



REPORT OF THE EXPERT COMMITTEE TO CHECK THE HEALTH AND ENVIRONMENTAL HAZARDS IN THE USE OF PLASTICS



Presented To
The Principal Secretary to Government
Environment & Forests Department
Chennai - 600 009



In pursuance of the Orders of the Madurai Bench of Madras High Court
in W.P.(MD) No. 11753 of 2010 and G.O. Ms.No. 92 Environment & Forests
(EC -2) Department , dated 10.08.2011

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The 'Expert committee to check the health and environmental Hazards in the use of plastics', is grateful to the Government of Tamil Nadu for providing the opportunity to serve as members in the Committee that dealt with an issue of deep concern in the life of every citizen in the modern day life style.

The Committee wishes to place on record its appreciation for the comprehensive support provided by Thiru C.V. Sankar, I.A.S., Principal Secretary to Government, Environment and Forests Department from time to time during the proceedings of the Committee.

The Committee also thankfully acknowledges the valuable contributions made by the office bearers and members of Chennai Plastics Manufacturers' Association and Tamil Nadu Plastics Manufacturers' Association during the Committee meetings as well as through their correspondence.

The Committee expresses its gratitude to the faculty from Department of Chemistry/Mechanical Engineering, Annamalai University, Chidambaram for sharing their research findings on 'Evaluation of Refuse Derived Fuel from Waste Plastics' during the meeting.

The Committee wishes to acknowledge the services offered by the TNPCB in the smooth conduct of the meetings. The Committee specially acknowledges the contribution of the NGO member Ms. Shweta Narayan for her valuable comments and inputs on the draft report.

The Committee appreciates the full-fledged involvement of all the members/representatives of the Committee/Sub committees I & II in the deliberation of the Committee and in providing useful inputs.

EXECUTIVE SUMMARY

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Preamble:

The Government of Tamil Nadu vide G.O.Ms.No.92, Environment and Forests (EC-2) Department dated 10.08.2011, constituted an 'Expert committee to check the Health and Environmental Hazards in the use of plastics and to find the ways and means to intensify plastic awareness camps', as suggested by the Hon'ble Madurai Bench of Madras High Court in their order dated 10.11.2010 in W.P. (MD) No.11753 of 2010. The Committee has been assigned with the responsibilities to evaluate the magnitude in use of plastic including throw away plastic, to assess the environmental and health effects in its usage, to evolve plan of action, to suggest alternatives, to suggest measures for creation of awareness, to advise the competent authorities, to mobilize action against the defaulters and to study the pollution caused during production, usage and disposal.

Expert Committee Meetings:

Dr. T. Sekar, I.F.S., Chief Conservator of Forests & former Director of Environment, and Director of Environment have been designated as Chairman and Member Secretary/Convener of the committee, respectively with members from the Industries, Rural Development and Panchayat Raj, Public Health and Preventive Medicine, Education, Municipal Administration and Town Panchayat Departments, CIPET, Anna University, TNPCB, Chennai Corporation, Women Development Corporation and a NGO member Ms. Shweta Narayan. The Committee held their meetings at periodical interval spanning over a year. The Committee had their sittings on 23.09.2011, 24.01.2012, 23.04.2012, 09.07.2012, 14.09.2012 and 16.10.2012. The Committee received assistance from the Sub-committees I & II entrusted with their respective responsibilities.

Initial Reviews:

The Committee reviewed the existing legal provisions on plastic waste management and the present status of agencies responsible for

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implementation of the same. The salient features of Plastic Waste (M&H) Rules 2011, including the manufacture of carry bags not less than 40 micron, Extended Producer's Responsibility, registration, explicit pricing, role of TNPCB and Municipal Authorities etc., have been reviewed.

Also, the Committee examined the role and responsibilities of various Government agencies in management of plastic wastes. TNPCB's role in monitoring the carry bags production in not less than 40 microns, the role of local bodies in setting up of collection systems and to encourage the use of plastic wastes for road construction, co-incineration, etc. were also studied. The absence of specific responsibility entrusted on District Administration and DoE in the present context was also discussed.

Methodology – ToR wise Analysis:

(i) While evaluating the magnitude of use of plastics, it is observed that cost of the plastic is less and convenient in use. As a result, the plastic bags are discarded as waste usually after a single use. The growth rate of 15-20% per annum is reported in developing countries. In Tamil Nadu, annually 5.0 lakh tonnes of virgin materials and 1.0 lakh tonne of recycled material are used in manufacture of plastic bags. The 7 categories of plastics viz., PET, HDPE, PVC, LDPE, PP, PS and Others with their respective applications have been examined. The annual per capita consumption of plastics in India is 5.0 kg. against the world average of 26.0 kg. and the country's consumption is observed as 3% of global consumption. Overall 5% AAGR is expected globally with 11% AAGR in bottle grade PET. Polyolefin (PE-33.5% and PP-19.5%) accounts 53% of the total consumption, followed by PVC with 16.5% and PS at 8.5%.

In Tamil Nadu, 3.6 lakh tonnes of plastics is consumed and 2123 plastic manufacturing units are in operation. Out of this, 464 units are using recycled plastics, which are to be monitored regularly. The life cycle analysis of the plastics indicates that the non-recyclable portion constitutes 20% of plastic waste, comprising of PC, ABS, Thermocol,

Malamine etc., which is cause for concern. Plastics make 8-9% of the total solid waste by weight against 30% by volume. In Tamil Nadu, 225 Tonnes of non-recyclable plastic waste has been estimated to be generated every day.

(ii) In analyzing the emission and occupational hazards associated with the manufacturing of plastic bags/packageging, it is observed that no scientific study report is available on the emission of volatile organics or oxides of heavy metals, occupational hazards etc., in the manufacturing process. The conditions for emission of noxious gases are not created as the extrusion process of plastic bag/ manufacturing units is undertaken at 110°C – 150°C. There is no evolution of any gas during softening process as the plastic involved in these industries softened below 170°C. Also no water pollution is envisaged as the water is used only for cooling purposes in closed circuits. The solid wastes in the form of damaged or torn out bags or packaging is upto 2%, which is also either directly reused in the process or sold out for further recycling. The TNPCB's monitoring with respect to air and water pollution during manufacturing is considered adequate. However, the status of monitoring with respect to the minimum thickness by the plastic units requires further strengthening.

(iii) While examining the health effects on usage and disposal of throw away plastics, the Committee observed that the plastic chemicals like phthalates, plasticizer, stearic acid etc., are bio-accumulated, which act as hormone mimicking chemicals in the life cycle resulting as a barrier in deciding the gender and reducing the fertility rate. The habit of using plastic bag/packageging for serving/dispensing the hot and fat food makes these plastic chemicals to leach into the food stuff. Styrene from PS, plasticizers from PVC, anti oxidants from PE, acetaldehyde from PET, etc., tend to migrate from plastic bags/packageging to food stuff. In general, all the seven categories of plastic cause varying health effects from skin problems to suspected carcinogen when they have direct contact with the food stuff.

In the study of problems due to disposal of plastic waste in Municipal Solid Waste dump sites, no scientific report on leaching of toxic materials attributable directly to plastic waste, which contaminates the soil and ground water has been come across. The possibilities in evolution of hydrogen chloride and other emissions are reported due to accidental or negligent burning of PVC or other chlorinated plastics. The plastic wastes are observed to be embedded at different soil depths due to long term disposal, which prevents infiltration of rain water and thus reduces the ground water recharge. Due to the non bio degradability, these plastic wastes exist over long period and the plastic carry bags along the roadside in tourism spots, residential areas, mass gathering locations etc., cause severe and continuous negative impact in the aesthetics. Also, because of their hydrophobic property, the plastic wastes when gets access to water bodies block the sewer/drainage resulting in foul odour, spreading of diseases due to stagnation/overflow of sewage. The death of livestock is also reported due to indigestion when the animals swallow the food wastes along with the plastic bags/sheets.

(iv) The environmentally unfriendly practices in unhygienic use of plastics and unscientific disposal of plastic wastes make the temple areas, tourism spots, etc., vulnerable to piling up of plastic wastes. The existence of non-recyclable portion of the plastic wastes in MSW makes the same unfit for composting and resulting in the release of foul odour gases like methane and hydrogen sulphide.

(v) In reviewing the Plan of Action to tackle the problems on disposal of plastics, the co-incineration in cement industries as supplementary fuel with 1.5% of coal as recommended by CPCB has been practiced in Tamil Nadu. Plastic roads to the tune of 10% of shredded plastic wastes in 1.18 – 4.36 mm size are reported to be good for better strength and performance. Also, 1.0 kg of plastic waste yields approximately 0.78 Kg of fuel derivatives consisting of 20% petrol, 50% diesel and 30% heavy fractions.

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(vi) While evaluating the action plan for manufacturers, traders, recyclers, local bodies and users on minimizing the plastics, strict implementation of Act/Rule with respect to thickness, size and type is required both at manufacturing and usage, followed by periodical review. Encouraging the higher volume packaging instead of low volume sachet, encouraging the use of conventional and naturally made products, declaring the Government offices as 'Throwaway Plastic Free Zone', creation of awards at District/State level and sustained awareness campaign are suggested.

(vii) In finding the alternatives to plastics, the degradable plastics with IS/ISO 17088 : 2008 (which is upto 10 times costlier), use of naturally made alternatives viz. cloth/jute bags, paper cups, glass, stainless steel tumblers, mutka, cotton/jute threads, higher volume containers, plaintain/arecanut/ lotus leaves, paper moulds, card boards, cut papers etc., are some of the alternatives suggested for retail dispensing, serving and packing in commercial establishments, pre-packing of daily consumables and for the heavy packing of household articles.

(viii) As for the methods for creation of awareness, it is envisaged that the campaign may have to evolve into a social reform and all departments make a massive drive by way of propaganda. The campaign adopted in 'Plastic Free Kanyakumari District - By and For the People' is appreciated.

(ix) The Committee suggests the Government of Tamil Nadu to enact a separate Act / Rule and stress on implementing the provisions of existing rules in letter and spirit by the concerned authorities with co-ordination from the District Administration.

The first part of the report is devoted to a general description of the project and its objectives. It is followed by a detailed account of the work done during the period covered by the report. The results of the work are then presented, and a conclusion is drawn from the findings. The report is written in a clear and concise style, and it is well organized and easy to read.

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RECOMMENDATIONS

After detailed deliberations in the six meetings and taking into account inputs from the members, the Committee recommends the following for consideration of Government of Tamil Nadu:

Policy / Legal:

- * Adoption of 'Throwaway Plastic (Avoidance) Policy'
- * Separate Legislation for Tamil Nadu in the style of 'Non Bio-Degradable Garbage (Control) Act/Rules' with provisions for manufacturing carry bags of thickness of not less than 60 microns and with the minimum size of 8 X 12 inches.
- * Inclusion of plastic cups/containers, disposal methods and compounding of offences in the proposed Act/Rule.
- * Strict enforcement at the stage of manufacture as well as usage, regarding the size/thickness specifications, supported with periodical review.
- * Incorporation of awareness campaign in coordination with the District Collector in the Act/Rule itself.
- * Banning Throwaway Plastics in mass gathering functions.
- * Declaring all the Government Offices as 'Throwaway Plastic Free Zone'
- * Enforcing the Extended Producers' Responsibility on the throwaway plastic manufacturers with fiscal and administrative clauses.

Action Plan for utilizing/reducing plastic waste:

- * To utilize plastic waste for distillation to obtain fuel derivatives like diesel, gasoline and heavy fractions.
- * To relay plastic roads using plastic wastes to the tune of 10% substitution of the bitumen used.
- * To use plastic wastes as supplementary fuel at 1.5% of the coal used in cement industries.
- * To encourage higher volume packaging by restricting the use of sachet etc.

Socio-Economic Measures:

- * Registration of rag pickers in the local bodies with provision for regular health check-ups, group insurance and low cost housing.
- * Setting up of the industrial park of plastic recycling units.
- * VAT exemption on the articles made from recycled plastics.
- * Supporting SHGs in production/supplying of plastic alternatives.
- * Instituting separate Throwaway Plastic (Avoidance) Award at District/State level.

Awareness:

- * Sustained awareness programmes for three years with monitorable output.
- * Creation of Throwaway Plastic (Avoidance) Standing Committee at District level, to be chaired by the District Collector.
- * Provision for funding for Throwaway Plastic (Avoidance) Awareness in the State Environment Protection Fund and from TNPCB.
- * Financial incentives to the degradable plastic manufacturers.

Further Studies to be undertaken:

- * Study by National Institute of Epidemiology, Ayapakkam, Chennai on the occupational health hazards in the plastic manufacturing units and at the dump sites in coordination with DoE/ TNPCB.
- * Creation of R&D facilities for development of alternative to plastics and plastic recycling processes with necessary financial support and designating DoE/TNPCB as nodal agency.

Dr. H. Malleshappa, I.F.S.,
Director of Environment and
Convener of the Expert Committee
Chennai

Dr. T. Sekar, I.F.S.,
CCF (P&D) and
Chairman of the Expert Committee
Chennai

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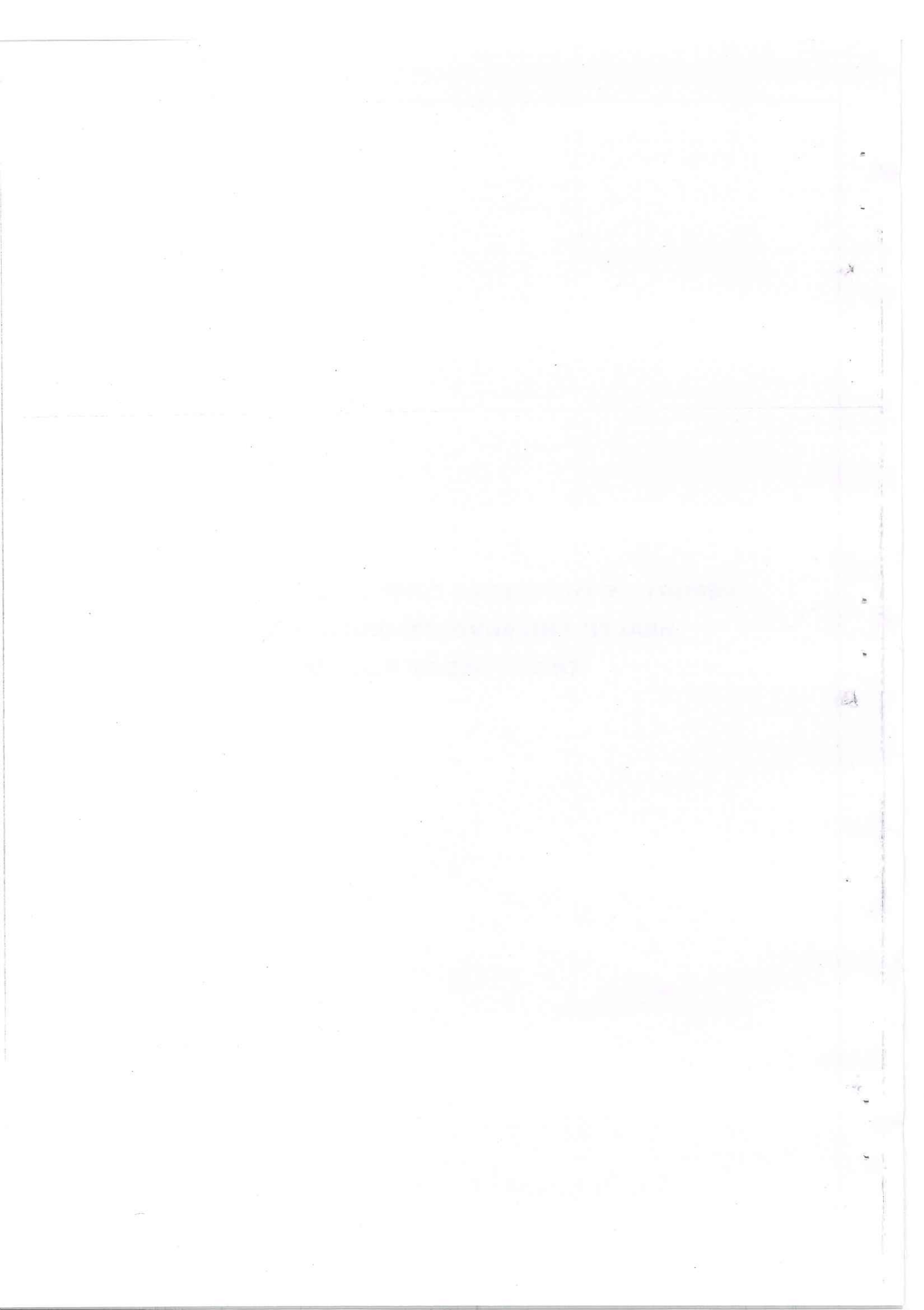
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1. PREAMBLE

The Suo-Motu Writ Petition (MD) No 11753 of 2010, praying for direction to the respondents viz., (1) Secretary to Government, Environment and Forest Department, (2) Secretary to Government, Municipal Administration and Water Supply Department (3) Chairman, Tamil Nadu Pollution Control Board (TNPCB) (4) Commissioner, Corporation of Madurai and (5) District Environment Engineer, TNPCB, Madurai for taking effective and emergent steps to remove the waste materials like broken plastic, used tyres and waste papers etc. heaped in a large quantity in the vacant places near the market opposite to Thidir Nagar police station, Madurai was taken up by the Hon'ble Madurai Bench of Madras High Court.

The Plastic Manufacturers' Association sought to implead themselves as a party to the above Writ proceedings was dismissed by the Madurai Bench of Madras High Court in a detailed order dated 28.10.2010. On the action taken report filed by Madurai City Municipal Corporation and TNPCB for clearing the accumulated wastes, the Hon'ble Madurai Bench of Madras High Court has disposed the suo-motu WP in its order dated 10.11.2010 with certain suggestions/directions to State Government and other regulating Agencies.

Among other things, the Hon'ble Madurai Bench of Madras High Court has suggested that the Government of Tamil Nadu may constitute an 'Expert Committee to check the health and environmental hazards in the use of the plastic bags and plastic packaging materials in Tamil Nadu and also to evolve various measures in checking the health and environmental hazards arising out of the use of plastic bags and to find out the ways and means to intensify plastic awareness camps'.

The Government after careful examination of the said orders have constituted an 'Expert Committee to check the health and environmental hazards in the use of plastics' for the implementation of directions issued

by the Hon'ble Madurai Bench of Madras High Court. Accordingly, the Government constituted an Expert Committee vide G.O. Ms. No.92 Environment and Forests (EC-2) Department dated 10.08.2011 (Annexure 1).

Scope of the Expert Committee:

Government of Tamil Nadu have ordered that the Expert Committee shall look into issues relating to checking the health and environmental hazards in the use of the plastic bags and plastic packaging materials in Tamil Nadu and also evolve various measures in checking the health and environmental hazards arising out of the use of plastic bags and arrive at the modalities to intensify Plastic Awareness camps.

Terms of Reference for the Expert Committee:

Following are the Terms of Reference (ToR) fixed for the Expert Committee on Plastic Wastes:

- i) Evaluate the magnitude of use of plastic including throw away plastics
- ii) Environmental problems including health effects on use of plastics and disposal of throw away plastic wastes
- iii) Plan of action to tackle the problems of use and disposal of plastics
- iv) Alternatives to plastics including throw away plastics
- v) Creation of Environmental awareness among public on the harmful effects of use of plastics
- vi) Action Plan for manufacturers, traders, recyclers, local bodies and users on minimizing the use of plastics
- vii) Advising competent authorities in enacting the rules and regulation/guidelines on the production, use and disposal of throw away plastics and plastic products

- viii) Mobilizing action against environmental unfriendly practices such as dumping of plastics, unauthorized, unhygienic use of plastics and unscientific disposal of plastics etc., in public places
- ix) To study the various solid, liquid and gaseous emissions generated during the manufacturing of plastic bags, plastic packaging materials and the pollution caused to water, air, soil, health and environmental hazards caused to the society due to use and disposal of plastics and evolve necessary measures to control degradation of environment and the health hazard based on the finding of the study.

Composition of the Expert Committee:

As per the Government Order, the Expert Committee comprises of following members:

Sl. No	Name and Designation	Status
1	Dr. T. Sekar, I.F.S., Chief Conservator of Forests and former Director of Environment, Tamil Nadu Forest Department, Saidapet, Chennai-600 015	Chairman
2	Industries Commissioner and Director, Chepauk, Chennai-600 005	Member
3	Commissioner of Rural Development and Panchyat Raj Department, Panagal Building, Saidapet, Chennai-600 015	Member
4	Additional Director of Public Health and Preventive Medicine 358, Anna Salai, Chennai-600 006	Member
5	Director of Teacher Education Research and Training, College Road, Chennai-600 006	Member
6	Director of Central Institute of Plastics Engineering and Technology (CIPET), Industrial Estate, Guindy, Chennai	Member
7	Director of Centre for Environmental Studies , Anna University, Chennai-25	Member
8	Ms. Shweta Narayan H 16/19, Seevakan Street, Kalakshetra Colony, Besant Nagar, Chennai- 600 090	Member
9	Director of Environment Government of Tamil Nadu Saidapet, Chennai-600015	Member Secretary and Convener

Periodicity of meetings:

Government ordered that the Expert Committee shall meet at least once in three months to propose/review and monitor action to take/taken in pursuance of the objectives mentioned in the Government order. Further, Government suggested that the Expert Committee may constitute such Sub Committees as deemed fit to study / propose / evaluate / recommend / monitor action to fulfill its role.

Meetings of the Expert Committee:

As envisaged in the Government Order, the Expert Committee met periodically at Chennai. Accordingly, six meetings of the Committee were held on 23.09.2011, 24.01.2012, 23.04.2012, 09.07.2012, 14.09.2012 and 16.10.2012. Details of the meetings and the subjects discussed are presented in **Annexure 2**.

The Expert Committee during its first meeting on 23.9.2011 considered the need for inclusion of following members in the Committee, accordingly recommended to the Government to include the following five officials as additional members to the Committee to fulfill its role in checking the health and environmental hazards from Plastic Wastes.

- i) Member secretary, Tamil Nadu Pollution Control Board.
- ii) Commissioner of Municipal Administration/representative
- iii) Director of Town Panchayats / representative
- iv) Commissioner of Chennai Corporation / representative
- v) Managing Director, Tamil Nadu Corporation of Development of Women Limited/representative.

Accordingly, Government vide G.O. Ms. No.180 Environment and Forests (EC2) Department dated 12.12.2011 have included the above officials as additional members in the Expert Committee. Copy of the Government Order is presented in **Annexure 3**.

Two Sub Committees were formed as decided during the first meeting of the Expert Committee to deal with the various Terms of Reference assigned to the Committee and to come up with the specific

recommendations in respect of each term. Composition of the Sub committees and the tasks assigned to them are enclosed in **Annexure 4**. A discussion meeting was also held on 03.01.2012 with the Conveners of the two Sub Committees to discuss on broad parameters for preparation of their reports. The Sub committees presented their interim reports in the second and third meetings of the Expert Committee held on 24.01.2012 and 23.04.2012, respectively.



Expert Committee Meeting in Progress

The Conveners of the Sub Committee I and II presented their respective final report during the Fourth meeting of the Committee held on 09.07.12. In addition, a presentation on the Impact of 'Co-processing of plastic waste in cement industries', findings of a research project on development of fuel derivatives from plastic wastes carried out in Annamalai University were made. Views of Plastic Manufacturers Association were also heard during the above meeting and their written representations were also considered during the drafting of the report. The draft final report was presented in the fifth Meeting of the Committee held on 14.09.2012 and the views expressed by the members have been incorporated. The final report of the Expert Committee was placed before its sixth meeting held on 16.10.2012. After discussion, the same was duly approved.

Minutes of the Committee meetings are in **Annexures 5-10**.

2. EXISTING LEGAL PROVISIONS FOR PLASTIC WASTE MANAGEMENT

The Committee reviewed the salient provisions in the existing regulations relating to Plastic manufacture, usage and plastic waste Management in the country. Following are the various notifications brought out by Government of India under the Environment (Protection) Act, 1986.

Sl. No.	Notification No& date	Name of the rule	Salient aspects
1	S.O. No.705 (E)/ 02.09.1999	Recycled Plastic Manufacture and Usage Rules 1999	➤ Minimum thickness of carry bags shall not be less than 20 microns. ➤ No recycled carry bags or containers be used for storing food stuffs ➤ The District Collector is the prescribed authority for collection, segregation and transportation ➤ State Pollution Control Board (SPCB) is the prescribed authority relating to manufacture
2	S.O. No. 698 (E) / 17.06.2003	Plastic Carry Bag Manufacture, Sale and Usage Rules (Amendment) 2003	➤ The Plastic bag shall not be less than 8x12 inches (20x30cms) in size and not less than 20 microns ➤ Grant of registration for manufacturers by SPCB ➤ Minimum weight of 50 carry bags shall be 105 gms plus or minus 5% variation

3	S.O.No.249 (E) / 04.02.2011	Plastic Waste (Management and Handling) Rules 2011	➤ Carry bags shall not be less than 40 microns in thickness ➤ The municipal authority is responsible for collection, storage and disposal of plastic waste ➤ The manufacturers shall set up collection centres as per Extended Producer's Responsibility ➤ The municipal authority shall make bye laws ➤ Protocols for compostable plastic materials ➤ Registration of manufacturers and recyclers by SPCB ➤ Explicit pricing of carry bags ➤ State Level Advisory Body to be formulated
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The Committee felt that the present Plastic Waste (Management and Handling) Rules 2011 mainly addresses the manufacture and usage of carry bags, which do not include bags that constitute or form an integral part of the packaging in which goods are sealed prior to use. The said Rules inadequately addresses the problems related with the plastic cups / containers, disposal methods, compounding of offences etc. Also, the Rules have not taken into the account of other Non-Biodegradable garbage, which also poses serious threat in handling the Municipal Solid Wastes (MSW) scientifically.

3. AGENCIES RESPONSIBLE FOR IMPLEMENTATION OF PLASTIC MANUFACTURE, USAGE AND WASTE MANAGEMENT ACT/RULES

The Committee examined the role and responsibilities of various Government agencies with regard to implementation of different provisions in the existing rules concerning Plastics.

a) TNPCB:

The TNPCB periodically reviewed the categorization of plastic manufacturing units. The Board vide its circular dated 19.06.2001 categorized the virgin and recycled plastic industry as red category units, as it has been noted that the plastics products manufacturing lead to dioxin emission, which causes environmental problems and health hazards. The Board vide its circular dated 18. 07.2001 insisted to use autoclaving or micro waving for the treatment and disposal of biomedical waste, which consists of certain portion of plastic material. The Board circular dated 09.02.2004 classified the synthetic resin and plastic including PVC manufacturing units as red category, plastic product manufacturing along with chemical/printing as orange category and plastic product manufacturing without chemical/ printing and using virgin materials as green category.

Subsequently, the Board in its BP No.41 dated 04.04.2007 categorized Recycled plastic products manufacturing unit, Plastic products (carry bags, sheets, ropes, plastic article, polythene bags/ poly sacks manufacturing units etc.,) as orange category. The Board re-categorized the Plastic industry vide B.P.No.37 dated 10.03.2010 as follows:

Code	Category	Type of unit/industry
1050	Red	Recycled plastic products manufacturing units
2098	Orange	Plastic products (carry bags, sheets, ropes, plastic articles, PVC Pipes, PVC /HDPE tanks)

Further, the Board vide its Circular dated 22.07.2011 also instructed to ensure bringing all the plastic manufacturing units under the provisions of Water and Air Acts.

As per the latest TNPCB's B.P.No.34, Dated 05.10.2012, the plastic industries are classified as follows.

Code	Category	Type of unit/industry
319	Orange	Digital printing on PVC cloth
359	Orange	Reprocessing of waste plastic (excluding PVC) (R)
611	Green	Biscuit trays etc from rolled PVC sheet (using automatic vacuum forming machine)
667	Green	Polythene & Plastic processed products manufacturing (virgin plastics)
674	Green	Rope (Cotton & Plastic)

The Tamil Nadu Pollution Control Board is responsible for enforcement of provisions relating to registration, manufacture and recycling of plastic carry bags as prescribed in the Plastic Waste (Management and Handling) Rules 2011. At present, the Board ensures the manufacture of carry bags not less than 40 microns thickness with the required IS specification for recycling as well as compostable plastics. The Board also has to ensure whether carry bag or multilayered packaging are carrying the name, registration number of the manufacturer and thickness of carry bags with labeling as 'Recycled' or 'Compostable', as the case may be.

b) Urban Local Body and Village Panchayats:

The Local body concerned is responsible for enforcement of the provisions relating to the use of plastics and collection, segregation, transportation and disposal of plastic waste. Setting up of collection systems for plastic waste with the assistance of manufacturers of plastic carry bags, to design the modalities based on Extended Producer's Responsibility, to incorporate the rules in the municipal bye laws, to encourage the use of plastic waste for road construction, co-incineration etc., are some of the key responsibilities of the municipal authorities.

c) District Administration:

The present Plastic Waste (Management and Handling) Rules 2011 does not prescribe any specific responsibility for the District Administration as against the earlier Plastic Carry Bag Manufacture, Sale and Usage Rules 1999, wherein the overall coordination of plastic waste handling and management was entrusted to the District Magistrate concerned.

d) Department of Environment:

Though no direct responsibility is vested with the Department of Environment in the Plastic Waste (Management and Handling) Rules 2011, Government of Tamil Nadu assigns the duties relating to creation of awareness among the public with special reference to school students through National Green Corps (NGC). The Department of Environment also coordinates with other Departments, Boards, NGOs etc, in formulating policy level decisions with respect to plastic manufacturing and plastic waste management.

4. ANALYSIS OF ISSUES COVERED UNDER TERMS OF REFERENCE

The Committee considered the various Terms of Reference in the light of the existing legal and institutional mechanisms in dealing with the plastics. While analyzing the level and effectiveness of implementation of these provisions, the areas requiring improvements have been brought out in the relevant ToR by appropriately grouping and re-arranging issues and presented in the report.

i) Evaluation of magnitude of use of plastics including throwaway plastics:

Plastic bags were introduced in 1970s and gained an increasing popularity among consumers and retailers. Plastic has become ubiquitous and life without plastic cannot be imagined in the current era of human development and growth. Almost every article of day-to-day use is either plastic or has plastic component in it. Plastics find wider applications and are available in huge numbers and varieties across the world. It is estimated that roughly around 500 billion plastic bags are used every year worldwide (Report of Chief Water Analyst, King's Institute, Chennai). Widespread usage of plastics is mainly due to their universal application, relatively lesser cost and their convenience in use. It is for the same reasons, majority of plastic bags are discarded as waste usually after a single use.



View of MSW Dump Sites

In terms of Plastics production, it is estimated to grow at a rate of 15-20% per annum for the developing countries (CIPET, 2009). The report of Chennai Plastics Manufacturers and Merchants' Association (CHEPMMA) indicates that annually a quantum of 5 lakh tonnes of virgin material and 1 lakh tonne of recycled material is used in Plastic manufacture in the State.

The Committee appreciated the need to understand the quantum of usage of various commonly used categories of plastics. Different types of plastic polymer and their domestic, commercial and industrial applications are enumerated hereunder:

Plastic Identification	Type of plastic polymer	Common Applications
	Polyethylene Terephthalate (PET)	Soft drink, water and salad dressing bottles; peanut butter and jam jars
	High Density Polyethylene (HDPE)	Water pipes, Hula-Hoop (children's game) rings, Milk, juice and water bottles; occasional shampoo / toiletry bottle
	Polyvinyl Chloride (PVC)	Juice bottles; cling films; PVC piping
	Low Density Polyethylene (LDPE)	Frozen food bags; squeezable bottles, e.g. honey, mustard; cling films; flexible container lids, carry bags
	Polypropylene (PP)	Reusable microwaveable ware; kitchenware; yoghurt containers; margarine tubs; microwaveable disposable take-away containers; disposable cups; plates.

	Polystyrene (PS)	Egg cartons; packing peanuts; disposable cups, plates, trays and cutlery; disposable take-away containers;
	Other (often polycarbonate or ABS)	Beverage bottles; baby milk bottles; electronic casing.

According to CIPET, Ministry of Chemicals & Fertilizers, GoI, Chennai, 'Asia has been the world's largest plastics consumer for several years, accounting for about 30% of the global consumption excluding Japan, which has a share of about 6.5%. Next to Asia is North America with 26% share, the Western Europe with 23% share in the global market. The highest share of consumption in Asia is contributed to its higher population, while consumption pattern in North America and West Europe is mainly due to their higher annual per capita use of plastics'.

The global annual per capita consumption of plastics is (in kg) as follows:

World Average	26
North America	90
West Europe	65
East Europe	10
China	12
India	5
South East Asia	10
L. America	18

It is estimated that worldwide, the plastics and polymer consumption will have an average annual growth rate (AAGR) of 5% and it will touch a figure of 227 million tons by 2015. Globally, it is projected that PET (Bottle grade) will have the highest growth rate of about 11% AAGR. (www.cipet.gov.in).

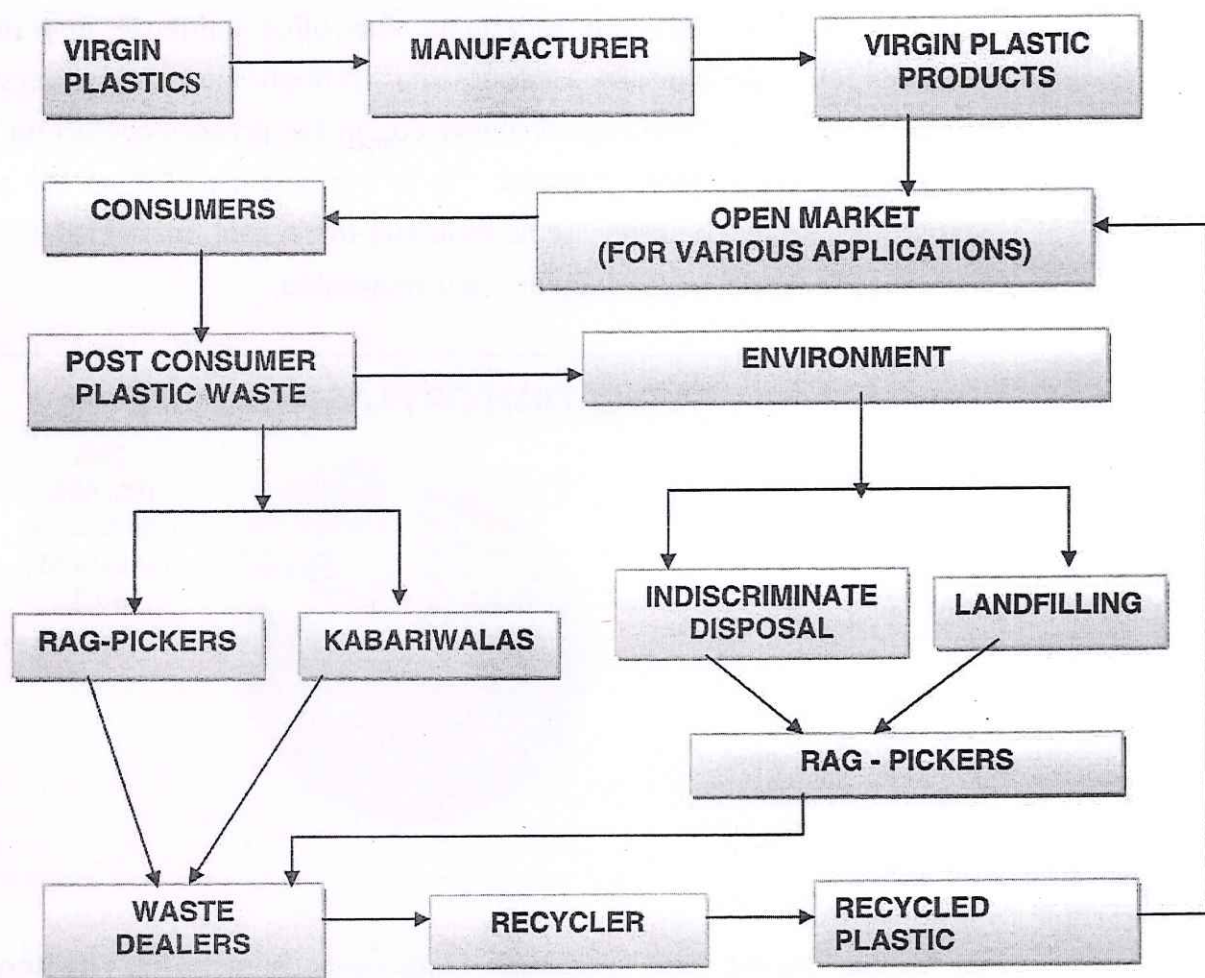
It is seen that the key growth segment in plastics remains to be the "Packaging" which accounted for over 35% of the global consumption. Amongst the individual plastic materials, Polyolefin (Polyethylene (PE) and Polypropylene (PP)) accounted for the highest of 53% of the total consumption, (PE with 33.5%, PP with 19.5%) followed by PVC contributing to 16.5%, Polystyrene with 8.5%, PET and Polyurethane (PU) accounting for 5.5%, Styrene co-polymers (ABS, SAN, etc) at 3.5% and other engineering and high performance and specialty plastics, blends, alloys, thermosetting plastics with 13%.

In India, consumption of major plastics is estimated to be about only 3% of global consumption i.e. about 4 million tonnes annually (CIPET, 2003). Among the plastic categories, the magnitude of use of the throwaway plastics has increased tremendously in the last 20 years. In terms of average per capita use of plastics in the country, the estimated use of plastics of all categories in the State of Tamil Nadu is in the order of 3.6 lakh tonnes annually. TNPCB has identified and consented 2123 industries manufacturing plastic products like carry bags, plastic sheets, plastic ropes, PVC pipes etc. Out of these industries, around 464 units are manufacturing the plastic products from recycled plastics, majority of which are in the informal sector (TNPCB and CIPET).

There is a need to examine whether all such industries are to be consented by the TNPCB/Local Bodies. The Committee also noted that the portion of discarded plastic waste that are not being taken for recycling end up in water bodies, drainage systems, open lands etc. and therefore felt that regular monitoring mechanism to analyze the health hazards caused by such disposal need to be put in place.

Assessment of Plastic Wastes:

For understanding the issues relating to Plastic Waste Management, we need to analyze the life cycle of Plastic starting from the consumption of virgin plastic to post use waste management. A schematic representation of the life cycle analysis of Plastics is presented in the following flow diagram.

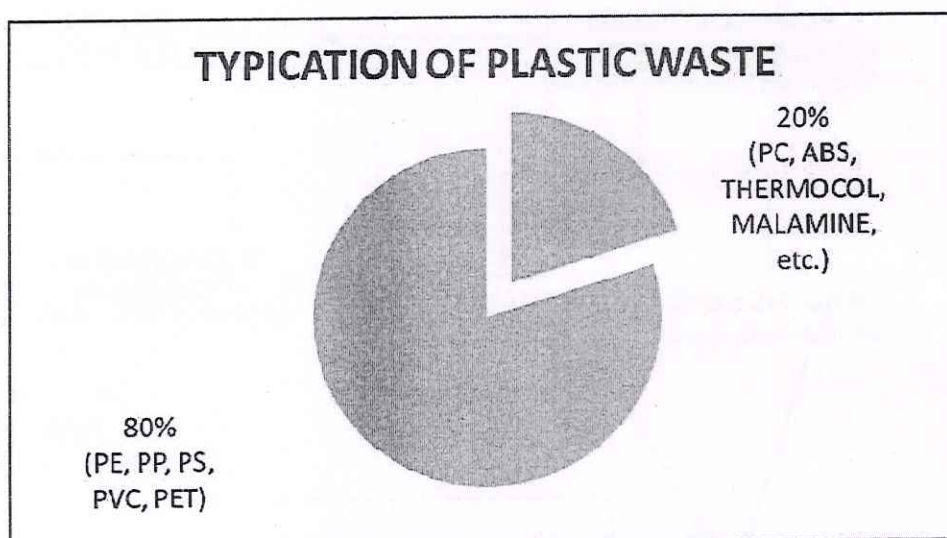


LIFE CYCLE ANALYSIS

Plastic consumer items have short life spans and quickly make their way into the waste streams. Though plastics make not more than 8-9% by weight of the total solid wastes, discarded plastics are highly visible, as they constitute about 30% of the Municipal Solid Waste (MSW) by volume (CIPET, 2009). In Tamil Nadu, the average municipal solid waste generated is between 150 - 200 grams per capita per day and with more than 7.2 crore population, 225 tonnes of non-recyclable portion of the plastic wastes is generated every day (**Annexure 11**).

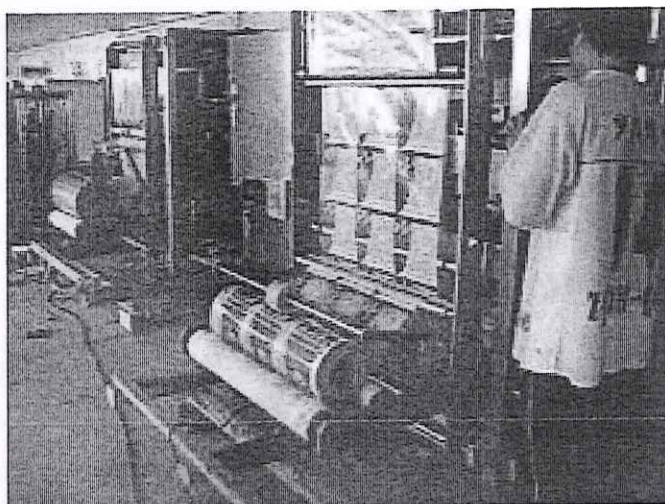
For better understanding of efficient plastic waste management, it is necessary to differentiate as to what portion of the Plastic waste in the waste stream becomes amenable for recycling and what is not recyclable. Analysis reveals that nearly 80% of the discarded plastics comprising of

PE, PP, PS, PVC, PET are recyclable and offer immense and diverse methods of recycling like reprocessing through closed-loop recycling, chemical recycling for energy recovery etc, in the process conferring many social and environmental benefits. It is the balance 20% of the plastic wastes that cover the other items including thermocol, malamine, PC, ABS are cause for concern, as they are non-recyclable.



ii) Solid, liquid and gaseous emissions generated during the manufacturing of plastic bags, plastic packaging materials and occupational health hazards:

The Committee considered that impact of emission during the plastic bags / packaging material manufacturing from various aspects. From various web sources, it is seen that anti oxidants and stabilizers are inorganic and organic chemicals, which are used to protect against thermal decomposition during the manufacturing process. Normally, colorants, pigments and azo dyes are used in the manufacturing process to give bright colours to various plastic products. Plasticizers used in the process have low volatility in nature. Phthalates, toxic heavy metals like Cadmium and Lead are also used in the manufacturing. However, the Committee noted that there is no scientific report on the emission of Volatile Organic Chemicals or oxides of heavy metals, occupational health hazard etc. from the plastic bag production houses.



Plastic Bag Manufacturing Unit

In the manufacturing process of plastic carry bags and packaging materials, the extrusion and other process operations are carried out in the temperature range of 110°C to 150°C, at which the conditions for emission of noxious gases generally are not created. It is also reported that there is no gaseous emission except water vapour, if the drying is inadequate. Providing suction hoods, ventilation system, adsorption technique etc., wherever necessary controls the emissions from such industries. As such, most of the plastics get softened below 170°C, except Poly Vinyl Chloride and Polyethylene Terephthalate. There is no evolution of any gas during softening at that temperature (PROBES/122/2008-2009 CPCB, 2008). In respect of manufacture of Polyethylene Terephthalate (PETE), one kilogram of PETE production entails release into the air of 40 grams of hydrocarbons, 25 grams of sulphur di oxides, 18 grams of carbon monoxide, 20 grams of nitrogen oxides, and 2.3 kilograms of carbon dioxide (source: World Watch Institute, 2004), which is to be taken care of by adequate air pollution control measures.

In plastic manufacturing industries, water is used only for cooling purposes in closed circuit and no effluent discharge is practiced. Therefore, water pollution from plastic bag and packaging manufacture units is not envisaged. In general, virgin plastic bag or packaging manufacturing industries do not generate any solid wastes in the process other than the damaged or torn-out bags or packaging, which are reused

in the process itself. With regard to recycled plastic bag or packaging manufacturing units, the process is suitably adjusted by modifying the proportion of virgin to recycled plastic granules to ensure the generation of lesser quantity of solid waste. Normally in such units, generation of Solid wastes is upto 2%, which is also either directly reused in the process or sold out for further recycling.

The Committee examined the existing legal provisions of Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981, which prescribe standards on the emission/liquid/solid waste issues comprehensively. The Committee further examined the performance in terms of the monitoring by Tamil Nadu Pollution Control Board on the plastic manufacturing units as on date with respect to air and water pollution control norms are found to be adequate. However, the Committee felt that the status of monitoring of the manufacturing of carry bags below the specified thickness and size by the plastic units requires to be strengthened.

It is felt that the issues concerning occupational health hazards in the plastics manufacturing units has not been studied comprehensively by any scientific institution and therefore, a study of such nature is considered necessary.

iii) Pollution caused to water, air and soil, environmental hazards including health effects on usage of plastics and disposal of throw away plastic wastes:

a) Health effects in use: Many additives are used in the plastic product processing, which include plasticizers, lubricants, stabilizers, colourants and anti oxidants. The chemicals used in the form of Phthalates, plasticizer, Stearic acid etc., are bio accumulated in the metabolism of the living organisms, which act as hormone mimicking chemicals in the life cycle. These chemicals would act as a barrier in deciding the gender and also reduce the fertility rates in the living organisms with special reference to animals. People are exposed to these (plastic) chemicals by using plastic packages. The hot and fat food usage habits of the people including procuring meat /fish items in recycled plastic bags, packing hot food items

like *sambar*, *soups* etc. in plastic pouches, eating food served in plastic sheets in hotels, hot coffee/tea packed in plastic bags, packaged drinking water left in the closed rooms/vehicles in hot weather, food cooked in micro wave oven along with plastic packaging materials become the most common source for direct contact of these food stuff with the plastic chemicals.



Rag pickers at work in dumpsites

Under such circumstances of usage of plastics for packing food materials, some chemicals are known to migrate from the plastic to the foods they contain. Examples of plastics contaminating food have been reported with most plastic types, including Styrene from polystyrene, plasticizers from PVC, antioxidants from polyethylene, and acetaldehyde from PET. Among the factors controlling migration are the chemical structure of the migrants and the nature of the packaged food. In studies cited in Food Additives and Contaminants, LDPE, HDPE, and polypropylene bottles released measurable levels of BHT, Chimassorb 81, Irganox PS 800, Irganix 1076, and Irganox 1010 into their contents of vegetable oil and ethanol. Evidence was also found that acetaldehyde migrated out of PET and into water.

The adverse health effects from usage of plastics for storing materials meant for direct human consumption are tabulated as follows:

Plastic	Common Uses	Adverse Health Effects
Polyethylene Terephthalate (PETE)	Water and soda bottles, carpet fiber, chewing gum, coffee stirrers, drinking glasses, food containers and wrappers, heat-sealed plastic packaging, kitchenware, plastic bags, squeeze bottles, toys	Suspected human carcinogen
HDPE	Overhead Tanks, milk and water jugs, laundry detergents, shampoo and motor oil containers, shampoo bottles some plastic bags, Water pipes, buckets, grocery bags,	Suspected carcinogen
Polyvinyl chloride (PVC)	Food packaging, plastic wrap, containers for toiletries, cosmetics, crib bumpers, floor tiles, pacifiers, shower curtains, toys, water pipes, garden hoses, auto upholstery, inflatable swimming pools	Can cause cancer, birth defects, genetic changes, chronic bronchitis, ulcers, skin diseases, deafness, vision failure, indigestion, and liver dysfunction
LDPE	plastic carry bags, cups, trays, containers, dispensing bottles, wash bottles, tubing, and various molded laboratory equipment, bread, frozen food, and grocery bags, most plastic wraps, some bottles	Suspected carcinogen.
Polypropylene (PP)	Cushions, mattresses, pillows	Bronchitis, coughing, skin and eye problems. Can release toluene diisocyanate which can produce severe lung problems

Polystyrene (PS)	Many food containers for meats, fish, cheeses, yogurt, foam and clear clamshell containers, foam and rigid plates, clear bakery containers, packaging "peanuts", foam packaging, audio cassette housings, CD cases, disposable cutlery, building insulation, flotation devices, ice buckets, wall tile, paints, serving trays, throw-away hot drink cups, toys	Can irritate eyes, nose and throat and can cause dizziness and unconsciousness. Migrates into food and stores in body fat. Elevated rates of lymphatic and hematopoietic cancers for workers.
Polycarbonate with Bisphenol A (Others)	Water bottles, Plastic spoons,	Scientists have linked very low doses of bisphenol. A exposure to cancers, impaired immune function, early onset of puberty, obesity, diabetes, and hyperactivity, among other problems (Environment California)
Acrylic (Others)	Clothing, blankets, carpets made from acrylic fibers, adhesives, contact lenses, dentures, floor waxes, food preparation equipment, disposable diapers, sanitary napkins, paints	Can cause breathing difficulties, vomiting, diarrhea, nausea, weakness, headache and fatigue
Tetrafluoro-ethylene (Others)	Non-stick coating on cookware, clothes irons, ironing board covers, plumbing and tools	Can irritate eyes, nose and throat and can cause breathing difficulties

(source: <http://www.ecologycenter.org/factsheets/plastichealtheffects>)

b) Health and environmental effects in disposal:

Leaching of toxic materials and contamination of soil and ground water:

Though there is no direct scientific study on leaching of toxic materials, which contaminates the soil and ground water with special reference to the plastic wastes, overall impact on the ground water and soil contamination have been studied in the Perungudi dumpsite of

Chennai Corporation. Damage to environment, particularly pollution caused to soil and water due to unscientific land disposal of plastic wastes along with domestic garbage is of significant concern, especially when such plastic wastes are dumped near water bodies.

Hazards from open, uncontrolled burning of plastics:

When the volume of garbage accumulating in the dump sites and other public and private places become uncontrollable, sanitary workers of the local bodies tend to set fire to the municipal garbage along with the plastic waste, which creates severe environmental damage. The flexible plastics, which constitute a major portion of the plastic waste in the dump yard or the temporary transit points, have plasticizers like phthalates. The presence of chlorine will definitely release HCl gas due to burning of plastics and the toxic chemicals ranging from paints to dyes are also emitted when burnt in open conditions. The smoke from burning plastics contains emission like dioxin and furan, which leads to serious health impacts when inhaled.



Burning of Plastic Waste along with MSW

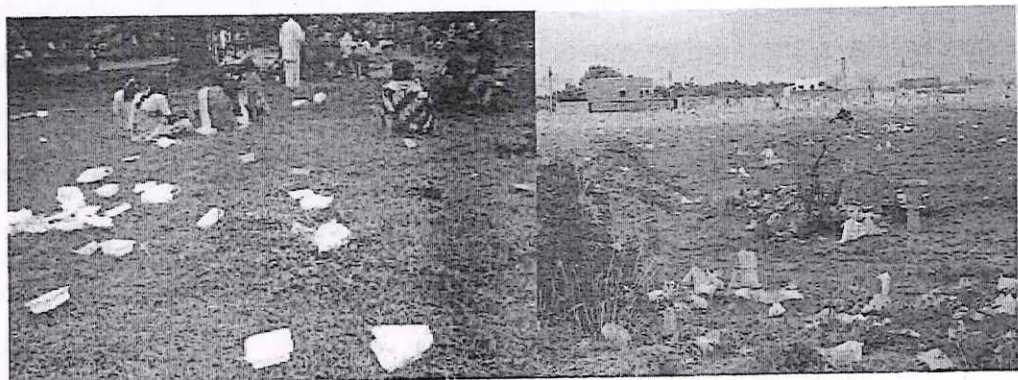
Impact and Soil infiltration:

The plastics when discarded on soil do not permit the rainwater to percolate into the soil and reduce the overall recharge of ground water. One plastic carry bags extend over one to four square feet of area and millions of carry bags when discarded over the land create severe and cumulative stress in the ground water recharge. It's a common site of getting plastic dumps when the earth is excavated for construction activities within or adjacent to the residential habitations. These buried

plastics are seen at different depths, which totally prevent the percolation of ground water for recharge.

Aesthetic impacts of plastic littering:

Hon'ble Chief Minister of Government of Tamil Nadu in her speech in the Assembly on 08-05-2002 has stated: *"Time cannot destroy the plastic wastes. Everywhere, these discarded plastic plates, plastic tumblers and plastic cups will remain as they are. For years together they will remain as they are. But today, both sides of the highway through its length can be found with empty polythene bags, empty plastic bottles, discarded plastic tumblers and cups. Dealing with these plastic wastes appears to be beyond the capacity of existing governmental structures. Wherever there is heavy movement of tourists and travelers, there are plastic bags, plastic tumblers, cups and bottles left behind and piled up"*.



Littering in Public places

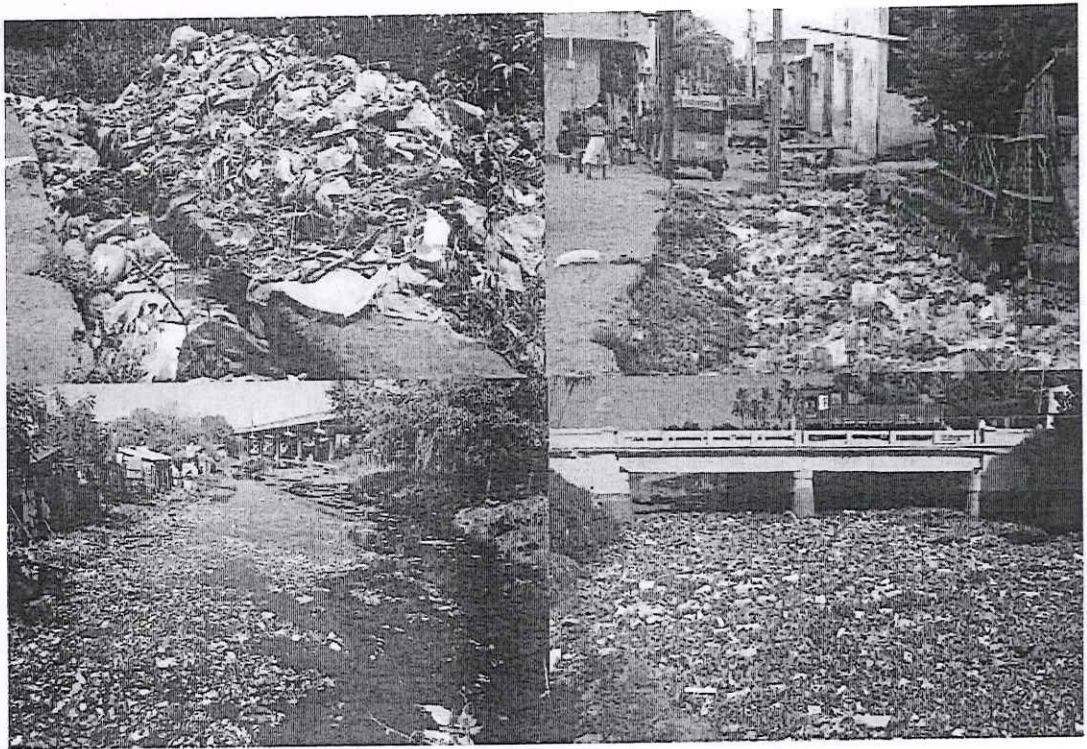
The visibility of Plastic waste in the MSW stream has been perceived as a big problem and made plastics a target in the management of solid waste. Hanging of different colored plastic carry bags in thorny bushes and trees are a common sight nowadays and because of their very low degradation by sunlight, rain, moisture or microorganisms, these carry bags visibly exist over long period. In wind, these coloured carry bags are blown away from one place to another in the open terrain because of its very light weight (1-3 gms) and finally accumulated in wind shadow areas or near obstructions or deposited over water systems which are totally becoming unsightly. The plastic carry bags along the roadsides in tourism

spots, residential areas, mass gathering during religious, political and social functions, railway lines adjacent to residential areas etc. also cause severe and continuous negative impact to the aesthetic senses because of their prolonged presence.

Blockage of storm water drain:

Because of the inherent hydrophobic property of plastic, the plastic wastes when disposed in drain neither get wet or disintegrated by the running sewage/storm water in drains. The plastic waste accumulated over the surface of the water bodies prevents the designed flow of the sewage, causing mosquito breeding in the area.

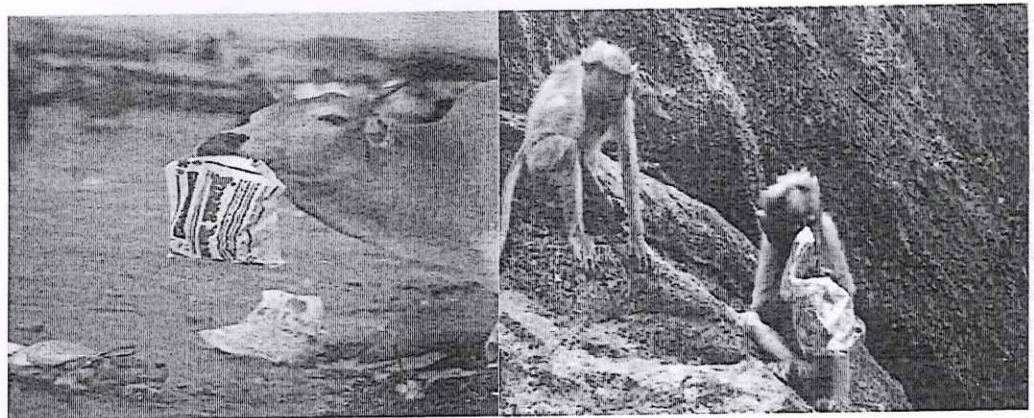
Plastic wastes when dumped near road sides, open plots, river sides, public places not only affect the environmental scenario, but also become the major reason for overflowing of water due to blockage in sewer / storm water drains resulting in flooding of that area during rainy season. Blockage of sewerage systems by plastic bags is becoming a common problem in cities and towns of developing countries. This in turn creates foul smell and favourable habitats for mosquitoes and other vectors that could spread many diseases such as Dengue fever, Chickunguniya etc. Clearing of the storm water drains and open channels of the accumulated plastic wastes entails huge additional man power and cost to the concerned local body.



Choking of drains and Channels

Death of livestock:

Hon'ble Chief Minister of Tamil Nadu in her speech before the Assembly on 08-05-2002 also stated: *"Not only people, but also livestock and animals have been adversely affected. In our cities, cattle walk around freely. There are so many goats and cows that have died after ingesting the plastic bags thrown on the roadside. But if the cattle swallow a plastic bag, that will not be digested because it does not dissolve. It will tear up the intestines of the cattle and the cattle will die."*



Animals exposed to plastic bags

So many cattle in our cities, urban areas and villages have died and continue to die in this fashion in recent times. Even the animals in forests also have been affected. The disposed packaging of foodstuff in forests when taken by the wild animals like elephants, tigers, bears and monkeys leads to their pitiable deaths”.

About 1,00,000 animals such as Dolphins, Sea Turtles, Whales, Penguins are killed every year due to plastic bags, consumed mistakenly for food. Animals including the cows die every year, when they choke on plastic bags, while trying to eat vegetable wastes stuffed in the garbage. (source: Reported by the Chief Water Analyst, King Institute, Chennai-32)

iv) Environmentally unfriendly practices such as dumping of plastics, unauthorized, unhygienic use of plastics and unscientific disposal of plastics etc., in public places:

Municipal Solid Waste (Management and Handling) Rules 2000 prescribes source segregation of recyclable wastes, including the plastic wastes and the concerned municipal authority is responsible to inform the public on the type and time of schedule by which the waste are to be handed over by the public. However, these provisions are not implemented with letter and spirit in the urban local bodies even after more than a decade of notification. The dumping of garbage including the increasing portion of plastic waste makes the urban local bodies to find it very difficult to scientifically dispose the MSW through composting, fuel derivatives etc.



Spilling of plastic waste in public place

The Plastic Wastes (management and Handling) Rules 2011 does not prescribe any specification for controlling the environmentally unfriendly practices such as dumping of plastics or unauthorized or unhygienic use of plastics. However, the Extended Producer's Responsibility is fixed by the way of setting up of plastic waste collection centres by the manufacturers, either collectively or individually by providing required finance to establish such collection centres. The State Government may by notification in the Official Gazette, impose restriction or prohibition on the unauthorized dumping of these plastic wastes either wholly or partly which affects the health of the local public and impact the environment in general.

The plastic waste alone is not dumped in heaps but the plastics littering is the common cause of concern. The existence of 1.8% of non-recyclable portion of the municipal solid waste makes the entire waste as unfit for bio-compost as these plastic wastes prevent the penetration of oxygen, which is required for effective aerobic composting. In the absence of oxygen, the organic food is converted into methane, hydrogen sulphide, etc., which gives foul odour and unhygienic conditions in the surroundings. The plastic waste when burnt with the left out foodstuff causes serious emissions as this waste food supplies chlorine molecules from the common salt used in the cooked food. Fatty foods and plastics are the worst combination of all because the chemicals in plastics are more soluble in fat, so they leach greater amounts of those chemicals into fatty foods. Hot water and the detergents used in automatic dishwashers break down plastics and increase chemical leaching.

Plastic containers that are scratched and cracked leach more unwanted chemicals into foods and drinks than new containers do. Any plastic that is the worse for wear should not be used for foods. (<http://www.china-energysaving.com/component/content/article/3-articles/>)

The Hon'ble Chief Minister of Tamil Nadu In her speech in the Assembly on 08.05.2002 remarked, *"The problem of plastic waste disposal is a national problem. In large temples, around the shrines, plastic wastes only are found and these plastic wastes continue to pile up like mountains. In these modern times, in the western world, there are fights between*

countries on plastic waste disposal. European countries are all small in size. In some of these countries, huge amounts of plastic have piled up. Not knowing what to do with these wastes, and not having the space to dispose of them, they dump the waste in a neighbouring country".

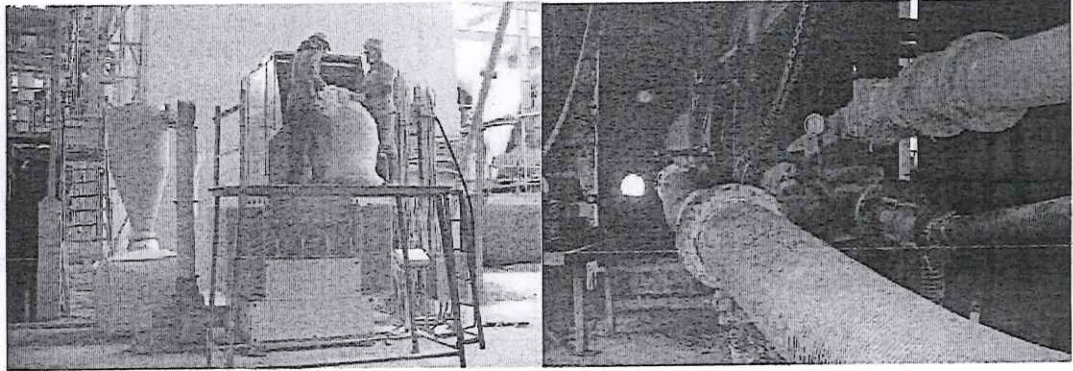
The use of plastic sheets for serving ready to eat cooked food or using the plastic pouches or sachets for packing these foods cause serious health concerns when the plasticizers leach into the food when packed in hot conditions. The left out and the other food wastes when disposed alongwith these plastic sheets, makes the entire waste as unfit for composting and any other scientific disposal.

v) Plan of Action to tackle the problems of use and disposal of plastics:

In recent times, emphasis was placed by the Central Pollution Control Board, Delhi in conceptualizing suitable ways to tackle the problems associated with the use and disposal of plastics. Co-incineration of plastic wastes in cement kilns, laying of polymer coated bitumen roads and deriving fuel substitutes from waste plastics are some of the methodologies suggested for tackling the problems associated with plastic waste disposal. Collection of plastic waste without other foreign materials, transportation of the same to the recovery / reuse site, shredding and handling are the major features involved in these systems.

a) Co-incineration in Cement Industry: The Plastic waste can be used as supplementary fuel in cement industry upto 1.5% of the coal used in the process as the average calorific value of plastic waste is 8200 kcal/kg. The 3Ts - Time (4 seconds), Temperature (1400°C) and Turbulence in Cement Kiln ensures complete destruction of organic compounds present in plastic wastes. The co-incineration of plastic waste in cement kiln is an approved method by the CPCB, Delhi. The absence of other foreign materials in the plastic waste and regular supply from the local bodies are the pre-requisites to the effective and continuous functioning of co-incineration of plastic waste. It is noted that in Tamil Nadu, the utilization of plastic waste for co-incineration is practiced in two cement industries

but however, the same was discontinued because of unavailability of these plastic waste from the nearby local bodies on a continuous basis.



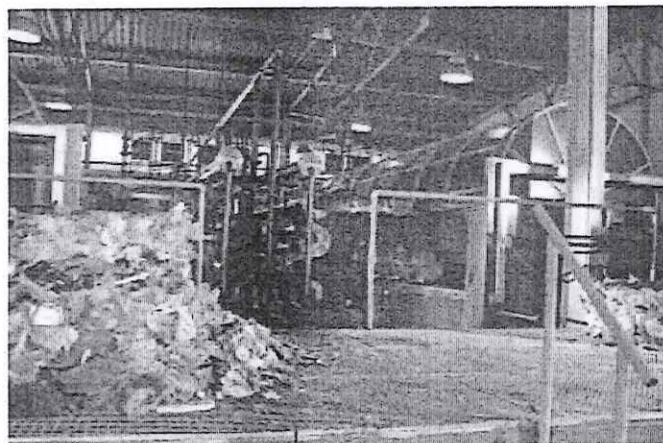
Shredding for Co-incineration and co-incineration

b) Plastic Roads: The use of plastic wastes in road construction is one of the best ways for the disposal of considerable quantity of plastic wastes. The use of plastic waste around 10% by weight against the bitumen used in road construction acts as binding material over the aggregates and the plastic waste in size between 1.18 mm to 4.36 mm are added over the hot road aggregates with proper shredding. These plastic roads are reported for better strength with no pothole formation and are performing very well in spite of their age. In Tamil Nadu, sanction has been accorded for relaying of 447 km length of plastic roads for 2012-13 and the same is under implementation. The plastic waste is collected both through the informal sector and through the Plastic Waste Collection and Processing centres established by the Rural Development and Panchayat Raj Department with the help of Panchayat Level Federations (PLF) comprising of Self Help Groups. **(Annexure 12).**



Shredding and use of plastic waste in recycling roads

c) Fuel Derivatives: Plastic waste is turned into energy by converting the same to petrol, diesel and heavy fractions through depolymerization process adopted in some industries and 1 kg of this plastic waste yields approximately 0.78 kg of final product which consists 20% petrol, 50% diesel and 30% heavy fractions. This process does not produce the large amount of secondary waste, emission or poisonous by products. A technical presentation made by the Principal Investigator of the MoEF sponsored project entitled 'Evaluation of Refuse Derived fuel from waste plastics as engine fuel substitute' from the Annamalai University before the Committee indicates that fly ash used as a catalyst helps chemical cracking of the waste plastic and the cracked oil is further fractioned and used in petrol and diesel engines.



Extraction of fuel derivate from plastic wastes

The above said methods will be successful only if, the plastic waste is supplied continuously and at an affordable price for collection, transport, storage, shredding and handling. The existing practice of the collection system by the rag pickers through the supply chain of local vendors, major hawkers followed by the recyclers are to be well organized by the respective urban local bodies by means of registration, licensing, extending welfare activities etc., Proper education and training are to be periodically imparted to this supply chain to ensure the supply of the waste both quantitatively and qualitatively.

vi) Action Plan for manufacturers, traders, recyclers, local bodies and users on minimizing the use of plastics

a) Strict implementation of the provision of Act / Rules:

In view of the widely dispersed application of plastic variants, various provisions in the Act / Rules become difficult for implementation. It is considered important that the prescribed authorities strictly implement the provisions of Act / Rules with respect to thickness, size, type etc., both at the manufacturing and usage stages without any compromise. Monitoring of existing mechanism, particularly with respect to trading activity needs to be strengthened by issuing suitable amendment in the existing notification of MoEF or in the proposed Act / Rules of the Government of Tamil Nadu. The State Level Authorities of the concerned implementing agency need to strictly review the progress periodically with respect to the plastic carry bags manufacturing, sale and usage.

b) Encouraging higher volume packaging:

Multi layered plastic or metalized plastic packaging are used unilaterally in lower quantity consumables like shampoo, gutka, panparak, hair oil, cosmetics etc., which causes indiscriminate disposal of these plastic packaging after its full or partial use. These multilayered or metalized plastic packaging causes severe environmental hazards including clogging of sewers, drains, channels etc. These low quantity consumables are to be discouraged and alternatively, high quantity consumable packaging in bottles and containers are to be encouraged.

c) Encouraging the use of conventional and naturally made products:

The use of non-degradable plastics consumable like plastic sheets, plastic plates, plastic cups etc., are required to be discouraged during social, religious, official, political functions. The usage of plastic sheets for serving foodstuff in hotels are to be strictly prohibited and the traditional use of banana leaves, arecanut plates, lotus leaves etc. are to be encouraged. Likewise, the use of cloth bags, jute bags, paper bags etc. instead of plastic carry bags in all commercial establishments have to be promoted. The Self Help Groups in the locality may be encouraged to supply the reusable metal plates, cups, tumblers, cutleries etc., with proper dishwashing facilities during the official, social, religious, political functions and this may also be considered as a measure for the groups revenue generation. Priority is to be extended to the halls, hotels, auditorium etc., and the others are to be brought under the proposal in a phased manner.

d) Declaring the premises of Government Offices as Throwaway Plastic Free Zone:

To stand as a role model before the common public, all the premises of the Government offices, boards, corporations, agencies, public places, educational institutions, courts, religious places, hospitals etc., are to be declared as 'Throwaway Plastic Free Zone'. This includes the canteen and store facilities located within the premises of the Government offices.



A Display Board

e) Creating awards:

The reduction or avoidance of plastic carry bags, cups etc., needs encouragement by instituting separate awards for different categories. Marriage halls, hotels, institutions, commercial establishments etc., which have self declared in avoiding of throwaway plastics and implementing the same have to be selected for the awards periodically at District and State Level and be honoured appropriately during Independence / Republic Day celebrations. The best three Districts and local bodies have to be considered for Throwaway Plastic Avoidance Award.

f) Awareness:

The minimization of the usage of plastic carry bags is possible only, if the public is fully aware of the health and environmental impacts caused by the disposal of these plastic wastes after its intended use. The awareness campaign must be a sustained one through all possible media like print media, local cable television, visible display boards / paintings, rallies etc., which is dealt in detail in a separate chapter.

vii) Alternative to plastics including throwaway plastics:

Any attempt in reducing the quantum of plastic waste generation will have to be supplemented with our effort to reduce the use of plastics or find alternatives or substitutes. This would help in bringing down the waste quantity. In the words of Hon'ble Chief Minister of Tamil Nadu in the floor of the Assembly on 08.05.2002, " *...plastic products had not come to the market. Did life not go on then? Did we not go to school? Was food not sent to school? Was drinking water not sent? Did adults then not go to work? Was food not sent in tiffin carriers? Was water not sent in rubber bags and glass bottles? Did life come to a standstill because there were no plastics? Did every day life not go on? Life did go on. Because plastics had not entered the market, people had no use for them. People were then using products made from healthy, natural material...*".

The Committee examined the options available in the present context in finding alternatives and substitutes for plastics. Following suggestions are made.

a) Degradable Plastics:

CIPET has made several tests for identifying alternatives to plastics. Research works are under progress to find degradable alternatives to plastics. At present, two types of degradable plastics (i.e.) photodegradable and starch based bio degradable plastics are available. Though these plastics are tested to be degrading by microbial action, these types of plastics are not completely degradable and non-degraded remnants still remain. Degradable plastic film process involves conversion of additive based polyolefin compound into film and then into carry bags, pouches etc., The BIS has notified IS / ISO: 17088:2008, which defines the criteria for biodegradable plastics under compostable conditions and these degradable plastics can be broken down into smaller particles, if blended with an additive to facilitate degradation. Polyethylene plastic bags that are produced with starch additives also partially degrade over time as microorganisms digest the starch, but leave the polyethylene fragments. The shelf life of the degradable plastics primarily depends on product requirements such as storage conditions, disposal environment etc. However, the cost of biodegradable plastics is known to be 2-10 times more than conventional plastics and the major cause of concern would be to segregate the biodegradable plastics from the non-biodegradable plastics in the waste stream of MSW. The Plastic Wastes (Management and Handling) Rules 2011 prescribes specifications for the compostable plastic with proper labeling.

b) Usage of articles made of conventional materials:

India is known for its wisdom in using the articles in the day-to-day life, made by conventional and naturally available materials. The unique identity of carrying the yellow (cloth) bag by the people of Tamil Nadu has slowly diminished by the usage of plastic carry bags.



Use of alternative to plastic carry bag

These plastic made from petrochemicals are not a product of nature and cannot be broken down by natural processes. The common alternatives or substitutes to the plastic including the throwaway plastic, by the goods made from the conventional and naturally available materials are tabulated below:

Plastic materials	Present applications	Substitute non-plastic materials
Throw away plastic carry bags	Retail dispensing	Cloth/Jute bag
Plastic cups	Hotels, restaurants, marriage halls etc	Paper cups / glass / stainless steel tumblers / mutka
Plastic strips	For commercial and domestic packing	Cotton/Jute threads
Plastic sachets	Drinking water, shampoo, hair oil, consumables like tobacco, gutka, betelnut etc.	Higher volume metal / glass containers
Plastic sheets for serving or packing ready to eat cooked food items	Hotels, fast food outlets	Plantain/arecanut/lotus leaves
Thermocol	Heavy Packaging	Paper mould, card boards, cut paper hay etc.

viii. Creation of environmental awareness among public on the harmful effects of use of plastics and to minimize the usage:

Highlighting the need for creating awareness among public about the harmful effects of plastics, the Hon'ble Chief Minister of Tamil Nadu made a speech in the State Assembly on 08-05-2002, thus "...Everybody must become aware of how much the environment is affected because of

these plastic products. This awareness must become a social reform movement and lead to a gradual phase out of the use of the plastics...Only then we can protect our natural beauty. Only then we can keep our environment clean". In the judgment dated 27-07-2009 in WP No 3959 of 2009, the Hon'ble High Court of Madras observed that '...people must be made aware of the ill effects of plastic use systematically and the concerned Department should take a massive drive by way of propaganda as to the devastation cost to the environment by use of plastic products and also make the people to aware that use of plastic products must be considerably reduced'.

Though there is no provision directly relating to creation of awareness about the environmental effects of use of plastics in the Plastic Waste (Management and Handling) Rules 2011, the TNPCB the DoE taking appropriate steps to create the mass awareness among the public on the plastic wastes.



Human chain to generate awareness

The Committee having heard about the measures taken in certain districts in this sphere, considered it worthwhile to refer to the initiatives taken by the District Administration of Kanyakumari District in coordination with the TNPCB to achieve the goal of 'Plastic Free Kanyakumari District' through multi pronged strategies. It was informed in the Committee's meeting that the programme gained remarkable improvement in the quality of environment in Kanyakumari District and felt that other District Administration may take initiatives up to District Level for the reduction of usage of plastics, on par with the initiatives taken in Kanyakumari District by taking to the public about the ill effects

of the use of plastics and improper disposal of plastic bags and also for strict implementation of the rules in this connection.

From the records, the awareness campaign in the Kanyakumari District was taken in the following four phases:-

- I: Preliminary Investigation and assessment of ground level situation.
- II: Building an atmosphere for the much needed change.
- III: Intensive campaign focusing the attitudinal and behavioural changes
- IV: Follow up and monitoring

Inter personal communication was the key tool used in the campaign along with the support of print media, FM radio, video through the local cable television, voice message through the landline phones, text message through the cell phones, traffic signal announcement, web site, magic shows, street plays, rallies, opinion makers, competitions and almost all the opportunities were used in this campaign. The highlights/features of 'Plastic Free Kanniyakumari District - By the People and for the People' campaign are:

- The entire initiative is implemented with a basic objective of irreversibility.
- The confidence of the elected representatives of the public was unilaterally obtained through the entire phase of the implementation of the initiatives.
- The initiative focused mainly on the attitudinal and behavioural change of the public.
- The role of all the Government departments was effectively utilized in implementing the initiative in all phases.
- The initiative is totally implemented with the available Government resources and without major additional financial commitments.
- The entire initiative is implemented systematically and in a phased manner. The initiative is well documented in the entire phases. On taking similar steps with good degree of involvement, the same results of the initiative can be attained in any part of India.

- The District Administration and TNPCB with their personal motivation and team building have taken this initiative as a lifetime challenge and gave the fullest co-operation and support for the cause from the team of Local Bodies, NGOs and other Government Departments. A well balanced approach was exercised by the District Administration between the elected representatives, Government officials and the common public, to make the dream initiative of 'Plastics Free Kanniyakumari District – By the People and For the People' to become true.

The awareness programmes relating to Plastic use reduction and minimization have to be conducted in a sustained manner, by creation of Permanent Standing Committee in each District, to be chaired by the District Collectors with members from TNPCB, Local Administration, Health, Tourism, Education Department, School eco club coordinators, NGOs, traders etc. The District administration may be provided with required funds by the State Government for sufficient period to ensure the sustained plastic awareness campaigns. The proposed Non biodegradable Garbage Control Act or other relevant Act / Rule may incorporate necessary provisions for conducting Plastics awareness programmes with special provision to incorporate the District Collector to coordinate the entire programme.

The Committee considers that the subject of Municipal Solid Waste Management with special reference to Plastic Waste Management may be brought into the regular curriculum itself starting from the elementary school level. The curriculum may be designed for each stage of the curriculum viz. elementary, middle, high and higher secondary school levels, with necessary hands on practical on the subject. The subject may also be considered for evaluation of the individual student's grade / marks.

ix. Advising competent authorities:

a) Enactment of State rules pertaining to Plastics: Hon'ble Madurai Bench of Madras High Court in W.P. (MD) No 11753 of 2010 suggested, among other things that the State Government consider the question whether it should exercise the discretion in bringing out the enactment, "The Tamil Nadu Non- biodegradable Garbage (Control) Act". Accordingly,

the Government of Tamil Nadu may pass the said bill in the Hon'ble Assembly, comprehensively including the provisions for increasing the thickness of plastic carry bag, with minimum size specification, compounding of offences etc.

b) Implementation of the provisions of existing rules in letter and spirit: The prescribed authorities shall implement the provisions of the existing rules in letter and spirit and the violations shall be dealt legally in a manner to prevent future violations. The Local body authorities have to summarily seize and penalize the commercial establishments, which use, store, handle or sell plastic carry bags without the display of specifications on the manufacturer, thickness of the bag and the registration number. The seized bags shall be arranged to be cut at the spot itself and forwarded for the beneficial uses like plastic road relaying, co-incineration etc. Local bodies may take steps to incorporate the provisions of the Plastic Wastes (Management and Handling) Rules 2011 notification into their byelaws. District Collectors may coordinate at district level with all stakeholders for creating mass awareness and to implement the provisions of the rules.

5. RECOMMENDATIONS

The Committee after detailed consultations among its members decided to recommend the following to Government with regard to checking the health and environmental hazards arising out of the use and disposal of plastic bags and the modalities to intensify Plastic Awareness Campaign.

Policy / Legal:

1. Having carefully considered policies adopted by few State Governments like Himachal Pradesh, Delhi etc. on the use of throwaway plastics, the Committee recommends that the Government of Tamil Nadu adopt specific "Throwaway Plastic (Avoidance) Policy" and consider developing a separate legal frame work for the manufacturing of throwaway plastics with thickness of not less than 60 micron, minimum size criteria of not less than 8x12 inches that will enable reuse of plastic carry bags and extended product life. To this effect, the Committee recommends to have separate legislation for Tamil Nadu to prevent the degradation of environment in the style of 'Non-Bio degradable Garbage (Control) Act / Rules'

2. The Committee felt that the present Plastic Waste (Management and Handling) Rules 2011 mainly addresses the manufacture and usage of carry bags and not covered the packaging items. The said Rules inadequately addresses the problems related with the plastic cups / containers, disposal methods, compounding of offences etc. Also, the Rules have not taken into the account of other non-biodegradable garbage, which also poses serious threat in handling the municipal solid wastes scientifically. The proposed legislation for the State may consider incorporating appropriate prescriptions on these items.

3. The Committee is of the view that the provisions in the Plastic Waste (Management & Handling) Rules, 2011 of Government of India in force for the implementing/monitoring agencies are not adequate and recommends that officials of specific cadre or above from various Agencies of Government viz., Public Health Department, Revenue Department,

Police Department may be vested with the powers for monitoring the provisions in the proposed Act/Rules of Tamil Nadu along with enabling penal provisions for spot compounding of the violations of the Rules with fine and for levying higher penalty for second and subsequent offences etc.

4. The Committee noted that the plastic products, particularly the carry bags generally don't carry proper labelling regarding the specification, manufacturer etc. This has to be strictly enforced and provision for heavy penalty on the trader and dispenser may be made.

5. The prescribed authorities may strictly implement the provisions of Act / Rules with respect to thickness, size, type etc., both at the manufacturing and usage stages without any compromise. The State Level Advisory Committee may review the progress periodically with respect to the plastic carry bags manufacturing, sale and usage.

6. The use of non degradable plastic like plastic sheets, plastic plates, plastic cups etc., may be banned during official, social, religious and political functions. The usage of plastic sheets for serving foodstuff in hotels may be strictly prohibited and the traditional use of banana leaves, arecanut plates, lotus leaves etc. may be encouraged. Likewise, the use of cloth bags instead of plastic carry bags in all commercial establishments may be implemented. The Women SHGs have immense scope and potential for production of environment friendly alternatives to plastics in the hospitality sector and to supply reusable metal plates, cups, tumblers, cutleries etc., with proper dishwashing facilities during the official, social, religious and political functions. This may also be considered as a measure for the groups' revenue generation. The Committee accordingly recommends that the SHGs may be promoted with financial support for production and supply of alternate materials / servicing with conventional metal/glass utensils particularly for bulk consumers for official, social, religious and political functions, in a phased manner.

7. To stand as a role model before the common public, all the premises of the Government offices, boards, corporations, agencies,

public places, educational institutions, courts, religious places, hospitals etc., may be declared as throwaway Plastic Free Zone. This may include the canteen and store facilities located within the premises of the said offices in a phased manner. The 'Throwaway Plastic Free Zone' may also be made applicable to the use of plastic cups, flexi boards and throwaway drinking water bottles.

8. Manufacturers of throwaway plastic articles/consumer goods may also be held responsible for the management of wastes generated post consumer use. This may be specifically applicable to materials like Expanded Polystyrene popularly known by trade names Thermocol or Styrofoam. The policy may also mandate manufacturers of new types of packaging materials (those that do not have an established post discard recovery market) to submit a detailed proposal to the state government for management of such materials before introducing them into the market.

Action Plan for utilization/reduction of throwaway plastic waste:

9. The Committee finds merit in the recovery of certain portion of oil through depolymerization process of plastic wastes, which yield 20% gasoline, 50% Diesel and 30% Heavy Fractions. Recognizing the advantage of resource recovery from Plastic wastes, the Committee recommends encouraging the establishment of such manufacturing units of fuel derivatives subject to stringent monitoring protocol.

10. The Committee records its appreciation for the continued initiatives taken by the Hon'ble Chief Minister of Tamil Nadu in promoting the use of post consumer plastic carry bags for relaying the Polymer Coated Bitumen (Plastic) Roads in the State. The Committee recommends that the savings resulting from the reduced requirement of bitumen for laying the Plastic roads may be passed on to the concerned local body as cross-subsidy for meeting the cost towards organized collection, shredding etc of the waste plastics used in road laying.

11. The Committee noted that Plastic waste may continue to be used as supplementary fuel in cement industry up to 1.5% of the coal used in the process, subject to proper monitoring of emissions.

12. Multi layered plastic or metalized plastic packaging are used widely in lower quantity consumables like shampoo, hair oil, cosmetics, drinking water etc., which causes instantaneous discarding and indiscriminate disposal of these plastic packaging after its use. These multilayered or metalized plastic packaging causes severe environmental hazards including clogging of sewers, drains, channels etc. These low quantity consumable packaging may be banned and high volume/ quantity consumable packaging in bottles and containers may be encouraged.

Socio-economic measures:

13. Recognizing the fact that informal system of collection of plastic wastes contribute immensely to the waste plastic recycling sector, the Committee recommends that the rag-pickers (Waste Collectors) may be registered with the Local Bodies. Rag-pickers families may be provided with some facilities like regular health checkups, group insurance, low-cost housing etc.

14. Large number of recycling units, most of them tiny and small household enterprises are functioning all over the State, utilizing plastic wastes collected from roads and houses as their raw material. As bulk of them function within Chennai City and its suburbs, setting up of an Industrial park for such recycling units in the outskirts of Chennai in the first phase will provide better opportunity for monitoring the operation of such units. They may be provided with land, machinery, warehousing for collection/storage etc. for encouraging such formal system of recycling.

The Government may also consider providing exemption from VAT to all articles made from recycled plastics.

15. Extending incentives to the degradable plastic manufacturers like tax reduction / exemptions/subsidies etc may be considered by the Government and the usage of conventional plastic to be substituted by the fully degradable plastic in a phased manner.

Awareness:

16. The Committee noted that the present 2011 Notification relating to management of Plastic Wastes has not made any provision for creation of awareness. For creating awareness in coordination with the District Collectors, necessary provision may be incorporated in the Rule, for which the State Government may propose suitable amendments to the Notification.

17. Sustained awareness programmes are to be conducted periodically by all the implementing Departments, combined with monitorable outputs through an effective monitoring mechanism. For sustaining the campaign, District level Throwaway Plastic Avoidance Standing Committee chaired by the District Collector may be formed. For undertaking intensive awareness campaign on plastic wastes for at least three years, funding to local bodies through district administration may be extended. The awareness campaign must be a sustained one through all possible media like print media, local cable television, visible display boards/paintings, rallies etc.

18. Provisions may be made in the State Environment Protection Fund and the funds from Tamil Nadu Pollution Control Board for conducting awareness programmes, institution of awards for outstanding works, support for R&D efforts towards substitution and alternate material to Plastics.

19. The reduction or avoidance of plastic carry bags, cups etc., may be encouraged by instituting separate awards for different categories. The self declared Marriage Halls, Hotels, Institutions, commercial establishments etc., in avoiding the throwaway plastics may be selected for the awards periodically at District and State Level and may be honoured appropriately during Independence / Republic Day celebrations. Awards for outstanding contribution in Plastic waste management may be instituted for best practices at local body level and the best three Districts and local bodies may be considered for Throwaway Plastic Avoidance Award annually.

Further studies to be undertaken:

20. The Committee felt that less importance is given to the occupational health hazard issues in plastic bags manufacturing industry. The Committee recommends to have a specific study by the National Institute of Epidemiology, Ayapakkam, Chennai on the occupational health hazards in the plastics manufacturing units and on the health hazards due to the unscientific disposal of plastic wastes in certain major MSW dump-sites in the State in co-ordination with the TNPCB, Health Department, Factory Inspectorate and concerned local bodies.

21. Government may consider exploring the possibilities for alternative technology for substitute development and recycle processes, for which R&D studies may be undertaken. The research and academic institutions and the industries which are involved in this field may be encouraged through appropriate funding for R&D works and for prototype development under the Department of Environment/TNPCB as nodal agency.

Dr. H. Malleshappa, I.F.S.,
Director of Environment and
Convener of the Expert Committee
Chennai

Dr. T. Sekar, I.F.S.,
CCF (P&D) and
Chairman of the Expert Committee
Chennai

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ACRONYMS

AAGR	: Average Annual Growth Rate
ABS	: Acrylonitrile Butadiene Styrene
BHT	: Butylated Hydroxy Toluene
BP	: Board's Proceedings
CCF	: Chief Conservator of Forests
CHEPMMA	: Chennai Plastics Manufacturers and Merchants Association
CIPET	: Central Institute of Plastic Engineering and Technology (India), Chennai
DoE	: Director of Environment
EPR	: Extended Producers' Responsibility
G.O	: Government Order
GoI	: Government of India
HDPE	: High Density Poly Ethylene
LDPE	: Low Density Poly Ethylene
MoEF	: Ministry of Environment and Forests
MSW	: Municipal Solid Waste
NGC	: National Green Corps
PC	: Poly Carbonate
P&D	: Planning and Development
PE	: Polyethylene
PET/PETE	: Polyethylene Terephthalate
PP	: Poly Propylene
PS	: Polystyrene
PU	: Polyurethane
PVC	: Poly Vinyl Chloride
SAN	: Styrene Acrylonitrile
SHG	: Self Help Group
TNPCB	: Tamil Nadu Pollution Control Board
ToR	: Terms of Reference
VAT	: Value Added Tax
WP	: Writ Petition

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ANNEXURES

ANNEXURES

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ANNEXURE-1

Copy of G.O. Ms.No.92 E&F (EC 2) Department Dated:10.08.2011

Abstract

Environment Control constitution of "Expert Committee to check the health and environmental hazards in the use of plastics"- Orders - issued

Environment and Forests (EC-2) Department

G.O. Ms. No.92

Dated: 10.08.2011

Read:

Orders of Hon'ble High Court of Madras (Madurai Bench) in
W.P. (MD) No.11753 of 2010 dated 10.11.2010

ORDER

The Hon'ble Madurai Bench of Madras High Court while dealing with the issue of dumping of broken plastics, used tyres, waste papers etc., in its judgment on W.P (MD) No.11753 of 2010 dated 10.11.2010 read and above, have given several direction/ suggestions to the Government of Tamil Nadu

2. Among other things, the Hon'ble Madurai Bench of Madras High Court has suggested that the Government of Tamil Nadu may constitute an "Expert Committee to check the health and environmental hazards in the use of the plastic bags and plastic packaging materials in Taminadu and also to evolve various measures in checking the health and environmental hazards arising out of the use of plastic bags and to find out the ways and means to intensify plastic awareness camps.

3. The Government after careful examination of the orders of the Hon'ble Madurai Bench of Madras High Court, have decided to constitute an "Expert Committee to check the health and environmental hazards in the use of plastics" for the implementation of directions issued by the Hon'ble Madurai Bench of Madras High Court, Accordingly, the Government constitute an Expert Committee as follows:

a. Scope

The Expert Committee shall look into issues relating to checking the health and environmental hazards in the use of the plastic bags and plastic

packaging materials in Tamil Nadu and also evolve various measures in checking the health and environmental hazards arising out of the use of plastic bags and arrive at the modalities to intensify Plastic Awareness Camps.

b. The composition of the Expert Committee consists of the following members:

Sl.No	Name & Designation	Status
1	Dr. T. Sekar, I.F.S., Chief Conservator of Forests and -- former Director of Environment, Tamil Nadu Forest Department, Saidapet, Chennai-600 015	Chairman
2	Industries Commissioner and Director, -- Chepauk, Chennai-600 005	Member
3	Commissioner of Rural Development -- and Panchyat Rai Department, Panagal Building, Saidapet, Chennai-600 015	Member
4	Additional Director of Public Health and -- Preventive Medicine 358, Anna Salai, Chennai-600 006	Member
5	Director -- Directorate of Teacher Education Research and Training, College Road, Chennai-600 006	Member
6	Director of Central Institute of Plastics -- Engineering and Technology(CIPET) Industrial Estate, Guindy, Chennai	Member
7	Director of Centre for Environmental -- Studies Anna University, Chennai-600 025	Member
8	Ms. Shweta Narayan -- H 16/19, Seevakan Street, Kalakshetra Colony, Besent Nagar, Chennai-600 090	Member
9	Director of Environment -- Government of Tamil Nadu Saidapet, Chennai-600 015	Member Secretary and Convenor

c. Terms of Reference for the Expert Committee

- i) Evaluate the magnitude of use of plastic including throw away plastics
- ii) Environmental problems including health effects on use of plastics and disposal of throw away plastic wastes
- iii) Plan of action to tackle the problems of use and disposal of plastics
- iv) Alternatives to plastics including throw away plastics
- v) Creation of Environmental awareness among public on the harmful effects of use of plastics
- vi) Action Plan for manufacturers, traders, recyclers, local bodies and users on minimizing the use of plastics.
- vii) Advising competent authorities in enacting the rules and regulation/guidelines on the production, use and disposal of throw away plastics and plastic products
- viii) Mobilizing action against environmental unfriendly practices such as dumping of plastics, unauthorized, unhygienic use of plastics and unscientific disposal of plastics etc., in public places.
- ix) To study the various solid, liquid and gaseous emissions generated during the manufacturing of plastic bags, plastic packaging materials and the pollution caused to water, air, soil, health and environmental hazards caused to the society due to use and disposal of plastics and evolve necessary measures to control degradation of environment and the health hazard based on the finding of the study.

d. Periodicity of meetings

The Expert Committee shall meet at least once in three months to propose/review and monitor action to take/taken in pursuance of the objectives mentioned above.

e. Constitution of Sub Committees

The Expert Committee may constitute such sub -Committees as deemed fit to study/purpose/evaluate/recommend/monitor action to fulfill its role.

f. Status of the committee

The Expert Committee and the Sub-Committees, if any formed by the Expert Committee, will be treated as First Class committees for the purpose of Travelling Allowances, Dearness Allowance etc., in respect of non-official

members and the said non-official members will be eligible to draw travelling allowance, dearness allowance as per the rules in force. The travelling Allowance/Dearness Allowance for the official members to be met from their department budget allocations.

g. Financial / Logistics support

The Expenditures towards conducting the meetings, travelling expenditures, Dearness Allowances to the non-official members, secretarial assistance, financial assistances to the activities, programmes etc., to achieve the objectives referred above and other logistics support will be met by the Tamil Nadu Pollution Control Board.

4. This order issues with the concurrence of Finance (BPE)/Law Departments vide its U.O. No.10248/Finance (BPE)/2011 dated 24.02.2011 and Law U.O.No.8147/11 dated 14.03.2011.

(BY ORDER OF THE GOVERNOR)

C.V. SANKAR
PRINCIPAL SECRETARY TO GOVERNMENT

To

The Chairman, Tamil Nadu Pollution Control Board, Chennai-32
The Member Secretary, Tamil Nadu Pollution Control Board, Chennai-32
The Director of Environment, Chennai-15
The Principal Chief Conservator of Forests, Chennai-15
The Registrar (Judicial), Madurai Bench of Madras High Court, Madurai-625 023

Copy to:

The Municipal Administration and Water Supply Department, Chennai-09
The Revenue Department, Chennai-09
The Industries Department, Chennai-09
The Rural Development and Panchayat Raj Department, Chennai-09
The Health and Family Welfare Department, Chennai-09
The School Education Department, Chennai-09
All the Members

//Forwarded By Order//

Sd./-xxxxx
Section Officer

ANNEXURE 2

DETAILS OF MEETINGS OF THE EXPERT COMMITTEE

Meeting No	Date	Subjects discussed
I	23.09.2011	- Discussion of the scope of the Expert Committee -Inclusion of additional members in the Committee - Formation of Sub committees
II	24.01.2012	-Presentation of the Reports of the Sub committees I and II -Follow up action required on the report of the Sub Committees
III	23.04.2012	-Presentation of the revised reports of Sub Committees I and II -Follow up action required on the report of the Sub-committees -Adverse impact of 'Co processing of Plastic Waste in cement industries' -Academics and Plastic Manufacturers Association to be invited to offer their views
IV	09.07.2012	-Follow up action required on the final report of Sub-committee I and II -Adverse impact of 'Co processing of Plastic Waste in cement industries' -Academics and Plastic Manufacturers Association to be invited to offer their views -Action Taken Reports by the members of the Expert Committee and the implementing departments
V	14.09.2012	Presentation of the draft final report of the Expert Committee and discussion thereon
VI	16.10.2012	Placing the final report of the Expert Committee for discussion and approval

ANNEXURE 3

Copy of:

Environment Control – Constitution of "Expert Committee to check the health and environmental hazards in the use of plastics" – Recommendation of Committee to include Additional Members – Amendment orders – Issued

ENVIRONMENT AND FOREST (EC-2) DEPARTMENT

G.O.(Ms). No.180

Dated 12.12.2011

Read:

1. G. O. Ms. No.92 Environment and Forests (EC-2) Department, dated 10.08.2011
2. From the Director of Environment, Letter Rc.No.1931/JDO/ 2011 Dated 29.09.2011

ORDER

In Government order first read above, orders were issued to constitute and Expert Committee to check the health and environmental hazards in the use of plastics as per the directions of Madurai Bench of Hon'ble High Court of Madras.

2. In the letter second read above, the Director of Environment has requested to include the following five official members as additional members in the Expert Committee to fulfill its role in checking the health and Environmental hazards.

- i) Member Secretary, Tamil Nadu Pollution Control Board
- ii) Commissioner of Municipal Administration/representative
- iii) Director of Town Panchayats/representative
- iv) Commissioner of Chennai Corporation/representative
- v) Managing Director, Tamil Nadu Corporation for Development of Women Limited/representative

3. The Government after care full examination of the above report of the Director of Environment have decided to include the officials as suggested by the Director of Environment in the Expert Committee to check the health and Environmental hazards in the use of Plastics issued in G.O. (Ms) No.92 Environment and Forests Department dated 10.08.2011

4. Therefore, the following amendment is issued to G.O.(Ms) No.92 Environment and Forests (EC-2) Department dated 10.08.2011

Amendment

In para 3(b) of the said Government order, the following officials shall be added after serial No.9:-

- i) Member Secretary, Tamil Nadu Pollution Control Board
- ii) Commissioner of Municipal Administration/representative
- iii) Director of Town Panchayats/representative
- iv) Commissioner of Chennai Corporation/representative
- v) Managing Director, Tamil Nadu Corporation for Development of Women Limited/representative

5. This order issues with the concurrence of the Finance(BPE) Department vide its U.O. No.61420/BPE/2011 Dated 25.11.2011

(BY ORDER OF THE GOVERNOR)

**C.V.SANKAR
PRINCIPAL SECRETARY TO
GOVERNMENT**

To
The Chairman, Tamilnadu Pollution Control Board, Chennai-32
The Member Secretary, Tamilnadu Pollution Control Board, Chennai-32
The Director of Environment, Chennai-15
The Principal Chief Conservator of Forests, Chennai-15
The Registrar(Judicial) Madurai Bench of Madras High Court, Madurai-625023

Copy to:
The Municipal Administration and Water Supply Department, Chennai-9
The Revenue Department, Chennai-9
The Industries Department, Chennai-9
The Rural Development and Panchayat Raj Department, Chennai-9
The Health and Family Welfare Department, Chennai-9
The School of Education Department, Chennai-9
All the Members

//Forwarded By Order//

SECTION OFFICER

ANNEXURE 4

CONSTITUTION OF SUB COMMITTEES

Government in G.O. (Ms) No.92, Environment and Forests (EC-2) Department dated 10.8.2011, has suggested that the Expert Committee on Plastic Wastes may constitute sub committees as deemed fit to study/propose/evaluate/recommend/monitor actions to fulfill its role. The suggestion to form two Sub Committees to cover the major issues listed out in the Terms of Reference assigned for the Expert Committee was discussed in the first meeting of the Expert Committee held on 23-09-2011 in detail.

The Committee resolved to constitute two Sub committees with an objective to address each of the specific tasks. It was considered necessary by the Expert Committee that the concerned sub committees may access to information on the best practices adopted for plastic waste management in various places in India and ascertain about successful models from various agencies working on specific issues concerning the plastic waste management. The Sub committees were requested to furnish their interim report within 3 months.

Sub Committee No.1:

Theme: "To evaluate the environmental Problems including health effect".

Tasks to be covered:

- (i) Evaluate the magnitude of use of plastics including throw away plastics
- (ii) To study the various solid liquid and gaseous emissions generated during the manufacturing of plastic bags, plastic packaging materials and occupational health hazards.
- (iii) The pollution caused to water, air, soil, health and environmental hazards caused to the society due to use and disposal of plastics and evolve necessary measures to control degradation of environment and the health hazard based on the findings of the study.
- (iv) Environmental problems including health effects on usage of plastics and disposal of throw away plastic wastes.

Composition:

1. Additional Chief Environmental Engineer, TNPCB - Convenor
2. Joint Director of Public Health & Preventive Medicine
3. Joint Director, Commissionerate of Municipal Administration
4. Joint Director, Directorate of Town Panchayat.
5. Superintending Engineer, Municipal Solid Waste, Chennai Corporation
6. A Professor, Centre for Environmental Studies, Anna University
7. Additional Director, Public health and Preventive medicine and Director, Institute of Community Medicine, Madras Medical College.

Sub Committee 2:

Theme: "Preventive Strategies for waste reduction and environmental awareness"

Tasks to be covered:

- (i) Alternatives to plastics along with economic viability study including throwaway plastics.
- (ii) Plan of action to tackle the problems of use and disposal of plastics.
- (iii) Action Plan for manufacturers, traders, recyclers, local bodies and users on minimizing the use of plastics.
- (iv) Creation of Environmental awareness among public on the harmful effects of use of plastics and to minimize the usage.
- (v) Mobilizing action against environmentally unfriendly practices such as dumping of plastics, unauthorized, unhygienic use of plastics and unscientific disposal of plastics, etc., in public places.

Composition:

1. Additional Director, Department of Environment - Convenor
2. Joint Chief Environmental Engineer dealing with the subject of plastics in Tamil Nadu Pollution Control Board
3. A scientist from Central Institute of Plastic Engineering and Technology
4. A Professor, Centre for Environmental Studies, Anna University
5. Representative of Project Director, Sarva Shikshya Abhiyan
6. Additional Director, Women Development Corporation.

The Committee further resolved that the Sub committees will ensure frequent meetings at least once in a month to deliberate on the subjects by the members. The reports and findings to be submitted by the Sub Committees to the Expert Committee would be crucial for formulating a framework for checking the health and environmental hazards due to plastic usage.

ANNEXURE 5

COPY OF:

Minutes of the First Meeting of the Expert Committee on Plastic wastes held on 23.09.2011 at 11.00 AM in the Conference Hall of TNPCB

Present:

1. Dr. T. Sekar, I.F.S.,
Chief Conservator of Forests and
former Director of Environment and
Chairman of the Expert Committee
2. Thiru K. Elangovan,
Joint Director (Chemicals),
Department of Industries
3. Thiru K. Megraj,
Additional Director,
Rural Development and Panchayat Raj Department
4. Dr. S. Saravanan,
Joint Director,
Directorate of Public Health and Preventive Medicine
5. Thiru R. Somasundaran,
Deputy Director,
Directorate of Teacher Education Research and Training
6. Dr. PSG Krishnan,
Chief Manager (Technical),
CIPET
7. Dr. S. Karthikeyan,
Assistant Professor (SG),
Centre for Environmental Studies
8. Ms. Shweta Narayan,
Community Environmental Monitoring
9. Thiru T.S. Srinivasamurthy, I.F.S.,
Director of Environment and
Member Secretary and Convenor of the Expert Committee

The Director of Environment and Member Secretary of the Expert Committee welcomed the Chairman and Members for the first meeting of the Committee and explained about the Government Orders on the constitution of

Expert Committee with the objectives of checking the health and environment hazards in the use of plastics.

The Chairman of the Expert Committee elucidated on the various types of plastics in usage and the need for greater awareness on plastic wastes and end users' responsibility in managing plastic wastes and individual agenda items were discussed in detail upon which the members made several suggestions.

Agenda No.1:

The following suggestions were made by the members on the scope of Committee:

1. Assessing source wise generation of plastic wastes may also include source wise disposal of such wastes in the state.
2. Look into the health and environment hazards in terms of unsafe chemical composition of the wastes as a part of generating awareness among public.
3. Bio degradable plastics could be substituted in place of non bio degradable and the CIPET may provide its valuable input in this regard on the technological angle.
4. The method adopted in other States for controlling the usage of plastics (Himachal Pradesh, Kerala) may be studied and considered for adoption in the State.
5. As per the Municipal Solid Waste (MSW) Rules, it is made mandatory to segregate the wastes at the source itself and hence it is suggested that the urban local bodies should enforce the source segregation.
6. Identifying proper technologies that can convert plastic wastes into fuel without causing any health impacts.
7. The Committee desired that inputs from Thiru Rajendra Ratnoo, I.A.S., may be obtained as significant efforts were taken in Kanniyakumari district in reducing the generation of plastic wastes during his tenure as Collector of the district.

After deliberations, the Committee decided to cover the general areas outlined in the agenda for examination and literature review so as to arrive at suitable recommendations.

Agenda Item No.2: Inclusion of additional members in the Committee

Apart from the members included in the Expert Committee to check the health and environmental hazards in using of Plastics constituted vide G.O (Ms) No.92, Environment and Forests (EC-2) Department dated 10.8.2011, it has been suggested that the following officials may also be included as members in the Expert Committee.

- (i) Member Secretary, Tamil Nadu Pollution Control Board
- (ii) Commissioner of Municipal Administration,
- (iii) Director of Town Panchayat,
- (iv) Commissioner of Chennai Corporation,

Decision Taken:

The Committee considered the need for inclusion of additional members in the committee who have considerable role in the production, handling, usage of plastics and in the management of plastic wastes.

After detailed discussion, the Committee resolved to recommend to Government to include the following officials as Members in the Expert Committee constituted vide G.O.Ms.No.92, Environment and Forests (EC 2) Department dated 10.08.2011.

1. Member Secretary, Tamil Nadu Pollution Control Board.
2. Commissioner of Municipal Administration / his representative
3. Director of Town Panchayat / his representative
4. Commissioner of Chennai Corporation/ his representative
5. Managing Director, Women Development Corporation/his representative

Agenda Item No.3: Formation of Sub Committees

In G.O (Ms) No.92, Environment and Forests (EC-2) Department dated 10.8.2011, it has been suggested that the Expert Committee may constitute sub committees as deemed fit to study/ propose/evaluate/ recommend/monitor actions to fulfill its role. The suggestion to form two Sub Committees to cover the major issues listed out in the Terms of Reference assigned for the Expert Committee was discussed in detail.

Decision Taken:

The Committee resolved to constitute two sub committees with the following composition with an objective to address each of the task outlined in the agenda. It was considered necessary by the Expert Committee that the

concerned sub committees may access to information on the best practices adopted for plastic waste management in various places in India and ascertain about successful models from various agencies working on specific issues concerning the plastic waste management. The sub committees may be requested to furnish their interim report within 3 months.

Sub Committee No.1:

Theme: "To evaluate the environmental Problems including health effect".

Tasks to be covered:

- (i) Evaluate the magnitude of use of plastics including throw away plastics
- (ii) To study the various solid liquid and gaseous emissions generated during the manufacturing of plastic bags, plastic packaging materials and occupational health hazards.
- (iii) The pollution caused to water, air, soil, health and environmental hazards caused to the society due to use and disposal of plastics and evolve necessary measures to control degradation of environment and the health hazard based on the findings of the study.
- (iv) Environmental problems including health effects on usage of plastics and disposal of throw away plastic wastes.

1. Additional Chief Environmental Engineer, TNPCB - Convenor
2. Joint Director of Public Health & Preventive Medicine
3. Joint Director, Commissionerate of Municipal Administration
4. Joint Director, Directorate of Town Panchayat.
5. Superintending Engineer, Municipal Solid Waste, Chennai Corporation
6. A Professor, Centre for Environmental Studies, Anna University
7. Additional Director, Public health and Preventive medicine and Director, Institute of Community Medicine, Madras Medical College.

Sub Committee 2:

Theme: "Preventive Strategies for waste reduction and environmental awareness"

Tasks to be covered:

- (i) Alternatives to plastics along with economic viability study including throw away plastics.
- (ii) Plan of action to tackle the problems of use and disposal of plastics.
- (iii) Action Plan for manufacturers, traders, recyclers, local bodies and users on minimizing the use of plastics.

(iv) Creation of Environmental awareness among public on the harmful effects of use of plastics and to minimize the usage.

(v) Mobilizing action against environmentally unfriendly practices such as dumping of plastics, unauthorized, unhygienic use of plastics and unscientific disposal of plastics, etc., in public places.

1. Additional Director, Department of Environment - Convenor
2. Joint Chief Environmental Engineer dealing with the subject of plastics in Tamil Nadu Pollution Control Board
3. A scientist from Central Institute of Plastic Engineering and Technology
4. A Professor, Centre for Environmental Studies, Anna University
5. Representative of Project Director, Sarva Shikshya Abhiyan
6. Additional Director, Women Development Corporation.

The Committee also resolved that the sub committees will ensure frequent meetings at least once in a month to deliberate on the subjects (1) and (2) by the members. The reports and findings to be submitted by the sub committees to the Expert Committee would be crucial for formulating a framework for checking the health and environmental hazards due to plastic usage.

Agenda Item No.4: Any other Items:

The Committee members felt that the deliberations of the Committee may be communicated within a group e-mail to be generated by the Director of Environment. The members were requested to give their inputs to the Convenor of the Expert Committee then and there through the group e-mail.

The meeting ended with Dr. T. Sekar, I.F.S., thanking the committee members for their participation.

sd./- T.S. Srinivasamurthy,
Member Secretary

Sd./- T. Sekar,
Chairman

ANNEXURE 6

Copy of:

Minutes of the Second Meeting of the Expert Committee held on 24.01.2012 at the TNPCB Conference Hall, Chennai 600 032

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List of officials / members who have attended the meeting is annexed.

The Chairman of the Expert Committee welcomed the members of the committee and explained the action taken up in this regard, course of action to be taken up by the Expert Committee in future. On behalf of Sub-committee-I, Thiru Kirubanantharajan, Assistant Engineer of Tamil Nadu Pollution Control Board made power point presentation. Thiru Yogesh Dwivedi, I.F.S., made power point presentation on behalf of Sub-Committee-II simultaneously. The following suggestions were offered by the Chairman and Members of the Expert Committee on the reports already forwarded by the Sub-Committee-I & II.

Comments on the Reports forwarded by the Sub-Committee I & II

- 1) Whenever furnishing secondary data reports, etc. the information furnished in the report of the Sub-Committees should be qualitative.
- 2) The present scenario of Tamil Nadu state in plastic waste should be highlighted.
- 3) While analyzing the reports of the Sub-Committee I & II that the informations furnished regarding presence of heavy metals are contradictory. May be examined by both the agencies (viz.) Tamil Nadu Pollution Control Board, Department of Environment and furnished the informations scientifically.
- 4) Data relating to Health Hazards due to usage of plastics/recycled plastics may be updated and discussed in detail. (For both Sub Committee I & II)
- 5) As indicated by the representative of Commissioner of Municipal Administration, Chennai-05 the role of M.K. Aromatics, Alataur in handling plastic waste as resource material, may be explored. The TNPCB may be instructed to sort out this issue, the details of present status of using plastics by the company may be reported.

- 6) The Committee indicated that the usage of plastics/handling of plastic waste/recycled plastics followed by the other states (viz.) Himachal Pradesh, Gujarat and Maharashtra may be collected by both the Sub-Committee I & II and updated.
- 7) The reports of the Sub-Committees are not mainly focusing on the thrust areas already allocated by the Expert Committee and hence the convenors are requested to revise the reports as indicated by the Chairman of the Expert Committee and submit their final reports within fortnight (on or before 10.02.2012)

After detailed deliberations, the following decisions were taken up in this issue:

- 1) The role of the Self-Help Groups in handling plastic waste functioning under the control of Tamilnadu Corporation for Women Development may be obtained.
- 2) Legislations enacted in other Countries/other states in handling plastic/recycled plastics/throwaway plastics, etc. may be explored.
- 3) Adverse impacts on "Co-processing of plastic waste in Cement industries" may be explored, as indicated by Mrs. Shwetha Narayan, the presence of heavy metals may be analyzed in detail. The TNPCB may be requested to render necessary assistance in this issue.
- 4) As indicated by the Director of Environment/Member Secretary (i/c) of TNPCB and convenor of the Expert Committee, the role of Community Participation/ NGO's, etc. is essential.
- 5) As indicated by the Director, CES, Anna University, Chennai-25 concrete action against the defaulters in this issue and in accordance with the provisions of the E.P. Act 1986/Air and Water Acts should be enforced. The Tamil Nadu Pollution Control Board may be directed to take appropriate action in this issue.
- 6) The Committee revealed that no legal provisions to take action against defaulters of handling throwaway plastics in the existing Municipal/Panchayat Acts. Suitable assessments could be essential, hence suitable amendments would be made in the existing acts.

- 7) As indicated by the representative of Department of Public Health and Preventive Medicines, it is decided to approach the National Institute of Epidemiology/Indian Council of Medical Research, in the field of the Environmental and Health hazards in the use of plastics.
- 8) It was decided to collect the information on plastics/recycled plastics/proper disposal of plastics waste from the Academic Institutions (viz.) CIPET, CES, Anna University and other Institutions who are actively involved in R & D work in this issue.
- 9) It is anonymously resolved that compounding powers against the defaulters in this issue is very essential. Hence it is decided to forward suitable recommendations in this regard.
- 10) Finally the Chairman of the Expert Committee insisted that the report of the Expert Committee shall focus on the themes indicated in para (3) of the record of discussions with the conveners of the Sub-Committee I & II held on 03.01.2012 which was circulated to the Members during the course of Expert Committee meeting.
- 11) The members were requested to offer their comments, academic (R&D) reports available with them to the Convener of the Expert Committees then and there through e-mail.

The meeting ended with Vote of thanks.

Sd./- xxxx
T.S. SRINIVASAMURTHY, I.F.S.
Director of Environment/Convenor
Expert Committee for Plastic Waste

Sd./- xxxx
Dr.T. SEKAR, I.F.S.,
Chief Conservator of Forest (P&D)/
Chairman
Expert Committee for Plastic Waste

List of Officers who have attended the Second Meeting of the Expert Committee for Plastic Wastes on 24.01.2012 at TNPCB Conference Hall, Chennai-32

Sl. No	Name of the Officer	Phone No./ e-mail id
1.	Dr.T. Sekar, I.F.S., Chairman & CCF (P & D), O/o the PCCF, Chennai-15	9840948342 sekar_mithun@yahoo.com
2.	The Commissioner, Dept. of Municipal Administration, Chennai-05 (Represented by)	JD (A) Sebastine 9382739898 cmapc@cma.gov.in jda@cma.gov.in
3.	The Director of Town Panchayats, Chennai-108 (Represented by)	A. Essaky, Asst. Executive Engineer, D.T.P. dtp@tn.nic.in/dtp.tn@rediffmail.com
4.	The Managing Director, Tamil Nadu Corporation for Development of Women, Chennai-17 (Represented by)	K. Murali, Manager, (Marketing) 9445034313 tncdwho@yahoo.co.in
5.	The Commissioner, Chennai Corporation, Chennai-03 (Represented by)	M.S. Premnath, SE/SWM 9445190738 seswm@chennaicorporation.gov.in
6.	The Director, Dept. of Teaching Education / Research & Training, Chennai-06 (Represented by)	R. Somasundaram, Deputy Director, 7373003335 dtert.tn.nic.in
7.	The Director, CIPET, Chennai-32 (Represented by)	PSG Krishnan, Chief Manager 9677123883
8.	The Director, CES, Anna University, Chennai-25 (Represented by)	A. Navaneetha Gopala Krishnan 9841280625 angkrshna@hotmail.com
9.	Ms. Shweta Narayan, H16/9 Seevakan Street, Besant Nagar, Chennai-90	8056024315 NOPVCEVER.NEW@GMAIL.COM
10.	The Director, Dept. of Environment, Chennai-15 MS & Convenor	9444051413 tndoe@tn.nic.in
11.	The Additional Director, Dept. of Environment, Chennai-15 Convenor-Sub Committee-I	tndoe@tn.nic.in

12.	The Addl. Chief Environmental Engineer, (P & D) Tamil Nadu Pollution Control Board, Chennai-32 Convenor-Sub Committee-II	8056042334 pkirupanantharajan@yahoo.co.in
13.	V. Murugesan, Municipal Engineer, O/o the CMA	
14.	Dr.B.R. Jemini (H.O.) O/o the DPH & PM, Chennai	9443091924 dphepi@nic.in/ kksamyddhs@gmail.com

ANNEXURE 7

Copy of:

MINUTES OF THE THIRD MEETING OF THE EXPERT COMMITTEE FOR PLASTIC WASTE HELD ON 23.04.2012 AT 03.00 PM AT TNPCB CONFERENCE HALL (ETI), THIRD FLOOR, GUINDY, CHENNAI

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The Chairman of the Expert Committee Dr. T. Sekar, I.F.S., welcomed the members of the Committee for its third meeting and explained the action taken so far, course of action to be taken up by the Expert Committee in order to finalize the report. List of officials who attended the meeting is in Annexure.

Then the agenda items were taken up for discussion.

AGENDA ITEM NO.1: PRESENTATION ON THE REVISED REPORTS OF SUB-COMMITTEE I & II

The Convenor of the Sub-committee-I, Dr. S. Balaji of Tamil Nadu Pollution Control Board did not attend the meeting and no intimation has been received regarding his inability to attend the meeting. The Expert Committee expressed its displeasure about the absence of the Convenor of the Sub-committee-I without any intimation, though invitation for the meeting was circulated well in advance. The Chairman requested the members of the committee to send their views on the report of the Sub-committee-I, so that the same can be incorporated in the final report.

As for Sub-committee-II, Convenor Thiru Yogesh Dwivedi, I.F.S, made a presentation on their report before the Committee. The presentation broadly covered the existing rules and regulations regarding the plastic waste management, quantification of plastic waste generated in the State, action taken by the Government of Tamil Nadu / Tamil Nadu Pollution Control Board in the management of plastic waste. The report also includes the broad preventive strategies for plastic waste reduction and environmental awareness that include alternative to plastics, action plan to tackle the problems of use and disposal of plastics, action plan for manufacturers, traders, recyclers, local bodies and users on minimizing the use of plastics. The Sub-committee had also made brief recommendations in respect of tasks assigned to the group.

The representatives from Corporation of Chennai, Commissionerate of Municipal Administration, Tamil Nadu Corporation for Women Development, Directorate of Town Panchayats, Directorate of Rural Development and Panchayat Raj and CIPET have briefly explained the action that have been taken by the respective agencies to minimize the generation of plastic waste and possible ways of managing the plastic waste by appropriate reuse and recycling mechanisms. The Chairman requested the members to give their specific remarks on the reports of the Sub-committee-I and II to the Director of Environment within a week's time for considering its inclusion in the final report.

AGENDA ITEM NO.2: FOLLOW UP ACTION REQUIRED ON THE REPORT OF THE SUB-COMMITTEES

The members of the Expert Committee were requested to provide additional information relating to the existing policies and policy level intervention proposed, prevailing legal provisions and proposed legal framework and the existing provisions at implementation level and the proposed changes in respect of each theme to the Convenors of the sub-committee in writing. The Convenors of the sub-committees will take efforts to get additional inputs from the respective Government departments / agencies by personally contacting the members concerned before finalizing their report.

AGENDA ITEM NO.3: ADVERSE IMPACTS ON "CO-PROCESSING OF PLASTIC WASTE" IN CEMENT INDUSTRIES

The Expert Committee has requested the Director of Environment to address the Tamil Nadu Pollution Control Board to get the impact analysis on Co-Processing of Plastic Waste in Cement Industries presented before the Expert Committee by the concerned cement units in its next meeting. The Director of Environment has been requested to coordinate with the Tamil Nadu Pollution Control Board in this regard.

AGENDA ITEM NO.4: ACADEMICS, PLASTIC MANUFACTURERS ASSOCIATION TO BE INVITED TO OFFER THEIR VIEWS

The Expert Committee has requested the Director of Environment to obtain the name of authorized State level Plastic Manufacturers Association and invite them to offer their views during the next meeting of the Expert

Committee. The Director of Environment has also been requested to invite reputed academicians from research institutions who are actively involved in research / policy issues concerning plastic waste management.

The Chairman further expressed that the report of the Expert Committee will have to be finalized at the earliest and suggested that a small core group from among the members of the Expert Committee may be formed to finalize the report of the Expert Committee. The members felt that the draft report of the Committee may be placed before the Expert Committee in its meeting, the views of the members heard and incorporated then and there and the report finalized through a full day meeting that may be held after the recommendations of the sub-committees are received and scrutinized.

The meeting of the Committee ended with vote of thanks to the Chair and the members by the Director of Environment.

Sd,./xxxx
H. MALLESHAPPA, I.F.S.,
Director of Environment/Convenor,
Expert Committee for Plastic Waste

Sd,./ xxxx
Dr.T. SEKAR, I.F.S.,
Chief Conservator of Forest (P&D)/ Chairman
Expert Committee for Plastic Waste

List of Officers who have attended the Third meeting of the Expert Committee for Plastic Wastes on 23.04.2012 at TNPCB, ETI Conference Hall, Chennai-32

1.	Dr.T. Sekar, I.F.S., Chairman & CCF (P & D), O/o the PCCF, Chennai-15
2.	Dr.H. Malleshappa, I.F.S., Director of Environment, Saidapet, Chennai-15
3.	Thiru Yogesh Dwivedi, I.F.S., Additional Director of Environment, Saidapet, Chennai-15
4.	Tmt. P. Shanthi, Assistant Executive Engineer, Dept. of Rural Development and Panchayat Raj, Panagal Building, Saidapet, Chennai-15
5.	Thiru R. Vijayakumar, Commissioner, (Representing), Dept. of Municipal Administration, Ezhilagam, Chennai-05
6.	Thiru P. Kumaraguru, Assistant Executive Engineer, Directorate of Town Panchayats, Kuralagam, Chennai-108
7.	Thiru R. Murali, Manager (Marketing) Tamil Nadu Corporation for Development of Women, Valluvarkottam Salai, Chennai-17
8.	Dr. A. Suganyadevi, Zonal Health Officer (Zone 14) Chennai Corporation, Chennai-03
9.	Tmt. S. Meenakshi, Chief Water Analyst, Director (Representing), Dept. of Public Health and Preventive Medicine, DMS Campus, Chennai-06
10.	Dr.Mrs. L. Radha, Principal (I/c), State Council for Education, Research and Training Representing Director of Teacher Education Research & Training, DPI Campus, Chennai-06
11.	Dr.P.S. Krishnan, Chief Manager Technical, CIPET, Thiru Ve.Ka. Estate, Chennai-32
12.	Thiru M.S. Premnath, Superintending Engineer, Solid Waste Management, Corporation of Chennai, Chennai-03

ANNEXURE 8

Copy of:

MINUTES OF THE FOURTH MEETING OF THE EXPERT COMMITTEE FOR PLASTIC WASTE HELD ON 09.07.2012 AT 2.30 P.M. AT TNPCB CONFERENCE HALL (ETI), 3RD FLOOR, GUINDY, CHENNAI-600 032

The Chairman of the Expert Committee welcomed the Members of the committee and explained the action taken so far, course of action to be taken up by the Expert Committee for presenting its final report to the Government of Tamil Nadu. On behalf of subcommittee-I & II, Thiru Kirubanandarajan, AEE, TNPCB and Thiru. Yogesh Dwivedi I.F.S., Additional Director, respectively presented the findings and recommendations of the draft final report. The following suggestions were offered by the Chairman & Members of the Expert committee on the draft reports already forwarded by the sub-committee I & II. The List of Participants is annexed.

AGENDA ITEM NO.1: CONFIRMATION OF THE MINUTES OF THE EARLIER MEETINGS:-

The committee resolved to confirm the minutes of earlier meetings.

AGENDA ITEM NO.2: FOLLOWUP ACTION REQUIRED ON THE FINAL REPORT OF SUB-COMMITTEE- I & II

After detailed deliberation by the members & Chairman of the Expert Committee, following decisions were taken

Sub Committee I :-

- 1) National Institute of Epidemiology may be consulted with regard to occupational Health problems due to ill effect of throw away plastics, carry bags, burning of plastic materials etc., The findings and suggestions of the said institute may be included in the final report of the subcommittee-I.
- 2) The present status of "Draft bill on Non-Biodegradable Plastics" may be ascertained and highlighted.
- 3) The quantification & quality of plastic waste which includes throw away plastics, carry bags, plastic packaging materials mixed with municipal solid waste may be included.

- 4) The subcommittee-I requested Thiru Premnath, Superintending Engineer, (SWM), Corporation of Chennai to provide necessary data available with them to the Director of Environment at the earliest. This may be expedited.
- 5) To ascertain the exact quantity of plastic waste from the solid waste dumped at the dumping yard (in terms of percentage) may be obtained from the CMA/CoC and included in the final report.
- 6) Action taken up by the concerned departments for implementations of plastic waste management by the local bodies/TNPCB/R&D Institutions etc., may be highlighted.
- 7) The details of various liquid/solid and gaseous emissions generated during the manufacture and disposal of plastic bags may be included.

Sub Committee II:-

- 1) Details of R&D activities literatures on plastic waste management etc., done by the academics may be collected & included in the report.
- 2) The List of NGO's, Voluntary organizations involved in plastic waste management may be prepared and enclosed.
- 3) The details of plastic waste generated in the commercial organizations, hotels, TASMAR bars, etc., may be assessed remedial measures to dispose the above items may also be included.

AGENDA ITEM NO.3: ADVERSE IMPACTS ON "CO-PROCESSING OF PLASTIC WASTE IN CEMENT INDUSTRIES

The Chairman of the Expert Committee requested the TNPCB to furnish the preset status on this issue. The Director ETI, TNPCB clarified that co-processing of cement industries (Sankar Cement) is not in operation due to technical problems. However he assured to furnish the details on this issue to be incorporated in the final report of the Sub committee-I. Likewise the Chairman of the Expert Committee requested the Additional Director of the Environment to incorporate this recycle process details in M/s. M.K. Aromatics, Alathur of Tirporur Taluk and the feasibility for such recycling options in the final report of sub committee -II.

AGENDA ITEM NO.4: ACADEMICS AND PLATIC MANUFACTURERS ASSOCIATION TO BE INVITED TO OFFER THEIR VIEWS

1) Academics

Dr. C.G. Saravanan, Professor of Mechanical Engineering, & Dr. M. Gopalakrishnan of Annamalai University presented their project namely "Evaluation of Refuse derived Fuel from Waste Plastics and Engine Fuel Substitute. The Chairman & Members of the Committee appreciated the efforts taken up them & the Committee requested the project team to forward their findings to the Director of Environment. The Chairman requested the Director of Environment / Additional Director & Director, ETI, to incorporate their findings suitably in the subcommittee report - II

2) Plastic Manufacturers Association

The following associations attended the Expert Committee meeting

1. The President,
Chennai District,
Plastic Manufacturers & Merchants' Association
2. The President,
Tamil Nadu Plastic Manufacturers' Association

The representatives of the both associations thanked the Chairman and Director of Environment for giving an opportunity to deliver their comments. The representative of the associations expressed that major constraints in plastic wastes arise from post use collection, handling and management of the plastic wastes and request that the Expert Committee may focus on Management issues in this respect. The Chairman and the Members of the Expert Committee agreed to consider their views and requested the Associations to represent their opinions in the form of Memorandum to the Director of Environment.

AGENDA ITEM NO.5: ACTION TAKEN REPORTS BY THE MEMBERS OF THE EXPERT COMMITTEE AND THE IMPLEMENTING DEPARTMENTS (DISTRICT COLLECTORS/LOCAL BODIES/TAMIL NADU POLLUTION CONTROL BOARD)

The Chairman reviewed the progress of submission of action taken report by the implementing departments/agencies/District Collectors/ TNPCB/Local Bodies & conveyed that the matter is badly delayed from the many departments.

He requested the Director of Environment to follow up on this issue. The implementing Departments may be requested to send their action taken report to the Director of Environment at the earliest.

The meeting ended with vote of Thanks.

Sd./- xxxxx
Dr. H. Malleshappa, I.F.S.,
Director of Environment &
Convener of the Expert Committee

Sd./-xxxxx
Dr. T. Sekar, I.F.S.,
Chief Conservator of Forests (P&D) &
Chairman of the Expert Committee

List of Officers who have attended the Fourth meeting of the Expert Committee for Plastic Wastes on 09.07.2012 at TNPCB, ETI Conference Hall, Chennai-32

1.	Dr. T. Sekar, I.F.S., Chairman & CCF (P & D), O/o the PCCF, Chennai-15
2.	Dr. H. Malleshappa, I.F.S., Director of Environment, Saidapet, Chennai-15
3.	Thiru Yogesh Dwivedi, I.F.S., Additional Director of Environment, Saidapet, Chennai-15
4.	Dr. K. Karthikeyan, Joint Chief Environmental Engineer, TNPCB, Chennai-32
5.	Tmt. S.R. Geetha, Assistant Executive Engineer, Dept. of Rural Development and Panchayat Raj, Panagal Building, Saidapet, Chennai-15
6.	Thiru R. Vengatachalam, Commissioner, (Representing), Dept. of Municipal Administration, Ezhilagam, Chennai-05
7.	Thiru P. Kumaraguru, Assistant Executive Engineer, Directorate of Town Panchayats, Kuralagam, Chennai-108
8.	Thiru R. Murali, Manager (Marketing) Tamil Nadu Corporation for Development of Women, Valluvarkottam Salai, Chennai-34
9.	Thiru M.S. Premnath, Superintending Engineer, Chennai Corporation, Chennai-03 Dr. A. Suganyadevi, Zonal Health Officer (Zone 14) Chennai Corporation, Chennai-03
10.	Thiru P. Duraisamy, Joint Director (SBHI), Director (Representing), Dept. of Public Health and Preventive Medicine, DMS Campus, Chennai-06
11.	Dr. R. Ayyappan, Representing Director of Teacher Education Research & Training, DPI Campus, Chennai-06
12.	Dr. P.S. Krishnan, Chief Manager Technical, CIPET, Thiru Vi.Ka. Estate, Chennai-32
13.	Thiru D. Kamaraj, Chennai Plastics Manufacturers Association, Chennai-112
14.	Thiru P. Swaminathan Thiru P.S.R. Balasubramanian, Thiru Virendrakumar, Tamil Nadu Plastics Manufacturers Association, Chennai-34
15.	Dr. C.G. Saravanan, Professor of Mechanical Engineering, Dr. M. Gopalakrishnan, Professor of Chemistry, Annamalai University,

ANNEXURE-9

Copy of:

Minutes of fifth meeting of the Expert Committee to check health and Environmental hazards in the use of plastics held on 14.09.2012 at TNPCB ETI Conference Hall, Chennai-32

The fifth meeting of the Expert Committee to check health and Environmental hazards in the use of plastics was held on 14.09.2012 at Tamilnadu Pollution Control Board, ETI Conference Hall. Dr. H. Malleshappa, I.F.S., Director of Environment welcomed the Chairman and Members of the Expert committee and other officials attended the meeting. He outlined draft report prepared by the Expert Committee and requested the members to offer their valuable comments.

The List of participants is annexed.

Dr. T. Sekar, I.F.S., Chief Conservator of Forests, Planning and Development, Tamilnadu Forests Department and Chairman of the Expert Committee briefed the action taken so far by the Expert Committee, existing legal provisions of Plastic Waste Management and requested Thiru Yogesh Dwivedi, I.F.S. Additional Director, Department of Environment and Chairman of the Sub Committee-II to present "Analysis of issues covered under Terms Of Reference" framed by Government of Tamilnadu and Thiru Kirupanantharajan, Assistant Environmental Engineer, TNPCB on "The draft recommendation of the Expert Committee " respectively.

Thiru A.V. Rajesh, Executive Engineer, Rural Development and Panchayat Raj suggested that the term "urban local bodies and village panchayats "may be included instead of "local bodies"

It is stated, in para in page 13 of the draft report that around 464 registered units are engaged in recycling plastics. Tmt. Shweta Narayan clarified that the discarded plastic wastes not being taken for the recycling are dumped in agricultural land and water bodies, and hence regular monitoring mechanisms to analyze the health hazards caused by such disposal need to be put in place. She requested that the Committee may examine whether all such units were properly registered with Tamilnadu Pollution Control Board or not.

The Chairman informed that the views offered by the Members would be considered and suitably incorporated in the final report.

i) Evaluation of magnitude of use of plastic including throwaway plastics

While discussing the above issues namely "Evaluation of magnitude of use of plastic including throwaway plastics" it is suggested that 225 tonnes is non recyclable plastic waste generated every day in Tamilnadu. The members of the Expert Committee suggested that broad methodology for working out the quantum of non recyclable plastic waste generated every day may be included are Annexure to the report.

The Chairman of the Expert Committee requested the representative of Chennai Corporation to furnish the actual figures of solid waste generated every day (Zone wise details) out of which the percentage of recyclable waste and non-recyclable waste which includes plastic waste, the composition of plastic waste etc., He appealed to the officials of Chennai Corporation to furnish information on the additional manpower required for cleaning of storm water drain in the Corporation area due to dumping of plastic wastes in this drains.

Tmt. Shweta Narayan suggested that the language of the draft report may be scientifically and technically accurate and appropriate.

ii) Solid, liquid and gaseous emissions generated during the manufacturing of plastic bags, plastic packaging materials and occupational health hazards.

It is stated that in para 3 under the subhead that **appreciable** solid waste is generated in packaging and manufacturing units and it is stated in the last para that comprehensive studies have not been undertaken by any scientific institutions to analyze the occupational health hazards in the plastic manufacturing units.

In this regard, Tmt. Shweta Narayan clarified that the word **appreciable** may be modified after analyzing the facts scientifically. Similarly she clarified that the later para i.e analysis the health hazards are not incorporated properly. She felt that many institutions have undertaken scientific studies periodically.

Based on the results of the studies, suitable additional information may be incorporated.

The Chairman requested the Members to share the details of studies convened by any academic institutions or through departments in this regard.

iii) Pollution caused to Water, Air and Soil, Environment Hazards including health effects on usage of plastic and disposal of throw away plastic wastes.

Thiru P.S. G. Krishnan, Chief Manager (Technical) , CIPET, Chennai clarified that during the manufacturing process of plastic there are no gaseous emissions, except water vapour . Also during the manufacturing process approved additives are used.

After detailed deliberations the Chairman requested the TNPCB authorities to ascertain if any solid waste are produced to as byproduct of the manufacturing process of plastic. The facts may be obtained authentically and incorporated.

Tmt. S. Meenakshi, Chief Water Analyst King Institute briefed about the ill effects of plastics. She explained the adverse effect of throw away plastic specially regarding the clogging of storm water drain.

The Chairman has requested the representative of the Chennai Corporation to furnish the recorded data of labourers involved in silt removal from storm water drain periodically. The officials of Corporation informed that cleaning of storm water drain is undertaken on contract basis(not by the department) however the details may be furnished to the Expert Committee to ascertain the ill effects due to dumping of throw away plastic carry bags in storm water drains and water bodies of Chennai.

The Chairman requested the Director of Environment to incorporate the details of studies undertaken on contamination of water due to disposal of Municipal Solid Waste in Perungudi dumping yard by the Centre for Climate Change Adaptation Research, Anna University, Chennai.

iv) Environmentally unfriendly practices such as dumping plastic, unauthorized, unhygienic use of plastics and unscientific disposal of plastics etc., in public places

After detailed deliberation the committee recommended that use of virgin plastic can also be included.

v) Plan of Action to tackle the problems of use and disposal of plastics

Tmt. Shweta Narayan clarified that co-incineration in cement industry is highly objectionable due the suspected release of heavy metals in the atmosphere and hence the practices could not be recommended. The TNPCB authorities clarified that the process was done scientifically and in many cement industries the co-processing has been stopped due to non availability of plastic waste regularly by the local bodies. She added that appraising the economic viability of plastic roads is also necessary.

Thiru K.Murali, Manager (Marketing) of Tamil Nadu Corporation for Women narrated the activates of Self Help Group who are involved in collection of throw away plastics for its utilization relaying of roads by the implementing departments. He assured that the details of Self Help Group activities in this regard will be forwarded to the Director of Environment to include in the final report.

vi) Action Plan for manufacturers, traders, recyclers, local bodies and users on minimizing the use of plastics

After detailed deliberations the Committee concluded that the following suggestions may be incorporated in the draft report.

- a) Plastic free zones may be extended in phased manner
- b) Monitoring of existing mechanism needs to be strengthened by issuing suitable amendment in the exiting legal frame work (while implementing wholly by the Government Machinery)
- c) As the trading activity is not covered under the purview of Industries Act, suitable amendment can be incorporated
- d) Plastic Avoidance Policy can be enacted
- e) The size/gauge may be prescribed by the Government regarding the use of throw away plastic carry bags and other non biodegradable plastic waste materials
- f) Powers for implementation/to regulate the violation of existing rules enacted by Government of India for the usage of plastic materials may be prescribed in detail after analyzing the existing legal framework

g) A road map need to be developed for effective implementation of plastic waste management rules.

vii) Alternative to plastics including throw away plastics

viii) Creation of Environmental awareness among public on the harmful effects of use of plastics and to minimize the usage

ix) Advising competent authorities

After detailed deliberations the Committee approved the contents of the draft report and decided to incorporate it in the final report of the Expert Committee.

Recommendations

After detailed deliberations the Committee decided to forward the recommendations subject to the modifications proposed by the members in the final report. The Chairman requested the Sub Committee -I and II to carry out the suitable modification proposed by the members in the final report.

The Director of Environment and the Convener of the Committee has requested the members of the Expert Committee that final report would be circulated to the members for approval after carrying out suitable modifications proposed during the Vth Expert Committee meeting. The suggestions on the final report may be forwarded to the Director of Environment in writing on or before 28.09.2012 after scrutiny.

The Chairman and Member Secretary of the Expert Committee thanked the Members of the Expert Committee who offered their valuable suggestions/ views/ comments.

Sd/-xxx
Dr. H. Malleasappa, I.F.S
Director of Environment and
Member Secretary for the Expert
Committee, Plastic Waste

Sd/-xxx
Dr. T. Sekar, I.F.S
Chief Conservator of Forests(P&D)
Chairman for the Expert Committee
Plastic Waste.

List of Participants who have attended the Review Meeting of the Fifth Expert Committee to Check Health and Environmental Hazards in the Use of Plastics on 14.09.2012 at TNPCB Conference Hall, Chennai

Sl.No.	Details of Participants	Phone No.
01.	Thiru K. Elangovan, Joint Director (Chemical), Department of Industries and Commerce, Raja Annamalaipuram, Chennai- 600 028	9445237416
02.	Thiru V. Ganesh, Superintending Engineer, Department of Rural Development and Panchayat Raj, Saidapet, Chennai 600 015. Thiru A.V. Rajesh, Executive Engineer, Department of Rural Development and Panchayat Raj, Saidapet, Chennai 600 015.	9444019782 950005807
03.	Tmt. S. Meenakshi, Chief Water Analyst, King Institute Campus, Guindy, Chennai-32	9840269104 dph@pi.nic.in
04.	Thiru V. Balamurgan, Joint Director, Directorate of Teacher Educations / Research & Training, College Road, Chennai 600 006.	7373003994 dtert.tn.nic.in
05.	PSG Krishnan, Chief Manager (T), CIPET, Chennai	9677123883
06.	Ms. Shweta Narayan, H-16/19 Seevakan Street, Kalakshetra Colony, Besant Nagar, Chennai 600 090.	8056024315 NOPVCEVER.NEW @GMAIL.COM
07.	Thiru Kirubanantha Rajan, Asst. Environmental Engineer Tamil Nadu Pollution Control Board, 76 Mount Salai, Guindy, Chennai 600 032.	22353155
08.	Thiru P. Venkatachallam, Superintending Engineer, Commissionerate of Municipal Administration, Chepauk, Chennai 600 005. Thiru K. Sridhar, Managing Officer, Commissionerate of Municipal Administration, Chepauk, Chennai 600 005.	9444940003 9786686030
09.	Thiru S. Kannan, Executive Engineer, Directorate of Town Panchayats, Kuralagam, Chennai 600 108	9362311423

10.	Thiru A. Vincent, Superintending Engineer, Chennai Corporation, Rippon Buildings, Chennai 600 003.	9445190738
	Thiru R. Kumaresan, Civil Engineer (Buildings and Bridges) Chennai Corporation, Rippon Buildings, Chennai 600 003.	9445190500
11.	Thiru K. Murali, Manager (Marketing), Tamil Nadu Corporation for Development of Women Ltd., Mother Theresa Complex, Valluvar Kottam High Road, Nungambakkam, Chennai 600 034.	9445034313 mmtncdw@yahoo.co .in
12.	Thiru Yogesh Dwivdei, I.F.S., Additional Director of Environment, Saidapet, Chennai-15	

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ANNEXURE-10

COPY OF:

Minutes of sixth and final meeting of the Expert Committee to check health and Environmental hazards in the use of plastics held on 16.10.2012 at TNFD Conference Hall, Chennai-15

The VI and final meeting of the Expert Committee to check health and Environmental hazards in the use of plastics was held on 16.10.2012 at Tamil Nadu Forest Department Conference Hall, Chennai-15. The List of participants is annexed.

Dr. H. Malleshappa, I.F.S., Director of Environment welcomed the Chairman and Members of the Expert committee and other officials attended the meeting and outlined the final report prepared by the Expert Committee and efforts taken up for preparation of this report. The Chairman requested to offer the comments of the members who attended the meeting.

Agenda 1: To approve the final report of the Expert Committee to check the Health and Environmental hazards in the Plastics.

Thiru R. Kumar, Additional Chief Environmental Engineer, Tamil Nadu Pollution Control Board suggested that the recommendations of the Expert Committee which have been incorporated in the final report from page 37 to 41 may be grouped and the committee accepted the same with decision to group as stated in the executive summary. Accordingly, the suggestions made by the CIPET are also considered and suitably taken into account.

The committee had gone through the final report of the Expert committee and requested the Director of Environment / Convener of the committee to carryout necessary corrections as indicated during the Expert Committee meeting.

Agenda No.2: Any other subject with the permission of the Chair

No remarks

Agenda No.: 3. The subject of adding the 21st Recommendation in the draft, as suggested by the member Ms. Swetha Narayan has been discussed in the 5th meeting and after detailed deliberations, the committee has decided to include the same as the 21st recommendation in the final report.

However, the same is not included in the final report already circulated among the members. Hence, the same may be included in the final report which reads as follows:

21. Manufacturers of throwaway plastic articles/consumer goods should also be held responsible for the management of wastes generated post consumer use. This shall be specifically applicable to materials like Expanded Polystyrene popularly known by trade names Thermocol or Styrofoam. The policy shall also mandate manufacturers of new types of packaging materials (those that do not have an established post discard recovery market) to submit a detailed proposal to the state government for management of such materials before introducing them into the market.

The committee discussed and decided to include the same as recommendation No.21.

Agenda No.4: Executive Summary, Acknowledgment and the Acronyms (to be included in the final report) are circulated among members.

The committee resolved to include the executive summary presented during the Expert Committee meeting in the final report.

Dr.T. Sekar, I.F.S., CCF (P & D) and the Chairman and the Director of Environment and Convener of the committee thanked the members of the Expert Committee, the officers and staff of both Tamil Nadu Pollution Control Board and Department of Environment who rendered assistance in the proceedings of the Committee and in the preparation of final report.

Sd./-xxxxx
Dr. H. Malleasappa, I.F.S
Director of Environment and
Member Secretary for the Expert
Committee, Plastic Waste

Sd./-xxxxx
Dr. T. Sekar, I.F.S
Chief Conservator of Forests (P&D) &
Chairman for the Expert Committee,
Plastic Waste.

List of Participants who have attended the Sixth Meeting of the Expert Committee to Check Health and Environmental Hazards in the Use of Plastics on 16.10.2012 at TNFD Conference Hall, Chennai -15

Sl.No.	Details of Participants	Phone No.
1.	Thiru R. Kumar, Addl. Chief Environmental Engineer, Tamil Nadu Pollution Control Board, Chennai-32	8056042104
2.	Thiru K. Elangovan, Joint Director (Chemical), Department of Industries and Commerce, Raja Annamalaipuram, Chennai- 600 028	9445237416
3.	Thiru K. Megraj, Additional Director of Rural Development and Panchayat Raj, Chennai-15	9443332309
4.	Tmt. S. Meenakshi, Chief Water Analyst, King Institute Campus, Guindy, Chennai-32	9840269104 dph@pi.nic.in
5.	Dr.Mrs.L.Radha, Principal, District Institute of Educational Training, Triplicane Chennai 600 005.	7373003382
6.	Thiru Kirubanantha Rajan, Asst. Environmental Engineer Tamil Nadu Pollution Control Board, 76 Mount Salai, Guindy, Chennai 600 032.	22353155
7.	Thiru P. Venkatachallam, Superintending Engineer, Commissionerate of Municipal Administration, Chepauk, Chennai 600 005.	9444940003
8.	Thiru K. Sridhar, Manure Officer, Commissionerate of Municipal Administration, Chepauk, Chennai 600 005.	9786686030
9.	Thiru S. Kannan, Executive Engineer, Directorate of Town Panchayats, Kuralagam, Chennai 600 108	9362311423

10.	Thiru A. Vincent, Superintending Engineer, Chennai Corporation, Rippon Buildings, Chennai 600 003.	9445190738
11.	Thiru R. Kumaresan, Civil Engineer (Buildings and Bridges) Chennai Corporation, Rippon Buildings, Chennai 600 003.	9445190500
12.	Thiru K. Murali, Manager (Marketing), Tamil Nadu Corporation for Development of Women Ltd., Mother Theresa Complex, Valluvar Kottam High Road, Nungambakkam, Chennai 600 034.	9445034313 mmtncdw@yahoo. co.in

ANNEXURE-11

APPROXIMATE GENERATION OF PLASTIC WASTES IN TAMIL NADU

Population of the State (as per 2011)= 7,20,00,000

MSW generated per capita per day = 175 gms.

Total MSW generated in Tamil Nadu = $\frac{7,20,00,000 \times 175}{1000 \times 1000}$ =12600 T/Day

Expected plastic waste in the MSW @ 9% = $12600 \times \frac{9}{100}$ =1134 T/Day

Non-Recyclable portion of plastic wastes
@ 20% of total plastic waste = $1134 \times \frac{20}{100}$ =226.8 T/Day
(or)
225.0 T/Day

ANNEXURE-12

Plastic waste Collection and Processing centre

The Commissioner, Rural Development & Panchayat Raj has released an amount of Rs.80.00 lakhs towards establishing Plastic waste Collection & Processing Centre. In first phase, an amount of Rs.37.50 lakhs has been released to 10 PIUs on 19.3.2012 for establishing the Plastic waste Collection and Processing Centre to the identified PLFs @ Rs.3.75 lakh per PLF. In II phase, an amount of Rs.36.70 lakhs has been released for establishing 10 more centres. The details of functioning of Plastic Recycling Centre are as follows:

PLASTIC WASTE COLLECTION AND PROCESSING CENTRE			
S. No	District	Name of the Block	Name of the PLF
1	2	3	4
1	Kancheepuram	Kancheepuram	Thiruppukuzhi PLF
2		Maduranthagam	Mangalam PLF / Sri Sakthi SHG
3	Vellore	Anaikattu	Cheri
4		Natrampalli	Sorakayal Natham
5	Trichy	Trichy	Thottiyam
6			Anthanallur
7	Tanjavur	Thanjavur	Pilliarpatti
8	Tiruvallur	Villivakkam	Ayapakkam PLF
9	Tirunelveli	Palayamkottai	Ramayanpatti
10	Tiruppur	Tiruppur	Chettipalayam
11		Kanagambalayam	Thambirattiamman SHG
12	Madurai	Madurai West	Naganakulam
13	Salem	Panamara thupatty	Nilavarapatty SHG
14	Ramnad	Ramnad	Sakkarakottai
15	Perambalur	Perambalur	Kalpadi Suriyagandhi SHG
16	Dindugal	Athoor	N.Panjampatti
17	Erode	Erode	Pichandampalayam
18	Sivagangai	Sakkottai	Sankarapuram PLF
19	Nagapattinam	Mayiladuythurai	Akkaraipettai SHG
20	Villupuram	Vikravandi	Mundiyam bakkam

So far, an amount of Rs.74.20 lakhs has been released for establishing these centres.

ANNEXURE-13

**COMMENTS OF INDIVIDUAL MEMBERS RELATING TO
RECOMMENDATIONS**

Subject Comments on recommendations
From Shweta Narayan <nopvcever.new@gmail.com>
Date Sunday, September 9, 2012 10:56 am
To sekar THANGAMUTHU <sekar_mithun@yahoo.com> , tndoe@tn.nic.in

Dear Dr. Sekhar and Mr. Malleshappa

Apologies for sending my comments on the recommendations so late. I have incorporated comments from two of my colleagues - Mr. Shibu Nair who is the program director for Zero Waste in Kerala based group - Thanal (www.thanal.co.in) and Mr. Dharmesh Shah, India co-ordinator for Global Alliance for Incinerator Alternative (GAIA - www.no-burn.org)

Let me assure you that our comments are with the interest of strengthening the report and not to criticise the hard work that has been put to consolidate this. Hope to discuss this further during the meeting on Friday.

warm regards
Shweta Narayan

--
Shweta Narayan
Community Environmental Monitoring

H16/9, Seevakan Street, Kalakshetra Colony,
Besant Nagar, Chennai 600090
Ph - +91 80560 24315
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"That's the whole problem with science. You've got a bunch of empiricists trying to describe things of unimaginable wonder." -

-- Bill Watterson, Calvin And Hobbes

RECOMMENDATIONS

1. Having carefully considered policies adopted by few State Governments like Maharastra, Himachal Pradesh etc. on the use of throwaway plastics, the Committee recommends that the Government of Tamil Nadu adopt specific policy on the use of plastics including throwaway plastics and consider developing a separate legal frame work for the manufacturing of throwaway plastics with higher thickness over the existing 40 micron, minimum size criteria of not less than 12'x8' that will enable reuse of plastic carry bags and extended product life. To this effect, the Committee recommends to have separate legislation for Tamil Nadu to prevent the degradation of environment in the style of 'Non-Bio degradable Garbage (Control) Act / Rules'

2. The Committee is of the view that the provisions in the 2011 notification in force for the implementing/monitoring agencies are not adequate and recommends that officials of specific cadre or above from various Agencies of Government viz., Public Health Department, _____ may be vested with the powers for monitoring the provisions of the Rules along with enabling penal provisions for spot compounding of the violations of the Rules with fine and for levying higher penalty for second and subsequent offences etc.

3. The Committee felt that less importance is given to the occupational health hazard issues in plastic bags manufacturing industry. The Committee recommends to have a specific study by the National Institute of Epidemiology, Ayapakkam, Chennai on the occupational health hazards in the plastics bag manufacturing units and on the health hazards due to the unscientific disposal of plastic wastes in certain major MSW dump-sites in the State in co-ordination with the TNPCB and concerned local bodies.

4. The Committee finds merit in the recovery of certain portion of oil through depolymerisation process of plastic wastes, which yield 20% gasoline, 50% Diesel and 30% Heavy Fractions. Recognizing the advantage of resource recovery from Plastic wastes, the Committee recommends encouraging the

Comment [S1]: 40 micron has proved to be futile across the country and it is not economically or technically viable to recycle the rejects of this thickness. Hence it needs to be increased to 100 micron.

Comment [S2]: The size of bag is immaterial if the thickness is above 100 microns. But it should be made mandatory for all producers to follow same production process, standards, material quality that will ensure maximum recovery and recycling.

Comment [S3]: Local Self Governments, Police, Department of Sales Tax Registration. Apart from these Govt should encourage LSGs to form Peoples Vigil Committees to Report violations.

Comment [D4]: Should also cover Occupational Safety and Health Issues faced by the informal waste pickers who work in open dumps.

establishment of such manufacturing units of fuel derivatives with committed supply of plastic wastes from the urban local bodies.

5. The Committee records its appreciation for the continued initiatives taken by the Hon'ble Chief Minister of Tamil Nadu in promoting the use of post consumer plastic carry bags for laying the Polymer Coated Bitumen Roads in the State. The Committee recommends that the savings resulting from the reduced requirement of bitumen for laying the Plastic roads may be passed on to the concerned local body as cross-subsidy for meeting the cost towards organized collection, shredding etc of the waste plastics used in road laying.

6. The Committee noted that Plastic waste could be used as supplementary fuel in cement industry up to 1.5% of the coal used in the process, with complete destruction of organic compounds present in plastic wastes. Effort in this regard needs to be sustained to ensure continuous availability of plastic waste to the cement industries concerned from the near by local bodies.

7. Recognizing the fact that Informal system of collection of plastic wastes contribute immensely to the waste plastic recycling sector, the Committee recommends that the rag-pickers (Waste Collectors) shall be registered with the Local Bodies to ensure appropriate in-house storage of plastic and other non-biodegradable wastes. Rag-pickers families may be provided with some facilities like old age pension, group insurance, low-cost housing etc

8. Large number of recycling units, most of them tiny and small household enterprises are functioning all over the State, utilizing plastic wastes collected from roads and houses as their raw material. As bulk of them function within Chennai City and its suburbs, setting up of an Industrial park for such recycling units in the outskirts of Chennai in the first phase will provide better opportunity for monitoring the operation of such units. They may be provided with land, machinery etc. for encouraging such formal system of recycling. The Government may also consider providing exemption from VAT to all the Plastic Wastes collected from homes and roadsides as also for the articles produced through reprocessing.

Comment [D5]: Depolymerisation of plastics is a technology still in its infant stage and not developed into commercially viable business. To help this technology work, The Govt. should take initiatives to unify and standardize the use of plastic resins in each product in such a way that it will be in tune with the technology. That means, it may require restrictions on using coloring agents, phthalates, plasticizers and even some plastic resins in widely used plastic products.

Hence Need more empirical evidence to prove the success of this technology. What is the basis for recommending this technology? What are the economics? I would refer to the committees TOR and suggest that until we are convinced of the results and back them with relevant research and studies we should refrain from suggesting such options.

Comment [S6]: Is this appreciation based on any results on technically proven research? If not please adhere to Precautionary Principle. There are other safer way to utilize plastic waste. It can be used to make pillars meant for fencing, or traffic dividers, roofing sheets for bus waiting sheds, display boards etc.

Comment [D7]: The committee should adhere to its TOR that mandates investigation/research into waste management technologies. The economics and environmental impacts of plastic roads is not well researched. If there is research available then please present it to the committee before such recommendation is made. Until then I would not be comfortable to endorse this recommendation.

Comment [S8]: Unless and otherwise there is a regulation on materials used in plastic products so as to prevent emissions which cannot be handled by the existing pollution control devices of cement kilns, it is not recommended to burn plastics. It is against the MSW 2000 rules as well as Stockholm declaration. Or modify the existing cement kilns to prevent pollution from burning of plastics.

Comment [D9]: Cement co-incineration requires further investigation. We need more data on the economics and emissions of plastic waste or municipal waste incineration before we recommend it. If there is research available then please present it to the committee and give the committee to fully investigate the results/ discuss it before such recommendation is made. Until then I would not be comfortable to endorse this recommendation.

Comment [S10]: For encouraging efficient recycling, Govt may think about giving grants to those registered recycling and or reprocessing units. This money can be pooled from waste management funds available with LSGs and a cess collected from the sale of plastic products in the State.

9. Government may consider exploring the possibilities for alternative technology for substitute development and recycle processes, for which R&D studies may be undertaken. The academic institutions, which are involved in this field may be encouraged through appropriate funding for R&D works and for prototype development.

10. The Committee noted that the present 2011 Notification relating to management of Plastic Wastes has not made any provision for creation of awareness in this regard. For creating awareness in coordination with the District Collectors, necessary provision may be incorporated in the Rule, for which the State Government may propose suitable amendments to the Notification.

11. Sustained awareness programmes are to be conducted periodically by all the implementing Departments, combined with monitorable outputs through an effective monitoring mechanism. For sustaining the campaign, District level Plastic Avoidance Standing Committee chaired by the District Collector may be formed. For undertaking intensive awareness campaign on plastic wastes for at least three years, funding to local bodies through district administration may be extended. The awareness campaign must be a sustained one through all possible media like print media, local cable television, visible display boards / paintings, rallies etc.

12. Provisions may be made in the State Environment Protection Fund and the funds from Tamil Nadu Pollution Control Board for conducting awareness programmes, institution of awards for outstanding works, support for R&D efforts towards substitution and alternate material to Plastics.

13. The Committee felt that the present Plastic Waste (Management and Handling) Rules 2011 mainly addresses the manufacture and usage of carry bags and not covered the packaging items. The said Rules inadequately addresses the problems related with the plastic cups / containers, fixing explicit pricing for the carry bags, disposal methods, compounding of offences etc. Also, the Rules have not taken into the account of other non-biodegradable garbage which also poses serious threat in handling the municipal solid wastes

Comment [S11]: Following the model of tobacco regulation, make it mandatory for every producer to give a list of ingredients in the product and a warning on preventing dumping, burning or burying.

Comment [S12]: Additional cess on plastic products and PET bottles can be imposed to generate money for periodical clean ups and awareness drive.

scientifically. The proposed legislation for the State may consider incorporating appropriate prescriptions on these items.

14. Extending incentives to the degradables plastic manufactures like tax reduction / exemptions etc may be considered by the Government and the usage of conventional plastic, substituted by the fully degradable plastic in a phased manner.

Comment [S13]: Incentives should be given to those producers who provides non plastic packing solutions and a disincentive in terms of additional tax for those who provide plastic packaging.

15. **Strict implementation of the provision of Act / Rules:-** The prescribed authorities shall strictly implement the provisions of Act / Rules with respect to thickness, size, type etc., both at the manufacturing and usage stages without any compromise. The State Level Monitoring Authorities shall strictly review the progress at least once in three months with respect to the plastic carry bags manufacturing, sale and usage.

Comment [D14]: This should also include subsidies for small businesses that are into the business/SHGs of making reusable cloth bags also. A road map to shift to a different kind of "disposable" material however eco-friendly will pose its own problems in the future. The aim of a progressive legislation should be to encourage reuse and discourage disposables.

16. **Encouraging higher volume packaging :-** Multi layered plastic or metalized plastic packaging are used unilaterally in lower quantity consumables like shampoo, gutkha, panparak, hair oil, cosmetics etc., which causes instantaneous discarding and indiscriminate disposal of these plastic packaging after its use. These multilayered or metalized plastic packaging causes severe Environmental hazardous including clogging of sewers, drains, channels etc. These low quantity, high volume consumables may be banned and high volume/ quantity consumable packaging in bottles and containers may be encouraged.

17. **Enforce Extended Producer Responsibility :-** Manufacturers of consumer goods should be held responsible for the management of unsustainable packaging material that is generated post consumer use. This shall be specifically applicable to materials like Expanded Polystyrene popularly known by trade names Thermocole or Styrofoam. The policy shall also mandate manufacturers of new types of packaging materials (those that do not have an established post discard recovery market) to submit a detailed proposal to the state government for management of such materials before introducing them into the market.

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18. **Encouraging the use of conventional and naturally made products:-** The use of non degradable plastics consumable like plastic sheets,

plastic plates, plastic cups etc., may be banned during social, religious, political functions. The usage of plastic sheets for serving foodstuff in hotels may be strictly prohibited and the traditional use of banana leaves encouraged. Likewise, the use of cloth bags instead of plastic carry bags in all commercial establishments shall be implemented. the Women SHGs have immense scope and potential for production of environment friendly alternatives to plastics in the hospitality sector and to supply reusable metal plates, cups, tumblers, cutleries etc., with proper dishwashing facilities during the social, religious, political functions and this shall also be considered as a measure for the groups revenue generation. The Committee accordingly recommends that the SHGs may be promoted with financial support for production and supply of alternate materials / servicing with conventional metal/glass utensils particularly for bulk consumers like marriage halls and for social, religious and political functions. This may be followed in the first phase in the halls, hotels, auditorium, etc having seating capacity of more than 100 or above immediately and others may be brought within two years in a phased manner.

189. Declaring the premises of Government Offices as Plastic Free Zone:- To stand as a role model before the common public, all the premises of the government offices, boards, corporations, agencies, public places, educational institutions, courts, religious places, hospitals etc., may be declared as Plastic Free Zones. This includes the canteen and store facilities located within the premises of the government offices.

2019. Instituting awards:- The reduction or avoidance of plastic carry bags, cups etc., shall be encouraged by instituting separate awards for different categories. The self declared Marriage Halls, Hotels, Institutions, commercial establishments etc., shall be selected for the awards periodically at District and State Level and shall be honoured appropriately during Independence / Republic Day celebrations. Awards for outstanding contribution in Plastic waste management may be instituted for best practices at local body level (GO NO 211) and the best three Districts and local bodies may be considered for Plastic Avoidance Award annually.

210. The Committee noted that the plastic products, particularly the carry bags generally don't carry proper labelling regarding the specification, manufacturer etc. This has to be strictly enforced and provision for heavy penalty of the trader and dispenser may be made

सेन्ट्रल इंस्टिट्यूट ऑफ प्लास्टिक्स

इंजीनियरिंग एण्ड टेक्नॉलाजी

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DR. K.PALANIVELU
DEPUTY DIRECTOR

CIPET/CHN/2012-13

29.09.2012

To

Dr. H. Malleshappa, I.F.S.,
Director, Dept. of Environment,
Ground Floor, Panagal Building,
Saidapet, Chennai - 600 015.

Dear Sir,

Sub: Environment Control – Constitution of "Expert Committee to check the health and environmental hazards in the use of plastics" – Fifth meeting of the Expert Committee – Convened on 14.09.2012 – Minutes of the Meeting - forwarding – reg.

Ref: Your letter No. R.C.No.1931/2011/JDO/21.09.2012

We would like to bring to your kind attention regarding the proposed recommendations to Government of Tamil Nadu regarding the plastic waste.

1. The title "Plastic (Avoidance) policy" is not appropriate and we are of the opinion that more appropriate title is "Plastic Policy"
2. Regarding the thickness of carry bag, we would like to retain the existing thickness of 40 microns.
3. All the premises of Government office etc. may be declared as "Plastic litter free zone" instead of Plastic free zone.

In the minutes of the fifth meeting of the expert committee convened on 14.09.2012, the following amendments may be incorporated. In the para (iii) Pollution caused to Water, Air and Soil, Environment Hazards including health effects on usage of plastic and disposal of throw away plastic wastes. "If the drying is inadequate" may be added after "Except water vapor" and the sentence will read as "Thiru P.S.G. Krishnan, Chief Manager (Technical), CIPET, Chennai clarified that during the manufacturing process of plastic there are no gaseous emissions, except water vapour", if the drying is inadequate.

Thanking you,

Yours Faithfully,

(K. PALANIVELU)

ANNEXURE-14

**REPRESENTATIONS RECEIVED FROM PLASTIC
MANUFACTURERS' ASSOCIATION**

பிளாஸ்டிக் உற்பத்தியாளர்கள் மற்றும் வியாபாரிகள் சங்கம்



Chennai Plastics Manufacturers & Merchants Association

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Regd. No. 149/2001
Dt. 27.08.2001

புதிய எண், 26 (பழைய எண், 142) சூலை நெடுஞ்சாலை. சென்னை-600 112.

problem. Most importantly, a conscious effort has to be made by the Government to implement the "Solid Waste Management and Handling" Rules 2000 throughout Tamil Nadu. Paradoxically, even after 12 years the formulation of these rules, these rules remain only in statue book with no prospect of its faithful implementation whatsoever. In fact, no purposeful attempt has been made by any civic body including the Corporation of Chennai to introduce segregation of bio-degradable and non bio-degradable wastes at source, though such a method was suggested by many environmental experts as the only fool-proof solution for Handling Solid Wastes. On the flip-side, the so called environment-conscious experts take up only plastic wastes as the sole problem that affects our for environment and hastily recommend for a ban on plastics, which is akin to attempting on a remedy, without first identifying the cause of illness and treat it.

THE TRUE PROPORTION OF PLASTIC WASTES

Even in the determination of the proportion of plastic wastes, opinion is divided and various figures statistics from 1 to 9 % is given in getting at volume of plastic wastes, vis-à-vis the other solid plastic wastes. Granting that we take the extent of plastic wastes at a maximum of 9 %, what is the solution they are giving in dealing with the other 91% of Solid wastes which they are unable to clearly put-forth. The problem of wastes in the present day context is of utmost importance and if it is not tackled within a fixed time with a well-thought out measure, it will become a problem of unimaginable dimensions and the whole Tamil Nadu would turn in to a huge dumping ground with many tonnes of wastes accumulating every day. To solve this problem, we have to make a dispassionate approach with a concrete measure on a war-footing. One may hold a view that all other solid waste are bio-degradable, but plastics is not, and it may affect the environment a great deal than others. We are of the view that such an assertion is only a myth. As a matter of fact, glasses, wood torn cloth, tyres, old iron, paper etc., also have a degree of non bio-degradability to last for over hundred years. Apart from this, the more harmful wastes such as battery, tube lights and deadly chemical wastes and building debris, also constitute a deadlier waste than the plastics. A sprawling marshy land of many thousands of acres at Pallikaranai has now been reduced to a small 100 acres of marsh, with our dumping many thousands of tonnes of wastes in that area. At this rate, our future generation will be able to read only from books about the existence of an extensive Pallikaranai marsh and not able to eye it, as of now.

THE ELUSIVE LAW THAT BAFFLES

For all the solid wastes explained above, the Central Government has formulated laws for their effective handling. But, unfortunately they don't have the teeth and remain only on paper with no practical implementation. In a totally sad situation when we have no measure in place to identify the bio degradable as well as the non-biodegradable wastes, the entire civic governance is in a mess in so far as the handling of solid wastes is concerned.

According to the statistics available from a few other countries, only around 10 to 20% plastic wastes only account for re-cycling. But unfortunately in our country with a high degree of poverty and unemployment on the one hand and with the increasing cost of original raw material on the

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if at all, count for an environmental hazard. As luck would have it the laying of roads under the modern technology by blending plastic wastes with bitumen as progressively done now, can fully solve this problem which is forcing for a necessity to collect all the plastic wastes through a well-planned strategy.

THE HIGH INTENSITY OF PLASTIC REPROCESSING ACTIVITY

In a few neighbouring countries also plastics are used on a large scale, but how the wastes are disposed there will provide an interesting account. In Japan, plastic wastes are used for generating electricity and it is stated that there are around 37 power generating plants in this country. In this process, even poly-vinyl Chloride (PVC) which is portrayed as a deadly substance in our country, is also put to use along with other wastes through the application of a harmless.

In South Korea they are successfully bringing out diesel oil from out of plastic wastes. In Singapore, they have pursue a novel method to utilize the plastic wastes. They reduce all plastic wastes in to small chips and putting them in to giant plastic bags they convert them into enormous press-packed blocks and these blocks are dumped all along the sea coasts and through this they are successfully able to push up the sea and reclaim land.

In the same way, the laying of plastic roads now introduced under the auspices of the Hon'ble Chief Minister of Tamil Nadu. Though it cannot match the technological excellence of other countries, still it is blessing in disguise for us because we need huge quantities of plastic wastes for road-laying purpose. That is the reason, we are sparing all our efforts to co-operate with the Chennai Corporation for the successful implementation of this scheme. But the canker of corruption appears to be raising its head in the systematic implementation of this project, as we are able to see it the trends.

CERTAIN REFORMS THAT CALL FOR ATTENTION

1. The recycling units which are functioning in large numbers all over the State and which are utilizing plastic wastes collected from roads and houses as their raw material, have to be encouraged with all needed incentives by the government.
2. The government must provide an exemption from VAT to all the Plastic Wastes collected from homes and roadsides as also for the articles produced through reprocessing.
3. In as much as the plastic recycling industries are numerous in the State and a bulk of them functioning within Chennai City and its suburbs, setting up of an Industrial Complex is all the more necessary and such of those entrepreneurs who are highly enterprising in this line, must be provided with land and electricity at concessional rates.
4. The cost of machineries in use at the factories of these units must also be subsidized to round 50% of their cost for purposes of encouraging those young men coming forward to start these units in more numbers.
5. Rag Pickers who go about from street to street to collect plastic wastes are partly assisting civic bodies, though they do it for eking out their livelihood. In the absence of civic bodies not being able to effectively handle solid wastes, the role of rag-pickers is something useful. The Government may keep a list of rag pickers and provide them with some facilities, like old age

தன பிளாஸ்டிக் உற்பத்தியாளர்கள் மற்றும் வியாபாரிகள் சங்கம்



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6. Since the re-processing units are supportive to Government in mobilizing plastic wastes for feeding their machines, their contribution reduces the burden of civic bodies to a great extent with many thousands of such units in the whole Tamil Nadu. The government must go all the way to provide more facilities to the owners of these reprocessing units and their work force.
7. The Expert Committee must make a strong recommendation to the Government that they should implement the Solid Waste Management and Handling Rules 2000, in letter and spirit.
8. In so far as laying plastic roads are concerned, a thorough watch to ensure the proportion of plastic-bitumen mix with all other components as laid down under the rules, is to be kept and disproportionate mix of materials and perfunctory work with no supervision by a responsible expert may lead to the black-topping getting peeled off very soon and would create problems of pot holes and craters at shorter intervals. The Expert Committee is requested to make a proper recommendation on the correct application of the road-laying technology, which we consider not only a wonderful project for the 21st century but also would result in one sure way of utilizing all the available plastic wastes for road-laying, which will give a go-bye to the litter culture, as is widely prevalent in Tamil Nadu.

CONCLUSION

Our finding with respect to the use of Plastics is that in no way either the hygiene is affected or the environment is polluted by plastics. With its pre-eminent position as one of the articles of common use, it is perhaps one of the matchless inventions of 20th Century. In fact it has revolutionized the growth of humanity like the invention of wheel and electricity. It is estimated that every individual in developed countries is on an average using 100kgs of plastics. Even in a most populous country like China, figures show that the individual consumption of plastics is around 30kgs, while in our country the per capita consumption is stated to be at 6 kgs only. The Plastic industry in our country continues to be in a state of infancy.

The issue of solid wastes has a common denominator and plastics alone cannot be de-linked from that. Our humble submission to the expert committee is that their recommendation must be two-fold, as to enunciate a formula to solve the problem of wastes and to contribute for the growth of plastic industry.

Thanking you.

Yours faithfully,

For CHENNAI PLASTICS MANUFACTURERS & MERCHANTS ASSOCIATION


(G. SANKARAN)

PRESIDENT

தமிழ்நாடு, பாண்டி பிளாஸ்டிக் உற்பத்தியாளர்கள் மற்றும் வியாபாரிகள் சங்கம்
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Regd. No. 223/2006.

SPEED POST

தேதி : 27.08.2012

பாக்டர் H. மணிகுமாரன், F.S.

சுற்றுச் சூழல் இயக்குனர்,
 தரைதளம், பனகல் மாளிகை,
 ஹைதராபாட், சென்னை - 15.

ஐயா,

பார்வை : தமிழக அரசு ஆணை எண்.92, சுற்றுச் சூழல் மற்றும் வனங்கள் துறை,
 தேதி 10.08.2011.

பொருள் : பிளாஸ்டிக் உபயோகிப்பதால் ஏற்படும் சுற்றுச் சூழல் மற்றும் சுகாதாரம் பாதிப்புகள்
 சம்பந்தமாக தமிழக அரசு அமைத்துள்ள வல்லுனர் குழுவிற்கு, தமிழ்நாடு பாண்டி
 பிளாஸ்டிக் உற்பத்தியாளர்கள் மற்றும் வியாபாரிகள் சங்கம் (டான்பா) சார்பாக
 அனுப்பப்படும் பரிந்துரைகள் சம்பந்தமாக.

தமிழ்நாடு பாண்டி பிளாஸ்டிக் உற்பத்தியாளர்கள் மற்றும் வியாபாரிகள் சங்கத்தின் (டான்பா)
இசுரிய நல்லாழ்வுறுதல்

எங்களுடைய சங்கம் தமிழக அரசின் சங்கங்களின் பதிவுச்சட்டத்தின் கீழ் பதிவு செய்யப்பட்ட மாநில
 சங்கமாகும். இச்சங்கத்தில் பதினோரு மாவட்ட சங்கங்களும், பாண்டிச்சேரி யூனியன் பிரதேச சங்கமும்
 இணைந்துள்ளன.

தமிழகம் மற்றும் பாண்டியில் 8000 பதிவு பெற்ற பிளாஸ்டிக் நிறுவனங்களும், 10,000 பதிவு பெற்ற
 நிறுவனங்களும் உள்ளன. இதில் 99 சதவீதம் குறு மற்றும் சிறு நிறுவனங்கள் வேகையைச் சார்ந்தது. நேரடியாக
 இரண்டு லட்சம் பேருக்கும், மறைமுகமாக 5 லட்சம் பேருக்கும் வேலைவாய்ப்பை வழங்கி வருகின்றது.

தமிழக அரசு அமைத்துள்ள, பிளாஸ்டிக் தொழில் சம்பந்தமான வல்லுனர் குழுவிற்கு எங்கள் சங்கத்தின்
 சார்பில் கீழ்க்கண்ட கருத்துகளை தெரிவித்துள்ளோம். இது சம்பந்தமாக எங்களை நேரில் அழைத்தால், எங்கள்
 கருத்துகளை மேலும் விரிவாக விளக்க தயாராக இருக்கிறோம். பல லட்சம் பேர் வாழ்வாதாரம் சம்பந்தப்பட்ட
 பிரச்சனை என்பதால், வல்லுனர் குழு அனைவரின் கருத்துக்களையும் தீர் பரிசீலித்து, தக்க பரிந்துரைகளை தமிழக
 அரசிற்கு தெரிவிக்கும்படி தாழ்மையுடன் கேட்டுக் கொள்கிறோம். நன்றி வணக்கம்

பிளாஸ்டிக் என்பதற்கு அர்த்தமே “மாற்று” என்பதுதான் ஆகும், ஒரு பொருளை
 நாம் உபயோகிக்கும் போது நாம் அதில் ஏற்படும் குறைகளை களைவதற்காக மாற்று பொருள் தேடுகிறோம். புதிய
 பொருள் கண்டுபிடிக்கிறோம். அதன்படி மண், இரும்பு, பித்தளை, அலுமினியம், எவ்ரில்வர், என்று பொருட்கள்
 மாறி மாறி தற்போது பிளாஸ்டிக் யுகத்தில் வாழ்ந்து கொண்டிருக்கிறோம். இதைப்போன்றே, நாளுக்கு நாள்
 காகிதம் உபயோகம் அதிகரித்து மரங்கள் அதிகமாக வெட்டப்பட்டு, தட்ப வெப்ப நிலை மாற ஆரம்பித்தது.
 காடுகளை பாதுகாக்க, காகிதத்தின் உபயோகத்தை குறைக்க 1970 களில் அறிமுகப்படுத்தப்பட்டதுதான் பிளாஸ்டிக்
 பைகள், தரத்திருஷ்டவசமாக, இன்றைக்கு, அந்த பைகள் சுற்றுச் சூழலுக்கு எதிராக சித்தரிக்கப்படுவது மிகவும்
 வருத்தத்திற்குரிய விஷயமாக உள்ளது.

புதிய எண்.26, [ப.எண். 142], துணை செஞ்சிவனாலை, துணை, சென்னை-600 112.

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இந்தப் பிரச்சனையை தீர்க்க பொது மக்களுக்கு சுற்றுப்புற சுகாதாரத்தைப் பற்றிய விழிப்புணர்வை ஏற்படுத்துவதிலும், இது சம்பந்தமாக இயற்றப்பட்டுள்ள சட்டங்களை முழுமையாக அமல்படுத்துவதில்தான் தீர்வு இருக்கின்றதே தவிர, வேறு எந்த அறக்கு வழியிலும் இந்தப் பிரச்சனையை தீர்க்க முடியாது. முக்கியமாக மத்திய அரசு 2000ம் ஆண்டு இயற்றிய தீக்கழிவு மேலாண்மை விதிகளை தமிழகம் முழுவதும் உள்பூர்வமாக அனைத்து ஊராட்சிகளிலும் முழுமையாக அமல்படுத்த வேண்டும். ஆனால் துரதிருஷ்டவசமாக, மேற்படி விதிகள் உருவாக்கப்பட்டு 12 ஆண்டுகளுக்குப் பிறகும், இன்றும் அது ஆரம்பநிலையிலேயே தான் உள்ளதே தவிர, எந்த முன்னேற்றமும் இல்லை. முக்கியமாக அந்த விதிகளின் அடிப்படை விஷயமான, மக்கும் குப்பைகளை தனியாகவும், மக்காத குப்பைகளை தனியாகவும் பிரித்து, அவைகளை அப்புறப்படுத்த வேண்டும் என்கின்ற ஆரம்ப நிலையைக்கூட, சென்னை மாநகராட்சி உட்பட, தமிழகத்தில் எந்த உள்ளாட்சிகளிலும் அமுல்படுத்தவில்லை. இதில் மேற்படி விதிகளில், சுறுப்பப்பட்டுள்ள விஷயங்களில் ஒன்றான பிளாஸ்டிக் கழிவுகளை மட்டும் குறிவைத்துப் பிரச்சனையாகப் பேசப்படுவது துரதிருஷ்டவசமானதாகும்.

குப்பைகளில் 1% முதல் 9% வரை, பிளாஸ்டிக் கழிவுகள் உள்ளதாக, ஒவ்வொருவரும், அவரவருக்குத் தோன்றிய விதமாக புள்ளி விவரம் கூறுகிறார்கள். அவர்கள் கூற்றுப்படியே அதிகபட்சமாக 9% என்று வைத்துக் கொண்டாலும், மீதமுள்ள 91% குப்பைகளுக்கு, அரசு வைத்திருக்கும் தீர்வு என்ன. யாருமே பதில் கூறமாட்டேன் என்கிறார்கள். குப்பை பிரச்சனை என்பது, இன்னொரு கால கட்டத்தில் ஒரு அதிமுக்கியமான பிரச்சனை, அதைத் தீர்க்காவிட்டால், எதிர்காலத்தில் அது ஒரு மாபெரும் பிரச்சனையாக மாறி, தமிழகமே குப்பை மேடாகி விடும். இதைத் தீர்ப்பதற்கு விருப்பு, வெறுப்பு இல்லாமல், தீர் ஆலோசித்து போர்க்கால நடவடிக்கைகளை எடுக்க வேண்டும். நீங்கள் கூறலாம், மற்ற பொருட்கள் எல்லாம் மக்கிவிடும், ஆனால் பிளாஸ்டிக் மக்காது, சுற்றுச் சூழலை பெரிய அளவில் பாதித்து விடும் என்று, ஆனால் அதில் உண்மை இல்லை. குப்பையில் உள்ள உடைந்த கண்ணாடி அளவில் பாதித்து விடும் என்று, ஆனால் அதில் உண்மை இல்லை. குப்பையில் உள்ள உடைந்த கண்ணாடி மரம், கிழிந்த துணிகள், டயர்கள், பழைய இரும்பு, காசித் பொருட்கள் போன்ற பல்வேறு பொருட்களும் பல நூறு ஆண்டுகளுக்கு மக்காத பொருட்களாகத்தான் உள்ளது. இது நிரந்தரமான உண்மை. இதைத் தவிர்த்து அபாயகரமான கழிவுகளான, பேட்டரி, டிசுப் லைட்டுகள், அபாயகரமான இரசாயன பொருட்கள், கட்டிட கழிவுகள் போன்ற, பல்வேறு கழிவுகள் குப்பைகளில் இருக்கின்றன. சென்னையில் இயற்கை நமக்கு அளித்த பல ஆயிரம் ஏக்கர் சதுப்பு நிலமான பள்ளிக்கரணை இடம், இன்று கட்டிட கழிவுகள் கொட்டப்பட்டு, கான்கிரீட் நிலமாக மாறி, ஒரு சில நூறு ஏக்கர் சதுப்பு நிலமாக குறைந்து உள்ளது. இப்படியே கழிவுகள் கொட்டிக் கொண்டு இருந்தால் எதிர்காலத்தில் பள்ளிக்கரணையில் சதுப்பு நிலம் இருந்தது என்று புத்தகத்தில் தான் படிக்க முடியும். நேரில் பார்க்க இயலாது.

மேலே நான் குறிப்பிட்டுள்ள திடக்கழிவுகள் அணைத்திற்கும் மத்திய அரசு, தனித் தனியாக பல்வேறு சட்டங்கள் இயற்றியுள்ளன. ஆனால் அவைகள் அணைத்தும் வெறும் ஏட்டாளவிலேயே உள்ளன. நடைமுறையில் எதையும் அமுல்படுத்துவதில்லை. நம்மாண் இன்று மக்கும் குப்பை, மக்காத குப்பை என்றே பிரித்து, சேகரிக்க முடியாத கும்பிலையில், நாம் வேறு என்ன விதிகளை அமுல்படுத்த போகிறோம்.

பிளாஸ்டிக் கழிவுகளைப் பொறுத்தவரை, மற்ற நாடுகளில் எல்லாம், 10% - 20% வரை தான் மறுசுழற்சி செய்யப்படுகின்றது. ஆனால் நம் நாட்டில் வறுமை அதிகம் இருப்பதாலும், வேலை இல்லா திண்டாட்டத்தினாலும், முடியாத சூழ்நிலையில், நாம் வேறு என்ன வகையில் குடிசைகளை அமைக்க முடியும்?

பாண்டி பிளாஸ்டிக் உற்பத்தியாளர்கள் மற்றும் வியாபாரிகளின் சங்கம்
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நடைபெறுகின்றது. இதை தங்களின் Sub Committee அறிக்கையிலேயே குறிப்பிட்டு இருக்கிறார்கள். மீதமுள்ள 20% பிளாஸ்டிக் கழிவுகள் தான் சுற்றுச்சூழலுக்கு பாதுகாமாக உள்ளது. தமிழக அரசு தற்போது அறிவித்துள்ள பிளாஸ்டிக் தார் சாலை திட்டம். மீதமுள்ள 20% பிளாஸ்டிக் கழிவுகளை குறைக்கும் அருமையான திட்டமாகும். மேலை நாடுகளில் பிளாஸ்டிக் கழிவுகளை மிகவும் உபயோகமான முறையில் உபயோகிக்கின்றனர். உதாரணத்திற்கு, ஜப்பானில் முப்பத்துவாழை இடங்களில் பிளாஸ்டிக் கழிவுகளைக் கொண்டு மின்சாரம் தயாரிக்கின்றனர். நம் ஊரில் மிகவும் பயங்கரமாக சிந்தரிக்கப்படும் PVC பிளாஸ்டிக் பொருட்களையே, மிகச் சிறந்த தொழில் நுட்பத்தைக் கொண்டு, அதன் கழிவுகளையும், மற்ற பிளாஸ்டிக் கழிவுகளுடன் சேர்த்து, எரித்து ஜப்பானில் மின்சாரம் தயாரிக்கின்றனர்.

தென்கொரியாவில் பிளாஸ்டிக் கழிவுகளைக் கொண்டு டீசல் தயாரிக்கின்றனர். சிங்கப்பூரில் நிலப்பரப்பு குறைவு, அந்த அரசாங்கம் பிளாஸ்டிக் கழிவுகளை சிறு துளிகளாக்கி, கடற்கரை பரப்பில், பெரிய பள்ளங்களை ஏற்படுத்தி, பிளாஸ்டிக் கழிவுகளை பொதிகளாக்கி, அந்த பள்ளங்களில் நிரப்பி, கடல் நீரை பின்னுக்கு தள்ளி புதிய நிலப்பரப்பை உருவாக்குகின்றனர். இதைப்போன்று தற்போது தமிழக அரசு அறிவித்துள்ள, நம் நாட்டிற்கு ஏற்ற, தொழில் நுட்பம் மிகவும் குறைவாக உள்ள பிளாஸ்டிக் தார் சாலை திட்டம், தமிழகத்திற்கு ஒரு வரப்பிரசாதமாகும். மேற்படி திட்டம் வெற்றியடைய சென்னை மாநகராட்சியுடன் இணைந்து, செப்டா செயல்பட்டுக் கொண்டிருக்கிறது. ஆனால் மேற்படி திட்டமும், அதிகாரிகளின் மெத்தனத்தாலும், நடைமுறை சிக்கல்களாலும் தற்போது தள்ளாடிக்கொண்டு இருக்கிறது.

பிளாஸ்டிக் கழிவுகள் பிரச்சனையைப் குறைக்க எங்களுடைய யோசனைகள்

பிளாஸ்டிக் கழிவுகளை மூலப்பொருளாகக் கொண்டு செயல்படும் மறுசுழற்சி பிளாஸ்டிக் தொழிலுக்கு முக்கியத்துவம் கொடுத்து, ஊக்கப்படுத்த வேண்டும்

1. வீடுகள் மற்றும் தெருக்களில் சேகரிக்கப்படும் பிளாஸ்டிக் கழிவுகளுக்கும் மற்றும் மேற்படி பிளாஸ்டிக் கழிவுகளில் இருந்து தயாரிக்கப்படும் மறுசுழற்சி பிளாஸ்டிக் பொருட்களுக்கும் முழுமையாக மதிப்புக் கூட்டு வரியிலிருந்து விலக்கு அளிக்க வேண்டும்.
2. மறுசுழற்சி சம்பந்தமான தொழில் தொடங்க, சென்னை போன்ற பெருநகரங்களை ஒட்டிய பகுதிகளில் தனி தொழிற்பேட்டை அமைத்து, குறைந்த விலையில் மனைகள், மின்சாரம் வழங்க நடவடிக்கை எடுக்க வேண்டும்.
3. மறுசுழற்சி பிளாஸ்டிக் தொழிலில் பயன்படும் இயந்திரங்களுக்கு 50% மானியம் வழங்க வேண்டும்.
4. வீடுகள் மற்றும் தெருக்களில் பிளாஸ்டிக் கழிவுகளை சேகரிக்கும் ஏழைமக்களை (Rag Pickers) சுற்றுச்சூழல் காவலர்கள் என்று பெயரிட்டு, அவர்களுடைய வயதான காலத்தில் அவர்களுக்கு ஒரு நிரந்தர ஓய்வூதியம் மற்றும் வீட்டு வசதி செய்து தரவேண்டும்.
5. ஒட்டு மொத்தமாக அரசாங்கம் செய்ய வேண்டிய வேலையை, அதன் வேலைப் பளுவை குறைத்து, சமுதாயத்தை எத்தமாகவும், சுகாதாரமாகவும் வைத்திருக்க செயல்படும் மறுசுழற்சி தொழிலுக்கும், அதில் ஈடுபட்டுள்ள தொழில் முனைவோர்கள், தொழிலாளருக்கு வேண்டிய வசதிகளையும், வாய்ப்புகளையும், அரசாங்கம் ஏற்படுத்தி தர வேண்டும்.

பிளாஸ்டிக் உற்பத்தியாளர்கள் மற்றும் விபாபாரிகளின் சங்கம்
TANPPA, PONDY PLASTIC MANUFACTURERS & MERCHANTS ASSOCIATION
 New No. 26, (Old No. 142), Choolai High Road, Choolai, Chennai - 112.

புதிய எண்.26, [ப.எண். 142], சூளை நெடுஞ்சாலை, சூளை, சென்னை-600 112.

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E-mail : tanppa_in@yahoo.co.in



Regd. No. 223/2006.



6, 2000 ம் ஆண்டு மத்திய அரசு இயற்றிய தீக்கழிவு மேலாண்மை விதிகளை முழுமையாக, தமிழகத்தில் உள்ள அனைத்து ஊராட்சிகளிலும் நூறு சதவீதம் செயல்படுத்த காலக்கெடு விதித்து விரைந்து நடவடிக்கை எடுக்க வல்லுனர் குழு தமிழக அரசுக்கு பரிந்துரை செய்யவேண்டும்.

7, மாண்புமிகு முதல்வர் அறிவித்துள்ள பிளாஸ்டிக் தார்சாலை திட்டம் வெற்றியடைய, தார்சாலை போட, அதனுடைய விதிகளில் எவ்வாறு ஜல்லி, தார், போன்றவைகளை சாலை போட எவ்வளவு சதவீதம் சேர்க்க வேண்டும் என்று விதி இருக்கிறதோ, அதைப் போன்றே, தமிழகம் முழுவதும் போடப்படும் அனைத்து தார்சாலைகளிலும் இவ்வளவு சதவீதம் கண்டிப்பாக பிளாஸ்டிக் கழிவுகளையும் சேர்க்க வேண்டும் என்ற நிபந்தனையை சேர்க்க வல்லுனர் குழு தமிழக அரசுக்கு பரிந்துரை செய்ய வேண்டும்.

பிளாஸ்டிக் உபயோகப்படுத்துவதால் சுகாதாரமும், சுற்றுச்சூழலும் பெரும்ளவில் காப்பாற்றப்படுகின்றது என்பதுதான் உண்மை. இருபதாம் நூற்றாண்டின் இரண்டையற்ற கண்டுபிடிப்பு பிளாஸ்டிக் என்றால் மிகையிலலை. சக்கரம், மின்சாரம் போன்ற கண்டுபிடிப்புகள் எவ்வாறு மனித குல வரலாற்றில் புரட்சியை ஏற்படுத்தியதோ அதைப்போன்றது. பிளாஸ்டிக் கண்டுபிடிப்பும் என்றால் மிகையிலலை. வளர்ந்த நாடுகளில் ஒரு நபருக்கு 100 கிலோவுக்கு மேல் பிளாஸ்டிக் உபயோகிக்கின்றனர். நம்மவரிட மக்கள்தொகையில் அதிகம் உள்ள சீனாவில் கூட ஒரு நபர் உபயோகம் கிட்டத்தட்ட 30 கிலோ என்ற அளவில் உள்ளது. நம் நாட்டில் தனிநபர் நுகர்வு வெறும் 6 கிலோ பிளாஸ்டிக் மட்டும் தான், பிளாஸ்டிக் தொழில் நம் நாட்டைப் பொறுத்த வரை தவறும் குழந்தை நிலையில்தான் உள்ளது. அது செல்ல வேண்டிய தூரம் மிக அதிகம். இந்தியாவில் தயாரிக்கப்படும் பிளாஸ்டிக் பொருட்கள் உற்பத்தியில் 50% குஜராத் மற்றும் மகாஷ்டிரா மாநிலங்களில் மட்டும் தயாரிக்கப்படுகின்றது. தென்னிந்தியாவில் தமிழகமும், குஜராத், மஹாராஷ்டிரா மாநிலங்களைப் போல பிளாஸ்டிக் தொழிலில் முதன்மையான மாநிலமாக வளர வேண்டும் அதற்கு உங்களுடைய ஒத்துழைப்பு தேவை.

குப்பை பிரச்னை எல்லா பொருட்களுக்கும் உள்ள பொதுவான பிரச்னை. தயவுசெய்து பிளாஸ்டிக்கை மட்டும் தனியாக பிரித்து பார்க்காதீர்கள். வல்லுனர் குழு தமிழக அரசுக்கு அளிக்கும் பரிந்துரை பிளாஸ்டிக் குப்பை பிரச்னைக்கு தீர்வாகவும், தமிழகத்தில் பிளாஸ்டிக் தொழில் வளர்ச்சிக்கு உறுதுணையாகவும் இருக்க வேண்டும் என்று விரும்புகிறோம். தயவு செய்து ஆவன செய்யவும்.

நன்றி, வணக்கம்.

தமிழ்நாடு, பாண்டி பிளாஸ்டிக் உற்பத்தியாளர்கள் மற்றும் விபாபாரிகளின் சங்கம்

G. Sankaran

செங்கரன்

தலைவர்

சென்னை பிளாஸ்டிக் உற்பத்தியாளர்கள் மற்றும் வியாபாரிகள் சங்கம்



Chennai Plastics Manufacturers & Merchants Association

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Regd. No. 149/2001
Dt. 27.08.2001

புதிய எண், 26 (பழைய எண், 142) சூலை நெடுஞ்சாலை. சென்னை-600 112.

SPEED POST

Date: 24.09.2012

To

Dr.H. Malleishappa, I.F.S.,
Director of Environment,
Ground Floor,
Panagal Building,
Saidapet,
Chennai - 600 015.



Ref: Our Memorandum submitted in response to the Expert Committee's
directive to check the health and environment hazard in the use of
plastics - reg.

We invite your kind attention to the memorandum that our Association has submitted to your goodself on 23.08.2012. As you may be quite aware that in the said memorandum of ours, we had stated that we have approached the Indian Centre for Plastics in the Environment (ICPE), an organization set by the Central Pollution control Board for a scientific version to supplement the facts, we have stated in our memorandum and which would also be in response to the various points mentioned in the sub-committee's report.

We would request you to kindly treat the above as part of our memorandum earlier submitted. Incidentally, the President Governing Council ICPE has informed us that his organization would be ready and willing to make a presentation to the Expert Committee of Tamil Nadu Government if so desired by them.

Thanking you in the meanwhile and awaiting the favour of your kind reply.

Yours faithfully,
For CHENNAI PLASTICS MANUFACTURERS & MERCHANTS ASSOCIATION,

(G. SANKARAN)
PRESIDENT.

Encl: As Above

Indian Centre for Plastics in the Environment

ICPE Observation on the Reports of Expert Committee for Plastics Waste set up by Government of Tamil Nadu

It is observed that an Expert Committee was constituted by the Government of Tamil Nadu to 'check the health and environmental hazards in the use of plastics'.

The Expert Committee has formed two Sub-Committees to evaluate Environmental Problems including some additional tasks as recorded in the Report of the Sub-Committee.

ICPE Response

At the outset ICPE categorically states that - "There is absolutely no Health and Environmental Hazards in the Use of Plastics". On the contrary due to use of plastics in many forms in different applications, health is preserved in a great way all over the world including that in India. On the other hand, plastics have reduced the environmental burden of various pollutions in the air and water to a great extent. We explain these in the following paragraphs:

It is evident that the benefits of plastics are not realised by all in its true terms. The scientific fact is that - plastics are most safe and environment friendly materials. Plastics are chemically inert and are used for, among others, packaging of an array of health and medical products including

- Pharmaceutical - Tablets & Liquid Formulations
- Sensitive Medical Equipments including parts to be implanted inside human body
- Intravenous Fluids
- Blood Bags
- Drinking water and Foods including Ready to Eat & Drink Foods
- Food grains
- Edible Oils

Apart from packaging, plastics are used for manufacturing 'Disposable Syringes', Catheters, and Breathing Gadgets etc. Plastics provide Safety & Hygiene to products packed. Plastics are inert and are approved by the regulatory authorities world over, including those in India, for use in contact with food, pharmaceuticals and drinking water.

Plastics save the environment from a much greater damage compared to the damage caused by alternatives due to the following basic properties:

- Energy consumption and Air and Water emissions are the least in case of production and transportation of plastics raw materials and finished products compared to the alternatives like metals, glass and paper.

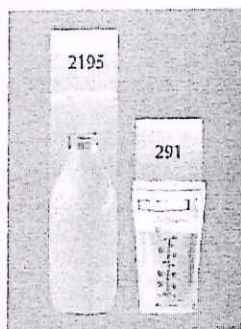
Indian Centre for Plastics in the Environment

Plastics consume least energy for production

Material	Energy Requirement KWH Kg-1
Aluminum	74.1
Steel	13.9
Glass	7.9
Paper	7.1
Plastic	3.1

Source: Scott, G and Gilead, D., editors, Degradable Polymers, Principles and Application, Chapman & Hall, London, 1995

Energy saving reduction of pollution for packaging of 1 lakh liters of Milk in Plastic Pouch vs. Glass Bottle



Energy in Giga Jules

Energy consumption in GJ for Production of Packaging Raw Materials, Production of Glass Bottles / Plastic Pouches, Filling and Distribution (Transportation) of Milk and Waste Management / Recycling of the Glass Bottles / Plastic Pouches:

Plastic Pouch - 291 GJ
Glass Bottle - 2195 GJ

Energy saving by Plastic (direct) - 1904 GJ or 86%

Energy Recovery from Plastics Waste- 20 GJ - per 1 lakh litres of Milk

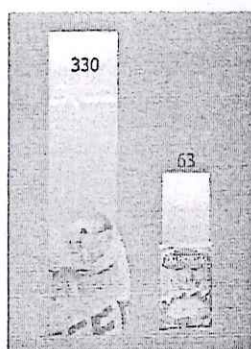
(There is no energy recovery from waste glass)

- COD and BOD values are at least 15 to 20 times higher in case of glass bottles leading to dangerous environmental impact apart from health hazard.
- Transportation of milk in glass bottles leads to use of 929 litres of excess fuel and 2317 kgs of excess emissions.

(Source: IIT Delhi report on LCA of Plastics in Packaging)

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Energy saving for packaging of 1 lakh MT of Atta in Plastics vs. Jute



(Reference IIT Delhi report on LCA of Plastics in Packaging)

Energy consumption in GJ for manufacturing Packaging Raw Materials, Packaging and Transportation of Atta:

Plastic bag - 63 Giga Jules
Jute bag - 330 Giga Jules

Energy saving by Plastic bag - 81%
Energy Recovery from Plastics bag Waste - 35 GJ

Environmental burden during production of raw materials and finished bags - Plastic & Jute

Environmental Burden in kg	Jute Bag	Plastic Bag
Air Pollution		
CO	54.3	0.6
CO ₂	6610.2*	760*
SO _x	134.8	5.2
NO _x	68.1*	4.8*
CH ₄	39.5	3.2
HCL	5.3	0
Dust	67.6	1.4
Water Pollution		
Suspended Solids	352.3	0.2
Chlorides	4535.5	0.1

(Source: IIT Delhi report on LCA of Plastics in Packaging)

Indian Centre for Plastics in the Environment

Emission of Carbon Dioxide due to Jute Bags is more than eight times than that of Plastics Bags. Emissions of other Green House Gases – NOx and CH4 also are 14 and 12 times higher respectively by Jute compared to Plastics.

Emission of chlorides due to Jute is more than 45000 higher than that of Plastics! Details have been given in the table above.

Environmental burden during transportation of the finished bags

Emission	Gm/k m	Excess Emission for Jute Bags	Plastic Bags
CO2	781*	11107.3*	Taken as Basis
CO	4.5	64.0	Taken as Basis
HC	1.1	15.6	Taken as Basis
NOx	8*	113.8*	Taken as Basis
Particulates	0.36	5.1	Taken as Basis
Total Regulated Tailpipe Emission	13.93	198.5	Taken as Basis

(Source: IIT Delhi report on LCA of Plastics in Packaging)

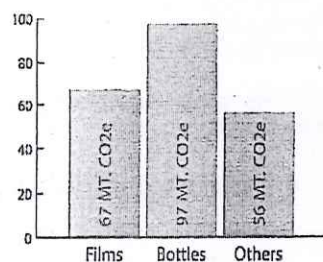
The excess emissions of Carbon Dioxide and other Volatile Organic Compounds (VOCs) during transportation are hundred or even thousand times more in the case of Jute compared to Plastic!

Plastics have least Carbon Footprints in the atmosphere causing least Green House Gas effect

Green House Gas emission saving by plastics packaging

A study conducted by McKinsey for the International Council of Chemical Associations (ICCA), the report of which was submitted during the Copenhagen Earth Summit in 2009, revealed that in the year 2005 the Earth's atmosphere could save an accumulation of a total amount of 220 Million Tons of CO2 equivalent due to the use of plastics in the Packaging Sector. Plastics Packaging is one of the top ten most GHG saver in the Earth's Atmosphere. The study compared the emissions with alternatives like Glass, Thin Steel, Aluminium, Corrugated Box, Paper, Card Board, Wood, Beverage Carton etc.

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Total Green House Gas Saving $\approx$ 220 Mn Tons CO₂e

Ref: McKinsey Report

Comparing Scenario	Comparing Materials
Carry Bags	Plastics : PE/PP/PVC/PS/EPS/PET
Flexible Packaging	vs
Rigid Packaging	Glass / Thin Steel / Al Corrugated Box / Paper Card Board / Wood Beverage Carton

Source: McKinsey Report: Carbon LCA Study for International Council of Chemical Associations.

- # Plastics are very light weight still very strong, inert and safe
- # Plastics offer the highest product to package ratio resulting in enormous amount of resource saving.

In addition plastics are the cheapest among the alternatives.

It is seen that Plastics are not hazardous to health or environment. On the contrary plastics save the environment and human health.

Let us discuss the issue of Plastics Carry Bags in particular.

'Plastics Carry Bags'

Plastic Carry Bags are generally made out of polyethylene (polythene) which is used in contact with food stuffs, pharmaceuticals and drinking water and its use in these critical areas is approved by the regulatory authorities across the world including that in India like Bureau of Indian Standards (BIS). There is no health and environmental hazards associated in the use of Plastics in general and Plastics Carry Bags in particular.

Plastic Carry bags have contributed significantly in creating a sustainable, cost effective, energy efficient, hygienic and environmental friendly packaging system and for carrying, storing and packing various types of commodities / products including

Indian Centre for Plastics in the Environment

food products. The attributes, which have made the use of plastics safe and popular as a packaging material in general and as a carry bag in particular, are:

- o Non toxic characteristics, inertness and chemical resistance.
- o Excellent barrier properties and water-proof characteristics.
- o Safe in handling due to non-breakability and light in weight
- o Transparency, allowing easy visibility of content being carried/stored/packed
- o Can also be made opaque to protect the content from exposure to sunlight
- o Resistance to bacterial and other microbial growth.
- o Pilfer proof characteristics etc.

Plastic carry bags due to the above-mentioned properties ensure that the products of mass consumption are delivered to the consumers in the best, hygienic and economic fashion. Plastic carry bags being inert in nature do not pose any health hazard. All plastics in general meet the requirements of both National and International standards like BIS, FDA etc.

Plastic carry bags and ancillary products add convenience to day-to-day life. Plastic bags are essential for packaging of bread, confectionery items, all range of Farsan / Nankeen and bakery products in view of its superior properties and cost effectiveness. All these products are very sensitive to moisture and loose taste and quality within no time. Hygroscopic edible products like sugar, salt, jaggery and many other food items susceptible to moisture cannot be effectively packed in alternative materials without sacrificing the quality or cost of packaging. Over years Plastics packaging have played a major role in protecting and increasing the shelf life of these products. For carrying fish, meat, poultry and other wet food products, plastic bags are most suitable and no other alternative packaging can substitute them.

IMPACT SUMMARY OF VARIOUS BAG TYPES

(Carrying Capacity Equivalent to 1000 Paper Bags)

	Paper (30% Recycled)	Compostable Plastics	Polyethylene
Total Energy - MJ	2622	2070	763
Fossil Fuel Use - (Kg)	23.2	41.5	14.9
Municipal Solid Waste (Kg)	33.8	19.2	7.0
Green House Gas Emission - CO ₂ e Tons	0.08	0.18	0.04
Fresh Water Usage	1004	1017	58

LCA of Grocery Bags – Boustead, USA

Indian Centre for Plastics in the Environment

Life Cycle Analysis (LCA) conducted on three different types of carry bags made of – paper (having 30% recycled component), compostable plastics and polyethylene by Boustead, USA, reveals that carry bags made of plastics

- consume least energy
- use least fossil fuel
- create least amount municipal solid waste
- emit least quantity of Green House equivalent Gases and
- use minimum quantity of fresh water

compared to those of paper and compostable plastics. Reference table is given above.

It is true that thin plastics carry bags, when disposed of carelessly after use create Waste Management issue as this waste is not picked up by the Waste Pickers due to reason of non-viability. In absence of appropriate infrastructure for SWM, the Government decided to set restrictions to the thinner types of Plastics Carry Bags for avoiding littering by the users. However it is needless to say that we have to manage the waste generated at different sources appropriately and keep our surroundings clean. This is true for all types of waste, be it plastics carry bags waste or multilayer laminated plastics waste or building & demolition waste or vegetable market waste. In absence of appropriate infrastructure to manage the MSW and in absence of anti-littering awareness among the general mass, it is not possible to resolve the issue.

To avoid the hardship of tackling the waste management issue directly (as described above), if we think that by imposing a ban on the use of plastics carry bags and one time use plastics items, we will be creating a greater environmental burden on us, the phenomenon not seen by naked eye though. The entire sector of Food and other products depend on Plastics Flexible Packaging and one time use Packaging Materials. Examples are:

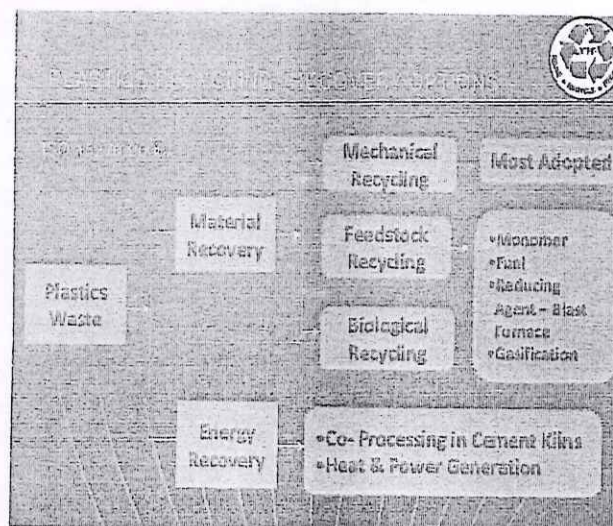
Biscuits / Tea / Coffee / Edible Oil / Milk & Milk Products / Chocolates / Baby foods / Various Types of Ready to Eat & Drink Foods / Soaps & Detergents / Tooth Paste / Yoghurts / Shrikhand etc.

If we plan to remove Flexible Packaging Plastics and one time use plastics materials from its use, we will be inviting for a much greater environmental hazard which could be created by the alternative materials, apart from associated Health and Safety hazards.

ICPE observes that Government of India, Ministry of Environment and Forests was careful while finalising the 'Plastics Waste (Management and Handling) Rules 2011' dated 4th February and while amending it on 2nd July, 2011. An 'Expert Committee' was set up by MoEF for drafting the Rule and later on consultations were made with other stake holders. 'Packaging' was not included in the said Rule due to the basic advantage of 'Plastics in Packaging', a brief of which has been discussed in the above paragraphs.

The issue of plastics waste management can be resolved with direct approach to the problem. Plastics are 100% recyclable. The below mentioned flow chart describes various routes of Plastics Recycling and Recovery methods.

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However to achieve the result, segregation of waste at the source of generation is the prime requirement. Mass awareness against littering is required to be created. All developed countries have done it; India also has to do this.

We will now correct some of the other mis-conception mentioned in the Sub-committee Report.

• **Additives in Plastics**

It is mentioned in the TN Government Sub- Committee Report that due to the presence of anti oxidants and other additives, plastics raw materials emit toxic gases.

This is not the correct position. Plastics Raw Materials - Polyethylene, Polypropylene, Polyvinyl Chloride, Polystyrene etc are produced by very large scale companies in the organised sector based on modern technology and abiding all National and International Rules & Regulations. Air and Water quality in the environment surrounding the plastics resin manufacturers' plants are maintained within the prescribed safety norm set by the regulatory authorities in line with the International Standards. Hence there is no scope that during manufacturing of plastics raw materials any untoward VOC is emitted beyond the permissible limit.

Indian Centre for Plastics in the Environment

Processing of plastics does not emit any VOC beyond the permissible limits. The test results recorded by Shriram Institute of Industrial Research, Delhi, clearly proved this. The table below gives the brief of the findings.

Polymer (processed at temp °C)	Emissions During Processing of Plastics			
	VOCs per ASTM D-3886 (GC)	Volatile Organic Compounds (VOCs) and HAPs (ppm)		
		Formic Acid, Acetic Acid, Acetaldehyde (HPLC)	Formal- dehyde (UV Spectrop- hotometry)	Hydroch- loric acid (Chlori- metry)
LDPE (170-205°C) Extrusion/Injection Moulding	Nil	Nil	<1	Nil
LLDPE (180-240°C) Extrusion/Injection Moulding	Nil	Nil	<1	Nil
HDPE (210-245°C) Extrusion/Injection Moulding	Nil	Nil	<1	Nil
PP (210-270°C) Extrusion/Injection Moulding	<1	Nil	<1	Nil
PVC (180-250°C) Extrusion/Injection Moulding	Nil	Nil	Nil	Nil
PS (190-270°C) Extrusion/Injection Moulding	<1	Nil	<1	Nil

PROCESSING OF PLASTICS IS SAFE UNDER STANDARD PROCESSING CONDITIONS.

Test Report by: Shriram Institute for Industrial Research, Delhi

Phthalates

Regarding the use of Phthalate Plasticisers, it is to be noted that plasticisers are used only in some types of plastics materials mainly in PVC. For manufacturing plastic carry bags, for which polyethylene is the material of construction, plasticisers are not used.

Moreover, the issue of Phthalate Plasticisers is being researched extensively in the developed countries like USA and in Europe. In the USA, six types of phthalates were banned for use in children's toys and child care articles (below the age of 3 yrs) at concentrations greater than 0.1 percent. As per latest information available, the use of three of these banned phthalates, DINP, DIDP, and DnOP may be reinstituted by the authority pending review by the Chronic Hazard Advisory Panel. The EU has confirmed that two of the most widely used plasticisers - DIDP and DINP are not classified as hazardous and pose no risks to either human health or the environment from their current use.

Let us not forget that 'Blood Bags' used for transfusion of live saving blood to patients are made of flexible PVC containing 'phthalate'. The complete issue can be discussed for more clarifications. More over, the issue of Phthalates does not arise in the current agenda of plastics carry bags and one time use plastics material.

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Biodegradable Plastics

Plastics are useful for its long life characteristics. Biodegradable plastics are required for specific applications like nursery bags, mulch film, paper coating etc. Although the concept and development of biodegradable plastics started as early as in the late Seventies, the industry is still in its nascent stage. While the production of normal plastics (crude oil / natural gas based) in the world is more than 200 Million Tons (2010) production of biodegradable plastics was in the range of 0.5 Million Tons. It is evident that biodegradable plastics have limited applications.

Biodegradable plastic are not recommended for mass applications as composting creates greenhouse gas emission - CO₂ and CH₄. 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. Moreover, composting requires an additional activity of appropriate mixing of the soil with sprinkle of water, which is not done in 99% of landfills in India. Mere throwing of biodegradable plastics waste in the landfill or waste steam would not ensure that such waste would vanish of its own.

Plastics recycling do not create such situation. It augments resource management of the basic raw material. Industry recommends recycling over biodegradation. A Position Paper on Biodegradable Plastics by ICPE is enclosed herewith.

Co-Processing of Plastics Waste in Cement Kilns

In the Minutes of a Meeting of Sub-Committee I, doubts were raised on the impacts of Co-processing of Plastics Waste in Cement Industries.

It is hereby clarified that CPCB has already approved such process in Indian condition. It is also to be noted that in Germany, Cement Kilns use more than 60% of coal as a source of energy has been replaced by Waste Plastics. ICPE ENVIS Newsletter carrying the Report of the 1st large scale trial in India for Using Waste Plastics for Co-processing in Cement Kiln is enclosed for ready reference.

There are other methods of recycling or recovery of energy from mixed plastics waste which enable disposal of all plastics waste in scientific manner. Details may be discussed.

