

Recycling of single-use plastic waste into composite tiles for multifunctional applications

While the petrochemical sector is regarded as the backbone of plastic production, it is also considered a yardstick for measuring global economic growth, wherein plastic processing and production is of vital importance. As per the World Wildlife Fund (WWF), plastic is harmful to the environment as it is non-biodegradable, takes years to disintegrate. But single-use plastics are worse -- never breaking down completely, they degrade and become microplastics and continue to pollute the environment. It can take thousands of years for plastic bags to decompose, thus contaminating our soil and water in the process. The noxious chemicals used to produce plastic gets transmitted to animal tissue, and finally, enter the human food chain, the WWF says. Birds usually confuse shreds of plastic bags for food and end up eating the toxic debris. Fish consume thousands of tons of plastic in a year, ultimately transferring it up the food chain to marine mammals.



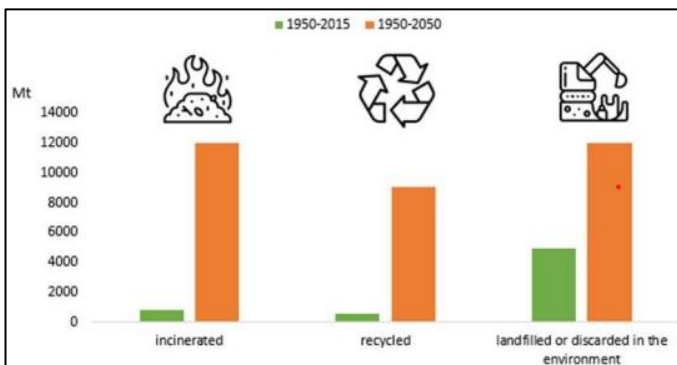
Around 380 million metric tons of plastic are being produced yearly with 8.3 billion metric tons produced since plastic was introduced in the 1950s. The amount of plastic produced in a year is roughly the same as the entire weight of humanity.

Single-use plastics are typically used only once before being disposed of as waste. Single-use plastic applications include consumer goods (e.g., carrier bags, toiletry items), packaging items (e.g., food containers), as well as inputs in the medical (e.g., blood bags, syringes) and agricultural (e.g., grain bags) sectors. In 2015, plastic packaging constituted 141 million tonnes of waste, corresponding to 46.7% of global plastic waste generation. This paper focuses on single-use plastic consumer goods and packaging, which have been the focus of recent waste prevention policy initiatives both for their importance in terms of volumes of waste generated, and because this type of waste is frequently littered.

Packaging is defined as any material, which is used to contain, protect, handle, deliver and present goods. Items like glass bottles, plastic containers, aluminium cans, food wrappers, timber pallets and drums are all used as packaging materials.



Among these packaging materials, plastic containers form a major source of pollution owing to its over utilization in wide variety of sectors. Packaging waste can arise from a wide range of sources including supermarkets, retail outlets, manufacturing industries, households, hotels, hospitals, restaurants and transport companies



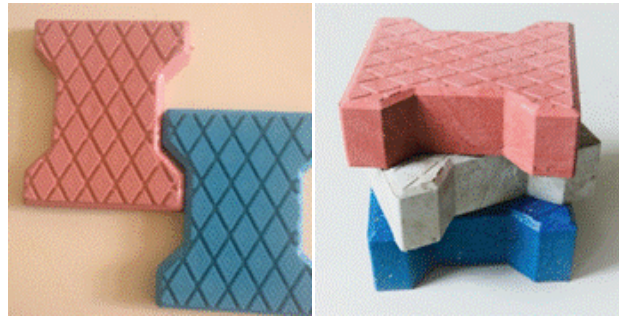
Cumulative plastic waste generation in indicated period, by fate (million tons)

Waste Management – A step towards Circular Economy

Disposal of Plastic Waste is a major problem. It is non-biodegradable & it mainly consists of low-density polyethylene plastic bags, plastic scrap, packaging materials and bottles etc. Plastic waste generally go to landfill site. In landfill, plastic material may take 1000 years to completely degrade. Plastics in different states of degradation release toxic material that leaches into ground and pollutes ground water. Plastic material should not be burnt. A multitude of toxic gases are released when plastic is burnt. These include carbon monoxide, phosgene, nitrogen oxide, dioxin etc. In addition, burning one kilo of plastic releases 3 kilos of carbon dioxide, a gas that contributes to global warming.

Recycling of plastics is desirable because it avoids their accumulation in landfills. While plastics constitute only about 8 percent by weight or 20 percent by volume of municipal solid waste, their low density and slowness to decompose makes them a visible pollutant of public concern. Thus, it becomes vital to use plastic waste in an environmentally sustainable manner and convert it into a product that can be used for various applications.

The main objective of our innovation is to utilize waste plastic scrap & fly ash for designing of floor tile, interlock tile, paver tile and roof tile in building of structures and rooms for general public for societal usage.



Paver tiles made using composite pellets made of waste plastic.

