

Parivesh

A News Letter from ENVIS Centre - Central Pollution Control Board

Editorial

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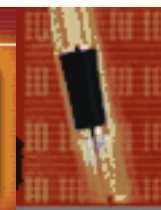


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Parivesh

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Editorial

The plastics, a marvel of polymer chemistry, have become omni-present in our daily life through various applications. But, indiscriminate use of plastics as well as its reprocessing and disposal of plastics waste are posing environmental problems and health hazards besides causing public nuisance

To formulate a strategy and an action programme for management of plastics waste, the Ministry of Environment & Forest constituted a Task Force comprising specialists, representatives of industry and civic authorities.

The Task force in this report (August 1997) recommended a package of preventive, promotional and mitigative (PPM) measures as also the modus operandi for their implementation. These include guidelines for compliance of environmental safety, specifications for restriction on recycling of poor quality plastics waste, deterrent penalties for littering, industry initiatives and collaboration with the civic authorities for improvement in plastic waste collection system, incentives for development and adoption for appropriate technologies and sustained campaigns for creating public awareness and involvement. Networking of concerned industry Associations, setting up of an Indian Centre for Plastics in Environment (ICPE) and constitution of an implementation and Monitoring Committee (IMC) were also suggested by the Task Force for follow-up of the recommendations.

On the basis of the Task Force Report, several initiatives have been taken, while some are on the anvil. The Ministry of Environment & Forest has issued a Gazette Notification prohibiting the use of recycled plastic for storing and carrying food stuff. To restrict the indiscriminate use of plastic carry bags, the notification also stipulates the minimum thickness for such carry bags. Public awareness programmes have also been launched.

This issue of the PRIVESH deals with various aspects of plastics - ranging from their demand and production to their environmental implications, strategies and action point to deal with the problem. We hope, this issue will enlighten the people about the measure taken by the Government and also the measures which are required to be taken by the concerned organisations as well as public at large

Dilip Biswas
Chairman, CPCB



PLASTICS WASTE MANAGEMENT

INTRODUCTION

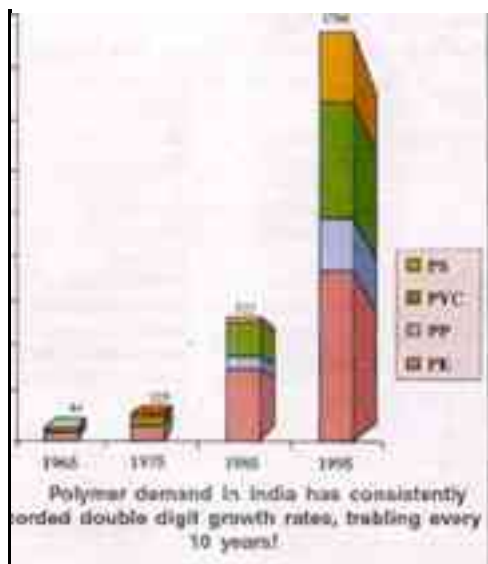
All synthetic products affect the environment over their life cycle from the point of manufacturing to disposal as waste. Plastic products are no exception. Indeed, plastics are so versatile in use that their impacts on the environment are extremely wide ranging. With this realization, the need for plastics to conform to certain guidelines/standards and code of conduct for its use has begun to dawn on manufacturers, civic authorities, environmentalists and the public.

Plastics have many advantages. They are light, easy to mould, durable, and easy to adopt to different user requirements. However, plastics are difficult to destroy and are classified as non-biodegradable. On the other hand, it is easy to recycle plastics.

Elsewhere in the world, the plastics industry has realized the need of environmentally acceptable modes for recycling plastics wastes and has set out targets and missions. Prominent among such missions are the Plastics Waste management Institute in Japan, the European Centre for Plastics in Environment, the Plastics Recycling Foundation and the American Plastics Council of SPI in the US, the National Packaging Protocol and Environmental Plastics Institute of Canada, Recycling Council of British Plastics Federation and the Plastics Waste management Task Force in Malaysia. Beside these, the European Parliament and the Council of European Union have issued 'Packaging and Packaging Waste Directive 94/62/EC'. Such a need has also been felt in India and a proposal for setting up an Indian Centre for Plastics in the Environment is being considered. In addition, a Nation Plastics Waste Management Task Force has been constituted.

In the Indian context, it must be borne in mind that the growth of the Indian plastics industry has been phenomenal - the growth rate here is higher than the plastics industry elsewhere in the world. Plastics are being used in all sectors of the economy. From 1.88 million tones (1995-96), the domestic demand for plastics is expected to cross 4 million tones by year 2001-2002. This development is striking also because the plastics industry itself has made remarkable progress worldwide. The Indian plastics industry has out-paced all other industries in the country.

This is hardly surprising since the use of plastics has infiltrated all sectors of the economy. Infrastructure, agriculture, building and construction, telecommunications, consumer goods and packaging are all high growth areas, which indicate a spiraling demand for plastics.



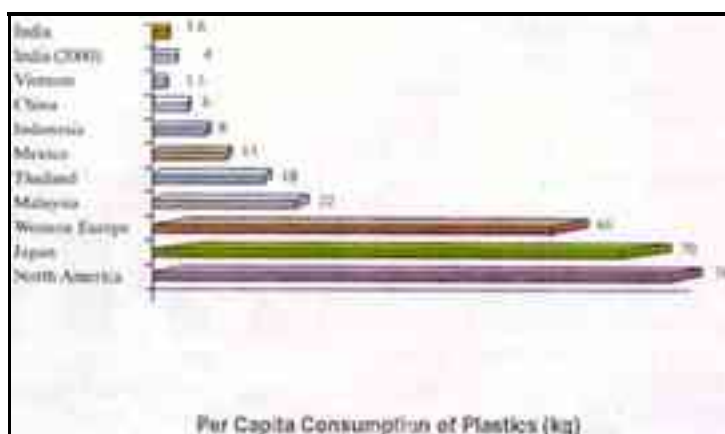
Polymer demand in India has consistently recorded double growth rates, trebling every 10 years !

Furthermore, the depletion of already scarce natural resources has established plastics as the material of choice in innumerable applications. For instance, in packaging, plastics are increasingly replacing jute, paper, wood, glass and metal. Even traditional areas, such as agriculture, area also using plastics as part of modern scientific methods for packaging.

India's current per capita consumption of 1.6 kg of plastics is expected to rise to around 4 kg. By the year 2000. This 2.4 kg. Rise represents demand for an additional 2.4 million tonnes of commodity polymers

It is felt that the maturing of the economy will witness a change in the shares of the end use sectors employing plastics. While consumption of plastics in agriculture, building and industry will stabilize, the demand from the consumer products industry and for packaging material will command an increasing share and by the turn of the century, these two segments alone will account for two-thirds of the demand for commodity polymers. Even today, packaging is the major application of plastics accounting for 52 per cent of plastics consumption. The trend is expected to continue.

Over the past 25 years, a countrywide network for collection of plastics waste through rag-pickers, waste collectors, waste dealers and recycling enterprises (numbering around 20,000) have sprung up in India. Being promoted in an era of shortage of raw materials and high import tariffs, this economy-driven development has been rated as complementary and parallel to the virgin plastics industry. Over 60 percent of the plastics waste (around 800,000 tonnes) generated in the country is recycled and used in the manufacture of various plastics products. About 2000 units recycle around 60 per cent of the plastics waste generated in the country. Which is the highest in the world (Europe: 7%, Japan : 12%, China : 10% and S. Africa : 16%). This activity is valued at Rs. 2,5000 crores per annum. By 2002, around 2 million tones of wastes generated will go in for recycling.



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PLASTICS WASTE MANAGEMENT

DELAYED DISPOSAL OF PLASTICS

It has been noticed that delay in the disposal of plastic wastes is an important feature of plastics wastes in India. This delay at the consumers' end is in contrast to the behaviour of their counterpart in advanced countries. This is due to the tendency of the people not to reject the shopping bags, milk pouches, mineral water bottles etc. upon first use, unless it is made of poor quality recycled plastics waste (this is reflected in its appearance and dirty colour). Their secondary/tertiary use continues to flourish unless bag/packaging material becomes completely unserviceable. So is the case with used plastics containers and even partially - broken plastics, moulded consumer articles, like buckets, baskets, jerry cans and the like. Here again the ingenuity of a few individuals has brought to the scene, the so-called 'Plastic-mechanics'. These mechanics visit various residential localities on weekdays and offer their services to repair on the spot, broken plastics articles by the simple process of 'fusion'. While this culture enables enhancing the economic utility of the commodity, it also results in delaying the disposal of plastics. So successful is the style of delayed disposal of a household 'plastics article' that a plastics mechanic claims to earn on an average Rs.75/- per day. In that sense, waste minimization, reuse and materials recycling concepts are being practiced in India.

So we have a situation, wherein a major portion, accounting for 60-80 per cent of India's plastics waste, is collected and segregated to be recycled back for further processing into items for the consumer. The balance unutilized waste remains uncollected, strewn on the ground, littered around in open drains or in unmanaged garbage dumps. The collection of such solid waste including the one recycled three, or even four times earlier, is not only uneconomical for recovery of material, but also unhygienic and undermines the environmental benefits of materials recycling. Hence, these indiscriminately disposed solid plastics wastes are of concern in view of causing chokage of municipal sewers and blocking of storm water run-off particularly in hilly areas besides aesthesis nuisance.

Such unclaimed plastics wastes together with Municipal Solid Waste, when incinerated can provide an economical source of energy with desired calorific value. Technology based systems of incineration, the contributions of plastics waste in general and dirty plastics waste in particular together with MSW for recovery of heat energy is encouraged the world over. In fact plastics wastes can be a fuel for the future. It is estimated that plastics waste is a fuel that can be burnt to produce nearly 10 per cent of Europe's domestic electricity and heating, and replace over half of the coal imports of Western Europe. Similar technology developments in India need to be explored in the near future for better and cleaner management of plastics waste.

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PLASTICS WASTE MANAGEMENT

THE TASK FORCE

The Ministry of environment and Forests (MOEF) is seized of the various social, environmental and technical issues related to the growth and diversification of the plastics industry, the generation of post consumer wastes and the subsequent problems of collection and disposal. Issues relating to plastics waste management had been debated in the National Waste Management Council of the MOEF since 1993 and a background paper was circulated among local authorities and the plastics industries.

For disciplining and regulating the growth of plastics waste industry, and to take a comprehensive view of the matter for the purpose of identifying the measures to be undertaken for management of plastics waste, the Government constituted a National Plastics Waste management Task Force under the Chairmanship of the Chairman, Central Pollution Control Board in September, 1996. The tenure of this Task Force was extended till August, 1997 to enable the Task Force to complete its work.

The members of the Task Force included experts from the plastics industry, IPCL, NOCIL, Trade Associations, representatives of FICCI, CII, Shri Ram Institute for Industrial Research, Department of Chemicals and Petrochemicals, Building Materials & Technology Promotion Council, CPHEEO ministry of Urban Affairs & Employment and the Municipal Corporation of Delhi. The Task Force had the following objectives:

1. To formulate a strategy and prepare an action programme for management of plastic waste;
2. To propose incentives/penalties/levies for checking the growth of plastics packaging waste; and
3. To prepare guidelines for packaging using plastics materials

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PLASTICS WASTE MANAGEMENT

PLASTICS WASTE INDUSTRY

The plastics waste industry has diversified its activities over the past 25 years. However, this diversification has not been accompanied with an appropriate body for plastics waste management in the country. The management of plastics wastes in India presents an interesting and economically feasible solution to the commonly labeled 'menace' of littering plastic wastes in public places. The collection of plastic wastes is the source of livelihood for the innumerable 'rag pickers' or waste collectors who are followed by the kabadiwala and waste dealers. In most cases, an entire family is involved in this trade. Plastics waste collection is termed as a 'lucrative' business as against paper, cardboard, glass bottles and metal cans. A typical kabadiwala in Delhi displays the following rate list:

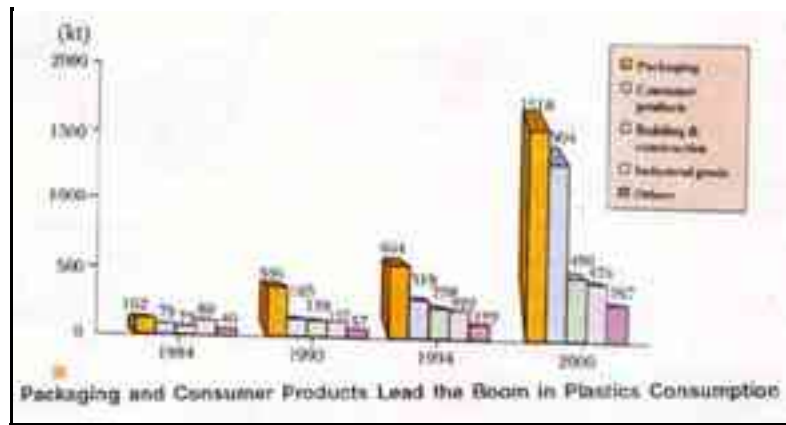
News Papers in English	: Rs.4-5/kg.
News Paper in Hindi	: Rs.3-4/kg.
Magazines	: Rs.3-3.50/kg.
Iron/Loha	: Rs.5.50/kg.
Plastics waste (mixed)	: Rs.12-15/kg.
Beer Bottles (per bottle)	: Rs.2.00

Evidently, the collection of plastics waste is more remunerative vis-à-vis other consumer wastes. Wastes generated from cold drinks/coffee/ice-cream cups and catering containers, which are mostly made of polystyrene, fetch anything between Rs.15 and Rs.25 per kg. Clear packaging film and polypacks are also attractive plastics waste items that fetch as much. India's plastics wastes recycling industry presently handles over 0.75 million tonne of different types and grades of plastics waste, including around 38,000 tonnes of in-house plastics scrap, which together at the recycled stage are valued at around Rs.2500 crores. With the expected consumption of plastics ranging between 4 to 5 million tones by the year 2001, and corresponding growth of packaging applications (flexible and rigid) including PET bottles and containers, the waste generated would vary between 1 and 2 million tones every year.

Field visits to recycling/reprocessing units and waste dealers markets have brought to light the need for up gradation of the working conditions of operations, as also the recycling technology. Also, it is important to pay some attention to the social status of rag-pickers and waste collectors who contribute towards clearance of plastics waste from public places and thus play a key role in the environmental management of plastics waste.

Packaging is the major application of plastics. Out of 1.88 million tones of plastics consumed during 1995-96, over 52 per cent was accounted for packaging applications. This trend is expected to continue. Packaging thus becomes the major source of waste. This includes PE, PVC, PP, and Multi layer films packaging including around 30 per cent carry forward of the previous year. This makes it imperative for the plastics industry to plan its strategy and targets, technologically, socially and environmentally. This calls for up gradation and diversification of recycling capacity and technology, guidelines for managing and disciplining plastics waste, maintaining inventory of types, grades and volume of plastics waste generated from various sources, formulating specifications and codes of practices. The need to formulate and issue 'Guideline on Plastics Packaging and Packaging Waste' has been emphasized during various meetings of the Task Force. This has been based on similar Directive issued by European Union.

To promote increased use of recycled plastics, and upgrading the consumer product applications, there is also a need for undertaking development work which would aim at volume applications, like that for the building and construction industry.



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PLASTICS WASTE MANAGEMENT

ENVIRONMENTAL ISSUES

The waste plastics markets all over India are so packed and crowded with waste spilling over all (examples: Delhi - Asia's largest waste plastics market, handling and trading over 1000 tonnes of waste daily; Jolly Mohala in Bangalore and Dharavi In Bombay), that frequent fires do create environmental problems both for the workers as also for residential areas around. Both the waste dealers and local authorities have to address these issues to work out safety measures. The need has often been expressed to locate such activities in eco-friendly areas.

- Plastics packaging/carry bags/bottles/containers/trash bags;
- Plastics from Health and Medicare;
- Plastics from the hotel and catering industry; and
- Plastics from air/rail travel

The polythene carry bags have been in the news for their environmental implications, right from cradle to grave. Through various stages of their use, they get disposed via municipal garbage dumps and finally collected by rag pickers to process for recycling. Carry bags of virgin plastics are accepted as user-friendly. The problem arises when plastics are recycled for repeated use. Because these are produced from wastes, these are an apparent consumer resistance.

The basic question for polythene carry bags is whether they should at all be manufactured using recycled materials (100%) and, if so, of what grade - first, second, third or the like. With repeated recycling, not only does the carrying strength of polythene bags deteriorate, but the very appearance gets repulsive (and at times unhygienic). For consumer acceptance, the recycled material of first grade should be used and in respect of the second grade, it should be a blend of 50:50 (recycled:virgin). However, third grade recycled material use should be discouraged for the manufacture of carry bags. To sustain the use of plastics through carry bags, certain gradation and acceptable consumer quality must be insisted and adhered to by the manufacturers. The recycled polythene bags are normally priced in the range of Rs.45 to 50 per kg., whereas for the virgin clear/brightly coloured bags, the price per kg is around Rs.80. What is worse is that a major volume of more that once recycled bags remain on ground, and are not collected by the rag pickers as their resale value gets reduced, these together with other food, vegetable oil and detergents packaging (PP, Polyester, multiplayer film) when not collected/recycled, become an eye-sore.

In respect of health and Medicare, items in plastics, such as disposable syringes, glucose bottles; blood and uro bags, intravenous tubes and catheters, and surgical gloves, though designed for single use and manufactured with appropriate plastics materials, find themselves under attack, when these are carelessly disposed of. Some of these items even return to the market without disinfections. There have been reports of organized picking from garbage dumps around major city hospitals. Such a practice is dangerous and calls for strict action. MOEF has notified rules for management of bio-medical wastes, which includes plastics wastes.

Plastics items (commonly of PS/PE/PVC/PET) used in the hotel and catering industry, air and rail travel are prominently identified, and after their use, are seen carefully disposed of through 'Dustbins/trash bags' placed in the vicinity. These disposed plastics items are quickly cleared by rag pickers/wastes collectors, and go for recycling at a premium price. Depending upon the scale of operation, a fast-food/catering establishment generates between 5-75 kg. of plastics waste/day. Whatever may be the merits of disposables in plastics, once their useful service life is over; they are looked down upon as eyesores in the garbage dumps.

PVC mineral water bottles, and PET liquor and mineral water bottles have invaded the market in India, as a replacement for conventional glass bottles. It is reported that around 7000 tones of PVC resin per annum are consumed for the manufacture of mineral water bottles and about 70 per cent gets transferred to the waste

stream within four days after one time use. Because PVC is of premium grade, the used bottles are efficiently collected back for materials recycling. However, in respect of PET mineral water and liquor bottles, which are currently marketed in India, around 50 per cent find themselves in waste stream within a week. A 10,000 tonnes capacity exists for manufacturing and marketing of PET mineral water/liquor bottles and assorted containers. Because of durability and glass-like clarity of PET bottles and containers, a major share of these becomes a long-term asset for the users. However, around 50 per cent of current consumption of 6000 tonnes of PET mineral water/liquor bottles used, are available for recycling. Considering the average weight of 27 g per bottle, 3000 tonnes of PET would amount to 115 million numbers of bottles going into waste that largely remains uncollected and unsold. This figure will multiply fourfold by 2001. A system of organized collection of PET bottles waste is required to be encouraged through waste collectors/dealers. Recycling of PET waste is undertaken in India by units in Madras, Gajraula, Kanpur and Mumbai. The existing recycling capacity is required to be fully utilized with generation of PET waste from increased use of mineral water/liquor and soft drink bottles. Appropriate product applications are to be identified and promoted in India.

Depending upon the capacity, a passenger airline per trip generates 5-10 kg. of plastics waste. This includes PE/PP film, PS cups, PVC/PET bottles. This waste is identified and graded at source and goes for ready recycling.

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PLASTICS WASTE MANAGEMENT

REGULATION AND LEGISLATION: PRESENT STATUS

Until recently, there has been no definite environmental policy and legislation framed in respect of plastics waste management in India. The HP Non-biodegradable Garbage (control) Act 1995, introduced by the Government of Himchal Pradesh envisages prohibition of throwing or depositing plastic articles in public places and to facilitate the collection through garbage in identifiable and marked garbage receptacles for non-biodegradables, placed at convenient places. Provisions of this Act, including those of existing laws, for imposing deterrent penalties may be referred to by the local authorities.

The Ministry of Environment and Forests has issued the criteria developed by CPCB in association with the Bureau of Indian Standards for labeling 'plastic products' as 'Environment - friendly' under its 'Ecomark' scheme. One of the requirements for plastic products is that the material used for packaging shall be recyclable or biodegradable. Suggestions for recycled plastic products are quoted.

At present, there are no guidelines or codes of practices for collection, sorting and recycling of plastics waste in the absence of which the conventional practices are adopted and accepted, though need has been voiced to upgrade these, both by the authorities and NGOs. However, while formulating Indian standard specifications for various plastics products, used for critical applications, like plastic piping system, water-storage tanks, packaging for food articles etc., a clause is included which reads "no recycled plastics waste shall be used". An exercise has also been carried out by the Ministry of Environment and Forests in association with the Bureau of Indian Standards to include use of recycled plastics wastes wherever appropriate in the manufacture of plastic products, and this shall be specified accordingly in the relevant Indian Specifications.

The Prevention of Food Adulteration Department of the Government of India has issued directives of various catering establishments to use only food-grade plastics, while selling or serving food items. Rules have specified use of 'food-grade' plastics, which meet certain essential requirements and are considered safe, when in contact with food. The intention is to prevent possible contamination, and to avert the danger from use of recycled plastics. The scheme announced in February, 1995, is being implemented in cooperation with the Bureau of Indian Standards (BIS) which has formulated a series of standards on this subject. The Bureau of Indian Standards Sub-Committee PCD 12:1& is charged with formulating guidelines, codes and specifications for recycling of plastics. Two documents viz. 'Guidelines for Recycling of Plastics', and 'Recycled Plastics for manufacturing of products - Designation' have been finalized by BIS. These two documents, together with the 'Guideline on Plastics Packaging and Packaging Waste' are to be implemented by the industry.

Plastics have become a symbol of our throwaway society. They are non-biodegradable, but recyclable. With the technological advances, plastics recycling are economically feasible for plastics packaging. Recycled materials compete with virgin materials in terms of price and performance. It is an established fact that without reuse, total/absolute diversion of material from waste stream is impossible.

To enhance the demand for recyclable materials, various mechanisms and options are to be assessed. These include: user charge or a tax to ensure that individuals and companies bear the cost of solid waste containing the plastics they produce; government procurement policies, i.e. certain percentage of purchased products be recyclable or made of recycled materials, or price preference on items containing recycled material be encouraged, and finally, through recycling standards (meaning thereby that either the products or packaging be made of recyclable material, i.e. the material must reach a specified recycling site, or products or packaging consist of a certain percentage of recycled material and this should be appropriately labeled on the product. The advantage of recycling standards, if properly designed and applied is that they provide mechanism for coordinating recycling activities, and for establishing board-based recycling infrastructure. As an illustrative and useful example for recycling, the one taken by the Irish business and Employers' confederation and the Irish Department of the Environment at Dublin Castle, deserves special mention. Repak is the result of a challenge to

industry to develop a scheme funded and organized by the industry to recycle packaging waste. It is an excellent example of a self-regulatory approach to implementation of environmental policy. In the United States, competitive non-regulatory recycling systems are responsible for recycling over 25 per cent of the total municipal wastes, with recycling having doubled over the past decade.

Plastic Waste Management Status In India

	1995-96	Estimated by 2001
	(Thousand Tonnes)	
Consumption of Plastic	1989 (-%)	4374 (-%)
Waste available for Recycling	800 (-%)	2000 (-%)
Total	2689	6374

(% of plastic waste in MSW 1-4% by wt.)

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PLASTICS WASTE MANAGEMENT

STRATEGY AND ACTION PROGRAMME

As a result of various meetings and discussions with the industry and experts, and the field visits to waste collection and recycling centers, the Task Force identified the following strategy and action programme.

Target

Evolving integrated plastics waste management policy, with priority for increase in total recovery in terms of materials and energy.

Mission

1. Raising consumer and public awareness, upgrading methodology of waste collection and segregation promoting social and environmental status of waste collectors/rag pickers, who are responsible for collection of plastics waste in India.
2. Evolving plastics waste management system with appropriate guidelines and directives; and
3. Promoting up gradation, technically and environmentally, of recycling/reprocessing systems/technologies, and end products applications with desired recycled content, and formulating guidelines.

Issues of Concern

Communicational

- Social and consumer awareness, to promote proper disposal culture through identified and appropriately located dust bins, both in public places, residential, institutional and industrial areas, including hotels and catering establishments, through audio-visual media, publications/newsletters/video films/posters etc./exhibitions/seminars/workshops.

Technical & Environmental

- Plastics packaging, consumption, waste generation, collection and disposal.
- Evolving plastics waste management system;
- Upgradation of materials recycling technology;
- Social and environmental issues relating to working conditions in plastics recycling industry;
- Limits to materials recycling; and
- Technology-based incineration to recover energy.

Industrial

To promote Government-industry interaction, and consumer awareness in respect of plastics waste recycling and demand for recycled content in products through:

- Systematic applications develop-mental research for promoting end products, their codification/standardization into critical and non-critical areas;
- Industry initiatives and stewardship, by promoting shared producer-user responsibility.
- Legislation approach; Incentives/penalties for checking the growth of plastics packaging waste;
- Industry-funded and Government supported institutional setup with a view to promoting industry's cause towards plastics waste management through setting up of Indian Centre for Plastics in the Environment (ICPE).

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PLASTICS WASTE MANAGEMENT

INTEGRATED APPROACH FOR PLASTICS WASTE MANAGEMENT

The strategy for effective management of plastics wastes should entail the three R's: Reduction, Reuse and Recycling of wastes. Hence, the action programme suggested by the Task Force includes a package of Preventive, Promotional and Mitigative (PP) measures to achieve these objectives. The implementation of the strategy will require active involvement of all sections of the society in which the industry and the civic authorities are the key partners. They have to act in unison to discharge their responsibilities. Public participation and catalytic support from the Government are the two important pre-requisites for implementation of the strategy.

The action programme for implementation of the strategy covers the following components:

1. Preventive measures: Minimizing use of plastics, segregation of wastes and compliance of environmental guidelines
2. Promotional measures: Improvement in waste collection system and recycling technologies.
3. Mitigative measures: Public awareness programme and penalties for littering, fire protection and safety measures. .

Institutional Mechanism

Establishment of a network of concerned Industry Associations, and the Indian Centre for Plastics in the environment (ICPE), for Government-industry interaction.

ACTION PROGRAMME

1. Guidelines on Plastics Packaging
Packaging constitutes 52% of plastics consumption. Accordingly, this issue was addressed by the Task Force and 'Guidelines on Plastics Packaging and Packaging Waste' were prepared. Guidelines lay down measures aimed, as the first priority, at preventing the production of packaging waste, and as additional fundamental principles, at reusing, at recycling, and other forms of recovering packaging waste, and hence, at reducing the final disposal of such waste.
2. BIS Guidelines/Specifications
The manufacture of products using recycled plastics should follow appropriate BIS "Guideline for Recycling of Plastics" and Indian Standard "Recycled Plastics for the manufacturing of Products-Designation", which have been finalized by Bureau of Indian Standards (BIS).
3. Limits to Recycling
Beyond Type-II materials; (post-consumer plastics waste of unknown origin having visible impurities, as per BIS Guideline), recycling of plastics waste should be banned. Alternatively, use of such plastics wastes (beyond Type-II) should be resorted to for energy recovery. Recycling of multilayer film packaging and plastics wastes beyond Type-II also be considered for use as composites and volume applications, such as substitutes for wood/concrete products.
4. Circulation of Dirty Coloured Plastics Carry-bags/Products
Consumer items, such as toys, water bottles, Kodum, carry bags etc., should not be allowed to use recycled plastics wastes, beyond Type-I (100%). Instead a blend with virgin plastics be encouraged (50:50), and efforts should be made not to downgrade the quality and performance of end products. Reprocessors using dirty plastics wastes for the manufacture of consumer items will be warned of the environmentally unsound practice. Manufacture of dirty coloured carry-bags with visible contamination and their circulation in the market should be banned.
5. Recycling Logistics
The integrated plastics wastes management needs the cooperation and participation of plastics industry, local authorities and the consumers. The industry needs to take the lead in supporting pilot collection

schemes with the objective of channelising more and more post-consumer plastics wastes for recycling.

6. Consumer Awareness Programme
Social and environmental issues relevant to the plastics industry should be addressed by the industry. For this, it is recommended that a country-wide consumer awareness programme be launched from time to time through media, exhibitions, newsletters, publications, video films, posters etc., for the education of common man, environmentalists, Government Departments, trade associations, educational institutions etc.
7. Applications Development Research
Appropriate applications development research programme should be launched by the industry in association with, and participation of waste reprocessors, government agencies CSIR, DST and other R&D institutions. In order to prevent repeated generation of plastics wastes, there should be shift from consumer products to volume applications, like synthetic lumber etc., where recycling plastics wastes could be technologically absorbed.
8. Penalties for Littering
Post-consumer plastics wastes is primary source of littering, as seen around in public places. This should be contained by promoting dustbins culture. Local authorities should promote anti-littering measures; enforce provisions of existing laws, and by imposing deterrent penalties. In this connection, it is recommended that provisions contained in HP Non-biodegradable Garbage (Control) Act, 1995 and rules 1996, may be referred to.
9. Incentives
In order to prevent indiscriminate generation of plastics wastes and promote recycling incentives, technical and financial assistance should be provided. Plastics products with appropriate recycle content should attract price preference/incentives. To promote increased use of plastics wastes, incentives, like concessions in sales tax, excise duty and custom duty, for upgradation of recycling technology, import of technology, equipment and machinery, may be considered for the better use of plastics wastes. Incentives should be provided by the plastics industry to ragpickers and NGOs for increased collection of plastics wastes from public places.
10. Recycling/Reprocessing machinery Equipment
These are already being manufactured in India. The existing units mostly depend upon local machinery. However, there is a scope of upgradation of recycling technology in tune with the scale of operations, and use of improved machinery. The plastics industry/waste recycling units should compile and inventory of such machinery and their requirements.
11. Hazardous Plastics Waste
Plastics waste generated as a result of use of large number of products in Health and Medicare, i.e. hospitals, nursing homes/clinics, should be carefully segregated. Infected plastics waste products should not be resorted to for materials recycling. Same is applicable in respect of plastics containers/packaging, used for shorting of hazardous and toxic chemicals including insecticides, pesticides, and petroleum products. These should be carefully segregated from waste stream, and not resorted to materials recycling, but incinerated as per Notification on Bio Medical Waste issued by Ministry of Environment and Forests. Only clean packaging waste, like films, EPS shaped mouldings, glucose bottles etc., are to be segregated for materials recycling.
12. Fire Protection and Safety Measures
Appropriate fire protection/safety measures should be planned in and around plastics wastes dumps, waste dealers markets, and reprocessing units, to prevent fire accidents. Waste dumps and dealers' markets should be located in specified industrial areas.
13. Networks for Concerned Industry Associations
To facilitate monitoring growth and diversification of plastics packaging industry - both flexible, like carry/shopping bags, multilayer film packaging, film wraps etc., and rigid packaging, like EPS shaped moulded packaging, blow moulded containers, PVC PET bottles, disposables used in hotel and catering establishments, it would be necessary for each of these products manufactures to form into individual Associations, with a view to promoting waste management as a result of their use, encouraging organized recycling, and upgrading its technology. In this connection, the plastics industry should resort to concepts of minimizing plastics waste, reuse and increased materials recycling.
14. Centre for Plastics in the environment: Government - Industry Interaction
The Task Force recommended setting up of an autonomous Institution under the name "Indian Centre for Plastics in Environment" (ICPE). Social, environmental and technical issues in respect of plastics industry/processors with specific emphasis on waste, should be handled by this Centre based on the pattern followed by similar institutions abroad. The plastics industry is advised to work out modalities of funding and operation, and finalize and setup of the Centre.

To achieve the targets (by 2002), relating to above activity, following Action Plan has been recommended by the Task Force:

1. Action by the Ministry of Environment & Forests

- (a) Announcement of strategy and action programme for plastics waste management in the country;
- (b) Issuance of "Guideline on Plastics Packaging and Packaging-Waste";
- (c) Coordination with the Bureau of Indian Standards for issuance of guidelines and standards on recycled plastics;
- (d) Promotion of activities towards better awareness in respect of plastics waste and recycling; and
- (e) Constitution of Implementation and Monitoring Committee for follow-up of the recommendation of Task Force.

2. Action by the Industry

- (a) Setting up of the Indian Centre for plastics in the Environment;
- (b) Implementation of Guideline on Plastics Packaging and Plastics Waste; BIS Guidelines on Recycling Plastics;
- (c) Taking up of lead role in establishing effective waste collection system through pilot projects;
- (d) Participation in Implementation and Monitoring Committee; and
- (e) Establishing network of concerned industry Associations for promoting waste management and organized recycling.

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