The phytoid technology can be constructed in series and parallel modules / cells depending on the land availability and quantity of wastewater to be treated.

Multi-sector application of climate and weather informatics which is helpful for society and industries was also displayed.

CSIR-CLRI has developed and deployed the technologies for end-of-pipe treatment for the waste generated in leather processing and increasing the efficiency of the common effluent treatment plants.

The autonomous institutes of **Department of Science & Technology(DST)** exhibited the technologies they developed that are relevant to Swachhata Mission as part of 'Swachhata Hi Seva'.

The Institute of Nanoscience & Technology, Mohali has developed a technology for low cost water purification system for domestic and industrial waste water treatment. It uses nano absorbents to treat water from toxic wastes.

The other technology is for recovering Nanostructured materials from the used batteries waste and industrial waste using environment friendly approach. The materials recovered include metal oxide, silica, sodium nitrate and sodium carbonate which can be used for treatments of organic pollutants in water.

National Innovation Foundation showcased ideal technologies developed by innovators for waste collection to fulfill the objective of "Swachh Bharat Abhiyan". It can be boon for sanitation workers as it reduces effort and time but increases coverage and frequency of area being cleaned. The first one is Wrapper Picker, designed to collect light weight garbage

except fine dust. It is battery operated device with an in-built provision to indicate the status of charge in battery. The other one is INSPIRE awarded innovation called Manual Waste Lifting and Dumping Device. It is helpful in providing manual and mobile waste tool with picking and dumping facility to make it more effective.

Vigyan Prasas showcased sanitation and hygienic practices in a very simplified manner that should be carried out in day to day lives by different sections of society.

Department of Bio-Technology (DBT) showcased a range of technologies like clean energy, river cleaning initiatives, technologies to clean up waste water, supporting bio-toilets and a range of other waste management & utilization technologies.

India's first home grown technology to convert biomass to ethanol with speed and efficiency was developed by the Institute of Chemical Technology, Mumbai. The rate of conversion of biomass to ethanol in this technology is faster than other technologies currently available in the international market. The technology has been transferred to BPCL and HPCL for building commercial scale biomass to ethanol plants expected by 2018



Photo of the Ethanol producing plant at Kashipur

Novel bio-toilet technologies that promises cleaner India

Innovative bio-toilet ideas generated through Reinvent the Toilet Challenge India was launched by the Grand Challenges India framework. Under this initiative 6 new bio-toilet technologies have been supported. Around 100 toilets have been set up to demonstrate the technology. Several bio-toilets set up in schools of North Eastern States. The technologies focused on redesigning the toilet seat, making it more eco-friendly. Off-grid, self-sustained, modular, electronic toilet have been innovated for slums, with solar energy for Indian weather and integrated with mixed waste processing unit & water, energy/ fertilizer recovery. Septic tanks have been empowered by converting them into decentralized wastewater treatment system.



Bio-toilet technologies

River cleaning technologies

DBT collaborated with the Dutch to help clean Delhi's Barapullah drain. This initiative would later expand to efforts for cleaning Yamuna River. In the next five years, a wastewater treatment plant to make the filthy water potable is scheduled to be set up. The plant will also remove heavy metals from the water for reuse. Most of the technology choices for cleaning the Barapullah drain would be biological in nature.



Sampling of water at the site/ Laboratory being set up at the site

Green remediation technology for wastewater

DBT's support helped develop green remediation process for textile dyes in wastewaters. The technology was developed by Shivaji University, Kolhapur. Aquatic plants were identified that can effectively clean up textile dyes & used for effluent treatment. By-products after treatment showed reduced toxicity.



The green remediation technology & the cleaned up waste water

Waste treatment technologies galore

These technologies for waste management and treatment include one for removing organic waste from municipal waste water at 95 percent efficiency called anaerobic membrane bioreactor, one for treatment of wastewater from distillery industry with enhanced bio-gas yield called Vortex Diode based Cavitation Devices, a novel, robust, versatile, modular, compact and cost effective appliance for decentralized waste processing which can obviate requirements for costly disposal and treatment system for entire cities or regions, a treatment system that can tackle domestic septage, municipal solid waste and landfill leachate—a major challenge for sustainable cities.

RDS/nb

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