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16th August 2016
at
Lady Irwin College, New Delhi**



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Area of Activity

**Capacity Enhancement Programme
on Management of Plastics, Polymer
Waste and Bio-Polymers, Impact of
Plastics on Eco-System**

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**Mr. K. G. Ramanathan-
President - GC**



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Hon. Secretary /

Member - EC



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Member - EC



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NGO - Project

Member - GC

ICPE-ENVIS Co-ordinator

Mr. T. K. Bandopadhyay

Technical Director



Designed By

Mr. Sudheer Khurana

Sr. Programme Officer



“Solid waste management is an obligatory function of Urban Local Bodies (ULBs) in India. However, this service is poorly performed resulting in problems of health, sanitation and environmental degradation. With over 3.6% annual growth in urban population and the rapid pace of urbanisation, the situation is becoming more and more critical with the passage of time. Infrastructure development is not in a position to keep pace with population growth owing to the poor financial health of most of the urban local bodies. Solid waste management is one among the essential services, which suffers the most in such a situation. Lack of financial resources, institutional weakness, improper choice of technology and public apathy towards solid waste management has made this service far from satisfactory.”

The above paragraph is quoted from the Executive Summary of the Report of the Committee constituted by Hon. Supreme Court of India to assess the Solid Waste Management in Class 1 Cities in India. The Report was submitted in March 1999. In the 13 Chapters of the Report, the Committee had deliberated in details on the subject and made several suggestions / recommendations to the Central Government as well as State Governments. Plastics waste is a part of Municipal Solid Waste.

Appropriate segregation of waste at source and proper handling of the waste to the disposal / processing site were the key issues dealt with in the Report. Various technologies are available for processing different types of solid waste. Even after about two decades of submission of the above report, the status of solid waste management in India has more or less remained as pathetic as it was earlier. During recent years, however, Waste Management has attained the prime focus in the National Policy in the name of – Swachh Bharat Programme. Various efforts are being made to improve upon the status.

Emphasis is focused on the aspect of possible generation of wealth from waste as a management policy. While it is true that segregated waste can generate wealth which could provide livelihood of a large number of work force in the informal sector in India, it is also true that considerable quantum of waste are not segregated properly and remain either uncollected or dumped in a heap aggravating the ground conditions to the detriment of health and environmental conditions. Mixed plastics waste and some other types of plastics waste create such a condition. There are technologies for dealing with such situations for disposal of such solid waste scientifically without creating any negative impact on the environment. However, in some cases, such processes may not be financially viable. Nevertheless such technologies are able to ensure keeping the environment clean and safe.

The question then may arise, who will sponsor such activities. The answer is straight and simple. Whosoever uses the materials and derive one benefit or other, the onus for financing such waste management / recycling activities lies on them. Manufactures being the prime beneficiaries of introducing such products in the field, should take the lead in taking the responsibility. Ultimately all users have to pay for keeping the environment clean for safe living.

Subscription Information:

ENVIS is sent free of cost to all those interested in the information on Plastics and Environment.

Readers are welcome to send their suggestions, contributions, articles, case studies, and new developments for publication in the Newsletter to the ICPE-ENVIS address.

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Editor : Mr. T. K. Bandopadhyay

Plastics and the Environment

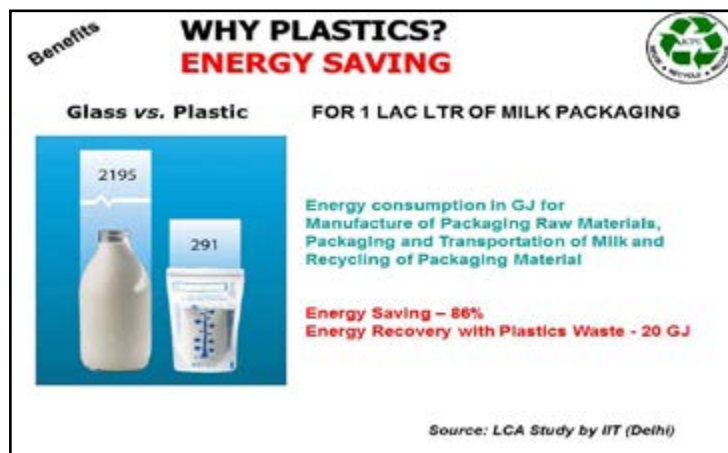
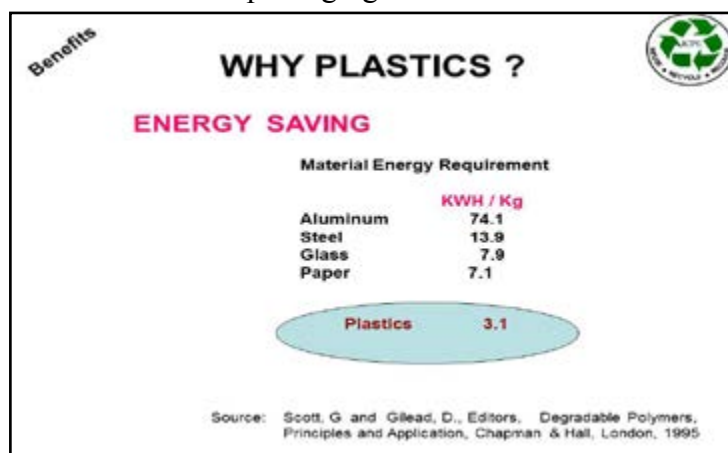
Scientists have termed plastics as a marvel of modern chemistry. They have declared discovery and development of plastics as one of the greatest achievements chemistry has ever made.

Development of Synthetic Plastics (henceforth termed as 'plastics') began during the second half of Nineteenth Century, close to the time when industrialisation began in the Europe and slowly in rest of the world. By the middle of Twentieth Century many major scientific discovery and inventions took place in the development of many types of plastics although the volume remained at a low sphere. However since around 1970's, the volume of production of plastics materials increased at a very fast rate and by 2015 the production at a level of around 250 Mn Tons is close to that of Steel on the basis of surface area covered.

Plastics have gained widespread applications from the common household goods to high technology instruments. Plastics have made significant contribution in the area of medical safety and health care. Light weight yet tough, inert, excellent barrier properties, ease of processing into flexible or rigid products, transparency when desired, low consumption of energy during its production and transportation - all these attributes have made plastics an inseparable entity of the modern human life. Plastics reduce the emission of green house gases and leave lesser Carbon Footprint on the earth compared to the alternative materials. Plastics save green house gas emissions and save the earth from global warming. Use of plastics in Piping, Automobiles, Insulation and Packaging applications saved the earth from Green House Gases to the tune of about 1.0 GT in the year 2005. (McKinsey study for ICCA - International Council of Chemical Associations).



Plastics pipes consume least electrical energy to discharge equal volume of irrigation water for agricultural purpose compared to pipes made of alternate materials. Plastics have replaced wood in many application areas saving millions of trees from felling. Packaging is the single largest application area of plastics. Positive attributes have clearly established 'preferred' status for plastics in packaging. Protection, preservation, light weight, hygiene, cost effectiveness, ease of availability, its amenability to be produced in different forms, sizes and shapes and many others, make plastics an ideal material of choice for food as well as non-food packaging.





Benefits

WHY PLASTICS?

LESSER EMISSIONS

Jute Vs Plastic

During Production of Raw Material & the Product

Environmental Burden in kg	Jute Bag	Plastic Bag
Air Pollution		
CO	54.3	0.6
CO ₂	6010.2*	790*
SOx	134.8	5.2
NOx	68.1*	4.9*
CH ₄	39.5	3.2
HCL	5.3	0
Dust	67.6	1.4
Water Pollution		
Suspended Solids	352.5	0.2
Chlorides	4535.5	0.1

* High Potential for Global Warming

**Values are for Packaging of One Lac MT of Atta

Source – Report by Centre for Polymer Science and Engineering, IIT-Delhi

During Transportation of Finished Product

Emission	Gmt in	Excess Emission for Jute Bags	Plastic Bags
CO ₂	791*	11107.3*	Taken as Bonus
CO	4.5	64.0	Taken as Bonus
HC	1.1	15.6	Taken as Bonus
NOx	8*	113.8*	Taken as Bonus
Particulates	0.36	5.1	Taken as Bonus
Total Regulated Tailpipe Emission	13.96	198.5	Taken as Bonus

Although plastics are employed in myriad applications where they actually conserve natural resources, there are some issues which have been surrounding the material ever since its growth rate increased.

First it is said that plastics are derived from non-renewable resources, viz. oil and hence the usage of plastics should be curbed.

The reality is that only about 4% of crude oil is used in the entire chain of petrochemicals of which plastics is only a part. Moreover use of light weight plastics materials in various applications including in automobiles, reduces the consumption of fuels to such an extent that it more than compensates its use of the crude oil for its production. While the economy of usage of crude oil is always welcome, curbing the use of plastics is not the solution.

The second aspect of criticism relates to the alleged health hazards arising out of usage of plastics.

Plastic products are being subjected to in-depth scientific analysis and they have clearly proved that plastics do not cause any health hazard. In fact plastic products have been implanted into vital organs like heart valves clearly disproving the myths. Plastics are used for packaging of live saving blood and vital pharmaceutical products. Plastics Disposable Syringes inject the live saving drugs into human and animal bodies. There are clear international and national regulations / standards for usage of plastics that comes into contact with food stuffs, pharmaceutical products and drinking water etc. Therefore, much of the alleged health hazards are pure scare mongering and not based on scientific facts. The issue of dioxin emission during the processing / burning of plastics has also been studied and documented to indicate that plastics and dioxin are not directly related. It is also documented that air and water emissions of various gases and other products during the production of plastics are much lesser compared to the alternative materials for same applications.

WHY PLASTICS?

HEALTH & SAFETY

PLASTICS USED FOR FOOD CONTACT APPLICATIONS ARE APPROVED AS SAFE MATERIAL AS PER BIS & OTHER INTERNATIONAL STANDARDS

AS IMPLANTS WITHIN HUMAN BODY

IN MEDICAL APPLICATIONS LIKE IV BOTTLE, BLOOD BAGS, PACKAGING OF LIQUID FORMULATIONS & DISPOSABLE INJECTION SYRINGES

FOR PACKAGING OF LIQUID MILK, DRINKING WATER & FOODSTUFFS

Indian Centre for Plastics in the Environment

The third major criticism is its non-biodegradability.

While it is true that plastics are not amenable to biodegradation like other organic matters, many alternate materials such as glass, metals are also not biodegradable. Moreover, many of the applications

for plastics arise from the need for the product to be long-lasting. Again, LCA and other studies carried out the world over clearly prove that the energy required for production of plastics is much lower than that of alternate materials. Thus the production and usage of plastics demand minimum energy in comparison to other materials and therefore non-biodegradability alone cannot be a consideration while deciding on the appropriate needs of a material.

Biodegradable / Compostable Plastics have been developed since as early as in the Seventies (1970's). In fact most of the major manufacturers of conventional plastics raw materials from Natural Gas, also manufacture compostable plastics for limited and specific applications which are difficult for recycling; for example mulch film in agricultural application. It is evident that the degradation / composting process releases carbon dioxide in aerobic condition and methane and carbon dioxide in anaerobic condition. Both the situations are not desirable as both carbon dioxide and methane are greenhouse gases. Conventional Plastics recycling do not create such situation. Recycling is preferred compared to biodegradation / composting due to fact that recycling help resource management. Compostable Plastics do not degrade or disappear in to the soil of its own. It will remain in the open environment if not treated appropriately. Moreover, composting takes several months even when handled properly. Some other type of degradable plastics has not been established as environment friendly.

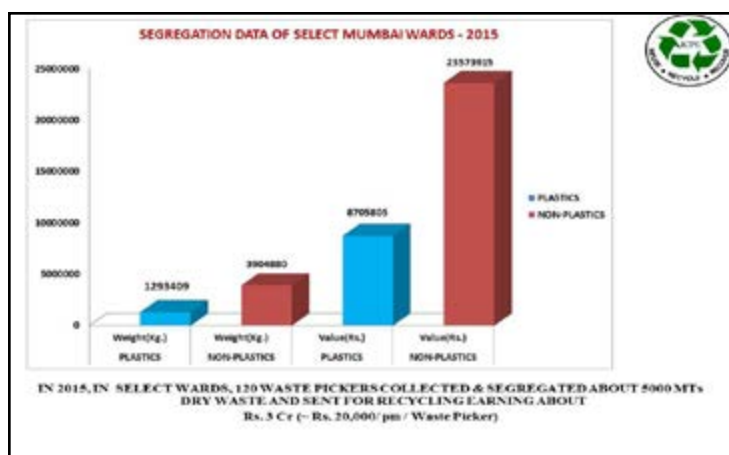
All these reasons have resulted in keeping the production / demand for compostable / biodegradable plastics at a miniscule level compared to that of conventional plastics world over.

Lastly, management of plastics waste is held against the usage of plastics. Plastics are blamed as the major cause of Solid Waste problem.

Undoubtedly this is a serious issue mainly due to the poor littering habit of general mass and inadequate infrastructure for management of solid waste. Due to this we find all types of dry waste including plastic waste littered in our surroundings. Even wet waste also is found littered around the street corners and

elsewhere. The reality is that plastics waste form much less than 10% of the MSW stream in major Indian cities. There is no problem of disposing the plastics waste when it is collected in segregated form at source of waste generation. Plastics waste can be 100% recycled by one process or other. Very thin plastic bags, though recyclable, are often left behind by the waste pickers when littered due to economic reason. These very light weight plastic film waste do not pay a reasonable return to the waste pickers and hence they avoid picking these up. In India, rigid plastics waste do not create any waste management issue, as these are collected by the waste pickers in the informal sector for selling to the waste dealers / recyclers for earning their livelihood. To avoid the problem of flexible plastics waste management, MoEF, Government of India has come up with Rules restricting the thickness of plastic carry bags. Manufacturers and users of multilayered plastics packaging materials have been assigned the responsibility for assisting the civic bodies for setting up collection centres for plastics waste. It is required that the government rules are implemented effectively.





Another most important issue is the plastics waste in the sea and river water. Marine litter is found in all oceans in the world – not only in most populated areas but also in area far away from the obvious source of plastics waste. According to the United Nation's Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), land based sources account for 80% of marine pollution, rest being from the ships. Although there is conflicting figures on the volume of marine plastics waste pollution, however there is no denying that the problem is definitely serious. There are concerns on how to avoid the marine pollution. Illegal dumping, proper education on anti-littering near the sea beaches are among the challenges. Recovery of plastics waste from the oceans also is possible and is actually practised in case of larger floating waste. More and more attention and efforts are required to address the issue. The real solution lies in the segregation of dry and wet solid waste at the source, creation of efficient solid waste management infrastructure coupled with establishment of recycling centres as plastics can be recycled to produce articles of critical and non – critical applications for mass use augmenting the concept of resource management.

Apart from the conventional Mechanical Recycling process, alternate processes of plastics recycling also are required to be encouraged. Feedstock Recycling and Energy Recovery are very important technologies. Low-end plastics waste, which often is abandoned by the waste pickers and conventional recyclers for difficulty in segregation and cleaning, thus creating a waste management problem, can be disposed of safely by co-processing in cement kilns. Industrial fuel can be produced from all types of plastics waste by pyrolysis

process. Plasma recycling process can resolve the issue of disposal of domestic hazardous waste like sanitary napkins, baby and adult nappies. Plastics waste can be used as an efficient reducing agent for the manufacture of steel. Plastics waste has been used to construct better quality asphalt roads. All these processes have been successfully tried and established. Government of India has made it mandatory to use plastics waste as per specifications laid down by Indian Road Congress for constructing all bitumen roads in the country. Use of plastics waste in co-processing in cement kilns has been approved by the regulatory authorities.



Plastics and the Environment



Plastics are here to stay. In fact consumption of plastics is an alternative indication of degree of development of a country. Against world average per capita consumption of about 30 kgs, India consumes about 10 kgs per capita, while China's per capita consumption is around 30 kgs. Per capita consumption of plastics in developed countries like the USA and UK is around 100 Kgs. Plastics have important uses across all sectors of our economy. The aim should be to monitor its usage according to Standards and Rules & Regulations and handling of the waste for efficient recycling to reduce the pressure on natural resources.

Do Not Litter. Keep Your Environment Clean.

- Segregate and Throw Waste Only in Waste Bins.
- Use Two Bins – One for Wet Waste, One for Dry Waste.



Plastics, Metals, Paper ...
Can be recycled into useful products.

Waste Food and other Biodegradable Waste.
Can be composted into manure.

Issued in Public Interest by

Indian Centre for Plastics in the Environment (ICPE)
www.icpeenvs.nic.in , www.icpe.in

ICPE ENVIS Centre's Awareness Campaign at International Exhibition IPLEX - 2016 from 26th to 28th August, 2016 At KOCHI

As a part of awareness programme, ICPE Envis Centre had participated in an International Plastics Exhibition: IPLEX - 2016 organised by Kerala Plastics Manufacturers' Association (KPMA) at Kochi, Kerala from 26th to 28th August-2016. Benefits of Plastics, various Issues and Solutions through effective Source Segregation of Dry Waste including Plastics Waste and Recycling / Recovery of the same in a scientific and environmentally friendly manner were depicted with the help of Display Panels and samples of recycled products. Awareness Films were screened within the Stall continuously. Easy to understand printed leaflets on source segregation of plastics and other dry waste were distributed among the visitors including school students. The Exhibition has been inaugurated by Shri A.C. Moideen, Hon. Minister for Tourism & Co-operation, Govt. of Kerala. Shri Balakrishnan Kakunje General Secretary KPMA & Shri Shahull Hameed and other office bearers of KPMA and Office Bearers of other Plastics Associations had visited ICPE Stall. The Stall was provided by KPMA free of cost. KPMA had also borne the expenses for printing of the Display Materials. An estimated 8, 000/ visitors & more than 10,000 students visited ICPE Stall and many of them had interacted with ICPE ENVIS Team.



Awareness Programme on 16th August 2016 at Lady Irwin College, New Delhi

An awareness program was conducted on 16th August 2016 at Lady Irwin College, New Delhi. Around 45-50 students from M.Sc. Resource Management & Design Application (RMDA) and M.Sc. Fabric & Apparel Science were participated in the programme. Apart from the students, 18-20 Professors/teachers from both Departments were also attended the program. The program started with a welcome address by Dr. Sushma Goel Associate professor –RMDA, followed by Dr. A. N. Bhat's introduction speech. Dr. A.N Bhat gave a briefly introduction of ICPE and our mission, viz to help sustain environment friendly image of plastics followed by ICPE presentation on "Plastic & Environment". The presentation was well received by the audience and appreciated ICPE's effort for organizing such awareness programmes among the student. ICPE awareness film "Listen Plastic Have Something to Say" & "Plastics our Lifeline" in English were also shown during the programme. The programme was concluded with a question/answer session. The students showed lot of interest in Plastics waste in Road-making process, Recycling, waste management /segregation and proper disposal of waste. ICPE's booklets, Point-counterpoint & Frequently Asked Questions and the recent editions of Eco Echoes/ENVIS Newsletter (10 copies) were handed over to the College library.

Say No To **THIN** Plastic Bags



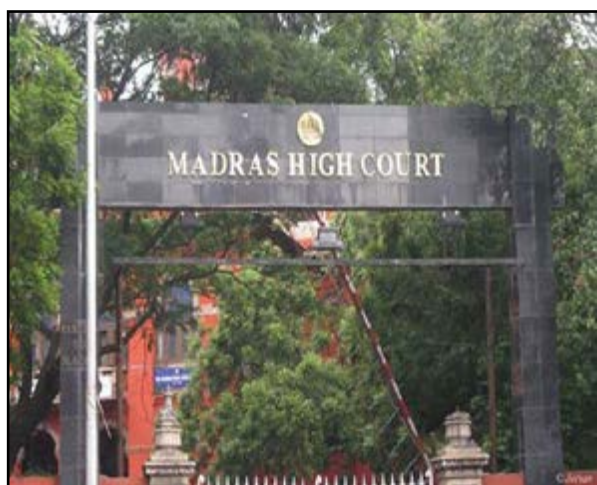
Use Plastics Bags > 50 Microns



Madras HC Orders Notice to Tamil Nadu Govt. on PIL Seeking Total Ban on Plastic Bags

MADURAI: The Madurai bench of the Madras high court on Friday ordered notice to Tamil Nadu chief secretary, principal secretary of health, secretaries of environment and forests and municipal administration and water supply on a public interest litigation that sought a government order imposing a total ban on the use of plastic products (like plastic bags, cups, plates, spoons etc) in the state. The division bench of justices Nooty Ramamohana Rao and S S Sundar ordered notice on the petition filed by K K Ramesh of Madurai and adjourned the case by eight weeks. In his petition, Ramesh said a case relating to the death of an animal which ate plastics on roadside had been filed in the Supreme Court recently seeking a ban on plastic bags in the country. The Supreme Court had expressed its concern over the issue and observed that it would analyse the performances of the state governments in preventing usage of plastic bags, the petitioner said.

Source: <http://timesofindia.indiatimes.com/city/chennai/Madras-HC-orders-notice-to-Tamil-Nadu-govt-on-PIL-seeking-total-ban-on-plastic-bags/articleshow/53671439.cms>



INTERNATIONAL NEWS

New Way To Create Fuel From Waste Plastics

WASHINGTON: Scientists have found a way to use plastic trash to create a cleaner diesel-like fuel that could power vehicles, an advance that may turn landfills into potential energy sources in future. The researchers from the Chinese Academy of Sciences and University of California in the US hope to scale up the technique to allow for it to be used in actually reducing plastic trash. Plastics break down very slowly causing them to pile up in landfills and serving as the source material in artificial island creation in oceans. Scientists have been looking for ways to degrade plastics, particularly polyethylene, the most common kind produced, but until now have not been able to find inexpensive and scalable means. The new method involves mixing the plastics with an organometallic catalyst, made from readily available molecules that were then doped with metal iridium, 'Phys.org' reported. The reaction caused the bonds holding the plastic together to weaken, allowing them to be more easily torn apart. Researchers were able to use the broken down material to create a diesel-like fuel which they claim could be used to power vehicles and other motors. Burning the fuel is also cleaner than burning other combustible materials, they said

The research was published in the journal Science Advances.

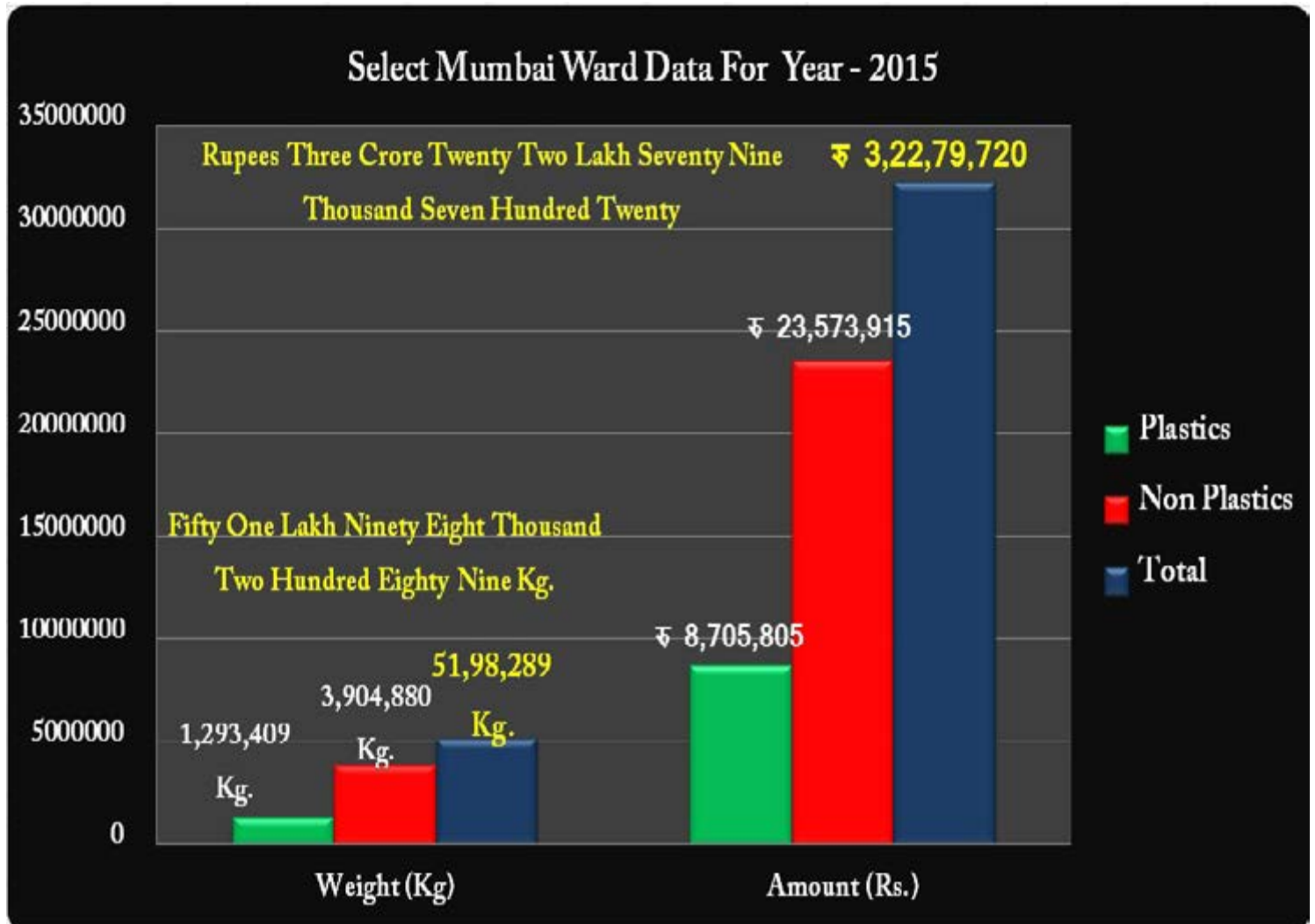
Source: <http://www.ndtv.com/world-news/new-way-to-create-fuel-from-waste-plastics-1421809>



DATA SHEET

SELECT MUMBAI WARDS DATA - 2015

	Weight in Kg.	Amount in Rs.
Plastics	12,93,409	87,05,805
Non- Plastics	39,04,880	2,53,73,915
Total	51,98,289	3,22,79,720



**IN 2015, IN SELECT WARDS OF MUMBAI
120 WASTE PICKERS COLLECTED & SEGREGATED
ABOUT 5000 MTs DRY WASTE AND SENT FOR RECYCLING
EARNING ABOUT
Rs. 3 Cr (~ Rs. 20,000/ pm / Waste Picker)**

Source : ICPE Project With Stree Mukti Sanghathana, FORCE & BMC

PLASTICS



Securing Our Future Today

Plastics, An Inexhaustible Source of Tailor-made Solutions -

From increasing crop-yields through modern farming techniques. To bringing more of what is produced more efficiently to the masses. And supporting highly efficient water management systems. Plastics help to secure the future of India. From food security to water harvesting plastics play a key role.



REUSE • RECYCLE • REDUCE • RECOVER

