

The Environmental Burden of Tobacco Products Wastes in India

Tobacco Use Makes You Ugly, Your Habitat Uglier



About the Institutions

School of Public Health, All India Institute of Medical Sciences (AIIMS) Jodhpur

All India Institute of Medical Sciences, Jodhpur is a central government tertiary level healthcare and research institute established under the Pradhan Mantri Swasthya Suraksha Yojna (PMSSY), by the Ministry of Health & Family Welfare, Government of India with the aim of correcting regional imbalances in healthcare in the country.

School of Public Health (SPH) at AIIMS Jodhpur was established in 2017 to provide excellence in public health education, research and training along with highest standard of care to the community. Many initiatives have been undertaken in the field of tobacco control by the institution such as sensitization of urban slums regarding harmful effects of tobacco use and development of IEC material for the same. Tobacco control is also a major component of the School Health Promotion Program, which is a flagship programme of SPH AIIMS Jodhpur since 2019. The faculty have been designated as Nodal persons for Scientific Group, of National Tobacco Testing Laboratory (NTTL) under the Ministry of Health and Family Welfare, Government of India in September 2020.

National Institute of Cancer Prevention and Research (ICMR-NICPR)

ICMR-National Institute of Cancer Prevention & Research (ICMR-NICPR) is the country's premier Institute for carrying out research in the field of Cancer Prevention. The Institute has been recognized for the contributions made in developing and validating strategies for cervical cancer screening in the country as well as in training faculty, research scholars, and students for carrying out screening of prevalent cancers namely oral, breast, and uterine cervix. The WHO FCTC Knowledge Hub on Smokeless Tobacco (KH-SLT) housed at the Institute generates information, knowledge and provides training, regionally and globally on smokeless tobacco. Several inter-departmental research projects on tobacco control are carried out and human resource development in tobacco control is promoted by organizing training programs and meetings for policy discourse in various global tobacco control best practices.

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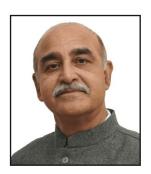
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INDEX

S.No.	Торіс	Page No
1	Foreword	1
2	Introduction - Tobacco: A Threat to Environment	2-3
3	Legal and Policy Framework for Reducing Environmental	4-6
	Burden from Solid Waste	
	Plastic Waste Management Rules, 2016	4-6
	Extended Producers Responsibility	5
	Responsibilities of producer, importer and brand-owners	5
	National Green Tribunal	6
	Swachh Bharat Mission 2.0	6
3	Study Landscape	7-8
4	National Estimates: Tobacco Product Packaging Wastes	9-15
5	Policy Recommendations and Conclusion	16
6	References	17-18
7	Appendix (A & B)	19-20

Foreword



Prof Dr (Col) CDS Katoch



Dr Shalini Singh

We are pleased to bring forth the report on 'Tobacco Use Makes You Ugly, Your Habitat Uglier: The Environmental Burden of Tobacco Products Wastes in India'. Tobacco is a big threat to human lives and environment. It is responsible for the highest number of preventable deaths globally. The use of plastic in tobacco products largely goes unnoticed. Our study provides important information on the total waste generated in form of plastic, paper, filter and foil produced by packaging of cigarettes, bidis and smokeless tobacco products in the country.

We congratulate the entire team of School of Public Health, AIIMS Jodhpur, ICMR-National Institute of Cancer Prevention and Research, Noida and The Union South-East Asia Regional Office for their untiring efforts in successfully compiling this report. We are sure the findings of this study will benefit government, policymakers and general public at large. We also believe that the findings of this study will bring about a movement for improving our environment and will give tobacco users one extra reason to quit.

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Introduction Tobacco: A Threat to Environment

Tobacco use and its adverse impact on health is well-known. It is an accepted global threat and a topic of many researches and discussions in public health community since many years. It is the greatest cause of preventable deaths globally and concerns directly with morbidity and mortality due to first-hand, second-hand and third-hand smoke. However, many hidden aspects of the devastating effects caused by tobacco products surface every now and then and are important to be highlighted to quantify the exact proportion of impact caused by the industry and its consumers.^{1,2}

Tobacco not only negatively affects the health of all the people involved in its supply chain, right from the cultivators to its final consumers, but it also endangers the health of the environment enormously. The GATS-2 data reveals that over 266 million tobacco users in the country use various forms of smoked and smokeless tobacco products. What largely goes unnoticed is the metric tonnes of waste that is discharged carelessly in the environmental due the consumption of these products by such a large number of people. This waste litters the environment with paper, plastics, microplastics, foils and filters, which without a proper disposal mechanism, end up polluting water, air and land with heavy metals, toxins and residual nicotine.³

The filters found in cigarettes and few bidi brands are essentially plastic made from cellulose acetate, which only degrade under severe biological conditions but remains non-degraded when collected on beaches, sewage, streets thereby choking many of the sewage ducts in the process. Cigarettes and cigarette filters form 19% of the total marine debris collected from an international coastal clean-up forming the largest proportion of all items collected. The heavy metals, chemicals and toxins from these filters seep into the aquatic ecosystems endangering the marine life and microorganisms. The resulting biological magnification of toxins due to this process are potentially devasting for environment as well as humans. 5-7

The plastics and cellophane used in the outer packaging are similarly neglected from proper disposal and end up in landfills. Cellophane is largely debated as a natural or "organic" product as it is derived from plant extracts. Although it is biodegradable, but releases its own set of toxins during the process, that were incorporated during its processing. When littered mixed with other non-biodegradable materials and poly-propylene based plastic cellophane, the set becomes non-biodegradable and ends up everywhere, including landfills, streets, drains, rivers and other aquatic environments, and remain there for decades together. In most areas, the responsibility for cleaning up the waste falls on the government using taxpayer funding. The process of making true cellophane uses a lot of chemicals, including toxic carbon disulphide. As

true cellophane biodegrades, it releases all of these chemicals into the surrounding environment. Thus, although it is biodegradable, it is not at all eco-friendly. Thus, for the study, cellophane was considered as a plastic waste for calculation of total waste generated due to tobacco product packaging.¹¹⁻¹⁴

This report summarises the actual proportion of daily, monthly and annual litter in terms of paper, plastic, foil and filter waste generated due to consumption of tobacco products (bidi, cigarettes, smokeless tobacco) to objectify the relationship between tobacco and environment from a never before explored lens. The purpose of this report is to share the colossal environmental burden due to tobacco packaging with the governments, policy-makers, researchers and the public health community in the country and highlight the deep-rooted impacts of tobacco as a threat to our environment.

Legal and Policy Framework for Reducing Environmental Burden from Solid Waste

Plastic Waste Management Rules

The Government of India have laid down comprehensive guidelines to manage the enormity of plastic waste generated in the country through the Plastic Waste Management (PWM) Rules, 2016. These guidelines provide a regulatory framework for the management of plastic waste thus generated by emphasising:

- Plastic waste minimization
- Source segregation, and
- Recycling

The guidelines also emphasise the involvement of waste pickers, recyclers and waste processors in collection of plastic waste, from sources such as households, sources of its generation, or intermediate material recovery facility, and adopt the polluter's pay principle for the sustainability of the waste management system.¹⁵

The provision 4(f) of the PWM Rules specifically prohibits the use of plastic material in sachets for storing, packing or selling gutkha, tobacco and pan masala, while provision 4(i) specifies the plastic material as any form including Vinyl Acetate - Maleic Acid Vinyl Chloride Copolymer.

Further, the guidelines lay down the following provisions for penalties as "Environmental Compensation" in case of violations:

- 1. Seizure of manufactured products & Closure of Unit.
- 2. Environmental Compensation (EC) to be levied @ Rs.5000/- per ton of plastic bags manufactured from the date of inception of the unit or date of notification of PWM Rules (March 18, 2016) whichever is later.
- 3. Penalty as per Section 15(1) of EPA 1986, i.e., EC to be levied @ Rs. 10000/- per ton for 2nd violation and @ Rs. 20000/- per ton for 3rd violation.

In case of failure of compliance and default in submission of fines, penalties may increase from 12% - 24% and finally resulting in closure of unit/facility, seizure of trade documents after 3 months of delay.

Extended Producers Responsibility

The Extended Producers Responsibility (EPR) regime, under the Plastic Waste Management Rules, 2016, states that it is the responsibility of Producers, Importers and Brand-owners (PIBOs) to ensure processing of their plastic packaging waste through recycling, re-use or end of life disposal (such as co-processing/Waste-to-energy/Plasticto-oil/roadmaking/industrial-composting).¹⁶

The regime was notified in the latest amendment (2022) of the PWM by the Ministry of Environment, Forest and Climate Change, Government of India, under the 'Guidelines on Extended Producer Responsibility for Plastic Packaging' in the Schedule II of the Rules. As per these guidelines, Producers, Importers and Brand Owners (PIBOs) shall have to register through the online centralized portal developed by the Central Pollution Control Board (CPCB).

Responsibilities of PIBOs

PIBO stands for producer, importer and brand-owners. Any entity that identifies as a PIBO and has operations in India that uses plastic packaging as part of its operation, irrespective of the turnover or scale of operations will fall under the obligation of EPR. Under the current framework of EPR, PIBOs are responsible to:

- 1. Register at EPR Portal
- 2. Submit their Action plan
- 3. Fulfil obligations for:
- Recycling
- Use of Recycled content
- Reuse
- End of life disposal
- Optional engagement in collection and recovery of the plastics
- Submit annual returns
- Provide proof of certificates (Plastic credits)
- PIBOs can engage with PRO's or other agencies separately to fulfil their targets but reporting and responsibility to fulfil the obligations is completely of PIBO¹⁷

National Green Tribunal

Formed under the National Green Tribunal Act, 2010 for effective and expeditious disposal of cases relating to environmental protection, it is a specialized body equipped with the necessary expertise to handle environmental disputes involving multi-disciplinary issues. The NGT has also passed order on complete prohibition on use of single use and non-compostable plastics (size less than 50 microns).

Further orders have been passed to ensure non usage of sale and storage of such plastics at shops with a provision of "Environmental Compensation" of Rs. 5,000 per default.¹⁸

Swachh Bharat Mission 2.0

The policy of Plastic Waste Handling also received an impetus in the Swachh Bharat Mission 2.0 resulting in an additional Central Assistance being provided to States and Union territories for plastic waste management. Swachh Bharat Mission Urban 2.0 has specific focus on elimination of single use plastics and have also been incorporated as an important component in Swachh Survekshan 2022. The prohibition of single use plastic has been made an entry condition for participating in Safaimitra Suraksha Challenge and Starrating of Garbage Free Cities.¹⁹

Study Landscape

Objectives and Methodology

The study was initiated with the objective to assess the total waste in form of plastic, paper, filter and foil, produced by major tobacco products consumed in the country, namely, cigarettes, bidis and smokeless tobacco products.

This cross-sectional survey was conducted in 33 districts of 17 States and Union Territories across the country in the months of January to April, 2022, to observe the packaging of major brands of cigarettes, bidis and smokeless tobacco as plastic packaged or paper packaged. The survey was conducted by visiting 3 tobacco vendors in the selected districts of each state. After the survey, duplicates were excluded and state-wise unique products were enlisted to be procured from across the country to ensure generalisability. Over 200 brands of tobacco products (70 cigarette brands, 94 bidi brands and 58 smokeless tobacco brands) were procured to ensure representation and generalisability from all the geographic regions of the country (Annexure).

After procurement of the samples, a digital weighing balance enclosed in glass chamber (to avoid disturbances due to wind) and least count of 0.0001 grams and a precision of 0.001 grams was used. Powder-free latex examination gloves and mask were donned by the team during the process to avoid contamination or inhalation of tobacco dust. The gross weight of all the samples was recorded followed by segregation of the main product and plastic, paper, foil and filter components from the packaging. Each component was weighed separately over a piece of foil (tared after placement) to avoid spillage and ensure uniform weight distribution. The weighing balance was re-tared after removal of each component and re-calibrated after every 10th product. Photographs were taken 2 seconds after the stabilisation of weight for every component, for the purpose of record and verification. The entered data was rechecked and verified twice before commencing the analysis.

After the initial data analysis, the data modelling was done using the GATS-2 data to determine the average quantity of products consumed per day and finally determine the quantity of waste generated per day, month and year due to the consumption of cigarettes, bidis and smokeless tobacco products.

Results

The study included segregated weighing of 70 cigarette brands, 94 bidi brands and 58 smokeless tobacco brands. The key findings are described in Table 1. It is important to note that the percentage of plastic used in packaging of the products were greatest in smokeless tobacco (18.13% of the gross pack weight) followed by plastic use in bidis packaging (3.98% of the gross pack weight) and least in cigarettes (1.79% of the gross pack weight).

Distribution and Characteristics

Table 1: Distribution and characteristics of sampled cigarettes and bidis

	Cigarettes	Bidis
Total brands under survey	70	94
Average weight per pack (gms)	13.7213	8.0551
Range (min – max) (gms)	7.1516 – 27.3617	2.9118 – 14.0809
Total number of sticks under observation	747	1585
Range of sticks per pack (min – max)	5 – 20	5 – 25
Average plastic weight per pack (gms)	0.2462	0.4806
Range of plastic weight per pack (gms)	0.0930 –	0.1983 –
Range of plastic weight per pack (gins)	0.3880	1.1799
Average plastic weight per stick (gms)	0.0221	0.0188
Average paper weight per pack (gms)	3.7944	0.5761
Range of paper weight per pack (gms)	2.4871 –	0.1199 –
Range of paper weight per pack (girls)	5.4329	0.9408
Average paper weight per stick (gms)	0.3403	0.0160
Average foil weight per pack (gms)	0.7679	-
Panga of fail weight per pack (gms)	0.4270 –	
Range of foil weight per pack (gms)	3.4611	-
Average foil weight per stick (gms)	0.0658	-
Average filter weight per pack (gms)	0.1612	0.0314
Range of filter weight per pack (gms)	0.0711 –	0.0230 –
Trange of filter weight per pack (gills)	0.2902	0.0368
Average filter weight per stick (gms)	0.0142	0.0001

Table 2: Distribution and characteristics of sampled smokeless tobacco products

	Smokeless Tobacco
Total brands under survey	58
Average weight per pack (gms)	4.7957
Range (min – max) (gms)	0.5100 – 24.5455
Average plastic weight per pack (gms)	0.8811
Range (min – max)	0.2211 – 2.4897
Average paper weight per pack (gms)	0.7123
Range (min – max)	0.2417 – 1.9564

National Estimates: Tobacco Product Wastes

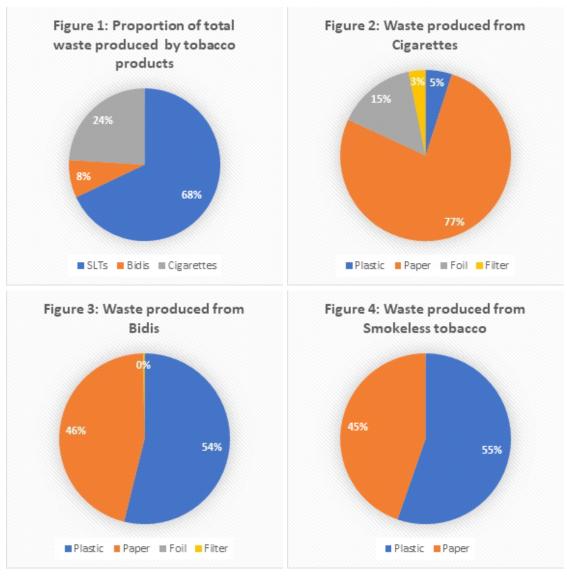
The Global Adult Tobacco Survey (GATS-2; 2016-17), provides a detailed set of data about the number of cigarette and bidi sticks consumed daily by the smoking population of the country aged above 15 years. From the data we derived an average number of sticks consumed per smoker (6.8 cigarettes and 15.1 bidi sticks)²⁰ to gather the figures of total waste generated each day, month and year. There was a paucity of data and literature for daily amount of smokeless tobacco consumed, thus the minimum number was taken as 1 pack per day. However, it is to be noted, that the consultations performed during the sample collection revealed that the actual number was much higher than assumed 1 pack of smokeless tobacco per day per consumer.

Table 3: Estimated waste production from tobacco products using GATS-2 prevalence data (in tonnes)

	Cigarette	Bidi	Smokeless tobacco	Total
Plastic				
Per Day	5.58	20.33	175.46	201.37
Per Month	167.54	609.77	5,263.84	6,041.15
Per Year	2,038.42	7,418.81	64,043.43	73,500.66
Paper				
Per Day	86.08	17.29	141.57	244.94
Per Month	2,582.39	518.76	4,246.96	7,348.12
Per Year	31,419.10	6,311.63	51,671.40	89,402.13
Foil				
Per Day	16.64	-	-	16.64
Per Month	499.19	-	-	499.19
Per Year	6,073.47	-	-	6,073.47
Filter				
Per Day	3.60	0.11	-	3.71
Per Month	108.10	3.21	-	111.31
Per Year	1,315.16	39.07	-	1,354.23

The study findings suggest that when generalised to the entire country's consumption, the waste produced by the packaging of tobacco products amounts to over **1 lakh 70 thousand tonnes in a year**. Two-thirds of this waste burden is contributed smokeless tobacco alone, amounting to over **1 lakh 15 thousand tonnes** (Table 3 and Figure 1).

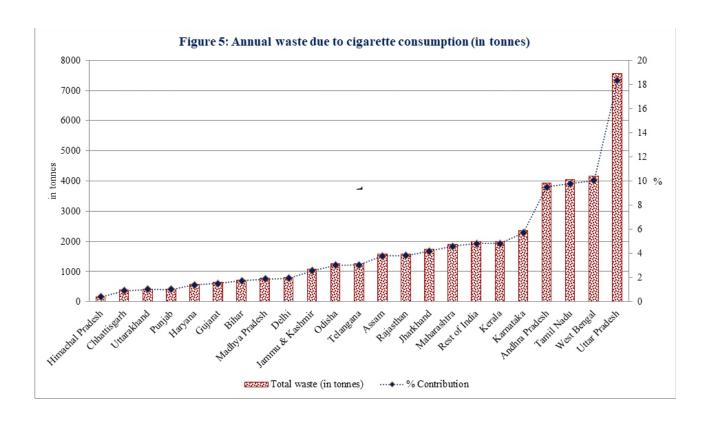
Analysis of the segregated waste reveals that over **73 thousand tonnes of Plastic** is discharged into the environment every year that roughly corresponds to 45% of the total waste produced by all forms of tobacco products. This is followed by over **6 thousand tonnes of foil** and **1.3 thousand tonnes of litter in form of used filters** being released in the environment. Furthermore, the plastic waste generated by the bidis were observed to be 3.5 times more than that by cigarettes. (Table 3, Figure 2-4)

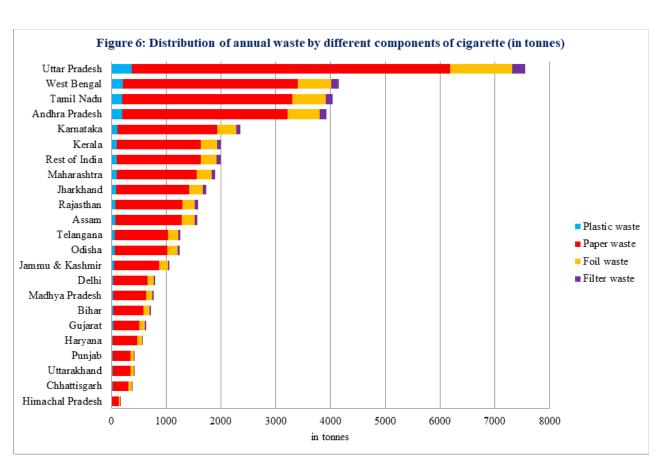


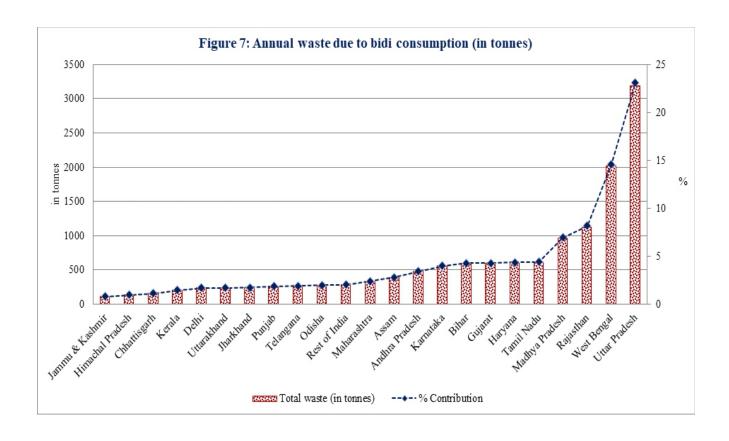
*contribution of filters in Bidi - generated based waste is 0.001% (Figure 3)

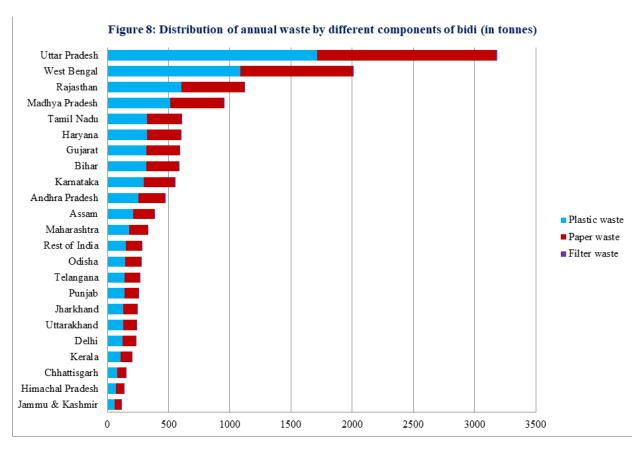
Table 4: Estimated state-wise generated annual waste (in tonnes)

			Cigarette				Bidi	 <u></u>		Smo	Smokeless Tobacco	acco
Name of states	Plastic	Paper	Foil	Filter	Total	Plastic	Paper	Filter	Total	Plastic	Paper	Total
India	2060.7	31730.4	6135.3	1324.0	41250.4	7428.4	6322.0	39.5	13789.9	64093.9	51712.1	115806.1
Uttar Pradesh	377.5	5812.8	1124.0	242.6	7556.9	1714.48	1459.13	9.12	3182.74	13827.7	11156.4	24984.1
West Bengal	207.2	3191.1	617.0	133.2	4148.5	1084.08	922.62	5.77	2012.47	4690.8	3784.6	8475.3
Tamil Nadu	201.8	3107.5	6.009	129.7	4039.8	326.76	278.09	1.74	606.59	1988.3	1604.2	3592.5
Andhra Pradesh	196.1	3019.2	583.8	126.0	3925.1	255.16	217.15	1.36	473.67	905.8	730.8	1636.6
Karnataka	117.6	1811.1	350.2	75.6	2354.5	297.93	253.56	1.58	553.07	2551.5	2058.6	4610.1
Kerala	99.5	1531.5	296.1	63.9	1991.0	106.56	69.06	0.57	197.81	469.4	378.7	848.1
Maharashtra	94.8	1460.3	282.4	6.09	1898.5	179.15	152.47	0.95	332.57	7131.8	5754.0	12885.8
Jharkhand	86.3	1329.4	257.1	55.5	1728.3	130.47	111.04	0.69	242.20	2753.4	2221.5	4974.8
Rajasthan	78.8	1213.2	234.6	50.6	1577.2	605.97	515.72	3.22	1124.91	2323.3	1874.5	4197.8
Assam	78.4	1206.8	233.3	50.4	1568.8	208.71	177.63	1.11	387.45	3137.2	2531.1	5668.3
Telangana	63.0	6.696	187.5	40.5	1260.9	142.20	121.02	92.0	263.98	9'806	733.1	1641.7
Odisha	62.5	962.4	186.1	40.2	1251.1	148.42	126.31	0.79	275.52	4485.8	3619.2	8105.0
Jammu & Kashmir	53.2	819.4	158.4	34.2	1065.2	59.95	51.00	0.32	111.24	128.8	103.9	232.8
Delhi	39.9	614.5	118.8	25.6	798.9	126.16	107.37	0.67	234.21	419.7	338.6	758.4
Madhya Pradesh	38.9	598.9	115.8	25.0	778.6	514.33	437.73	2.74	954.79	4923.3	3972.2	8895.4
Bihar	35.9	553.1	106.9	23.1	719.0	316.64	269.48	1.68	587.81	5492.1	4431.1	9923.2
Gujarat	31.5	485.2	93.8	20.2	630.8	317.46	270.18	1.69	589.33	2952.3	2382.0	5334.2
Haryana	28.8	442.9	85.6	18.5	575.7	323.88	275.64	1.72	601.24	408.1	329.2	737.3
Meghalaya	27.1	417.4	80.7	17.4	542.7	37.64	32.03	0.20	69.87	137.7	111.1	248.8
Manipur	24.2	373.3	72.2	15.6	485.3	9.94	8.46	0.05	18.46	342.0	275.9	617.9
Punjab	21.0	323.8	62.6	13.5	421.0	137.86	117.33	0.73	255.93	579.5	467.5	1047.0
Uttarakhand	21.0	323.1	62.5	13.5	420.0	127.00	108.09	0.68	235.76	310.9	250.9	561.8
Chhattisgarh	19.1	293.5	56.8	12.2	381.6	82.02	69.80	0.44	152.25	2232.4	1801.1	4033.5
Tripura	13.9	213.5	41.3	8.9	277.6	58.11	49.46	0.31	107.88	452.7	365.2	818.0
Mizoram	13.4	206.5	39.9	8.6	268.4	1.31	1.11	0.01	2.42	90.4	72.9	163.3
Himachal Pradesh	8.5	130.2	25.2	5.4	169.3	71.90	61.19	0.38	133.47	54.8	44.2	99.1
Arunachal Pradesh	7.1	110.0	21.3	4.6	143.0	16.10	13.70	0.09	29.89	132.5	106.9	239.5
Nagaland	4.7	72.6	14.0	3.0	94.4	15.47	13.17	0.08	28.72	188.9	152.4	341.3
Puducherry	2.9	44.3	8.6	1.8	57.6	2.30	1.96	0.01	4.27	15.2	12.3	27.5
Sikkim	2.5	38.5	7.5	1.6	50.1	1.54	1.31	0.01	2.86	15.5	12.5	27.9
Chandigarh	1.8	27.9	5.4	1.2	36.3	6.26	5.33	0.03	11.62	18.5	14.9	33.4
Goa	1.7	26.5	5.1	1.1	34.5	2.63	2.24	0.01	4.88	25.2	20.3	45.5

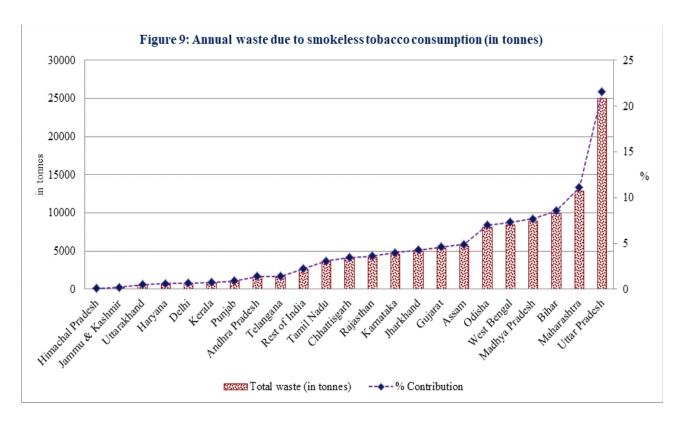


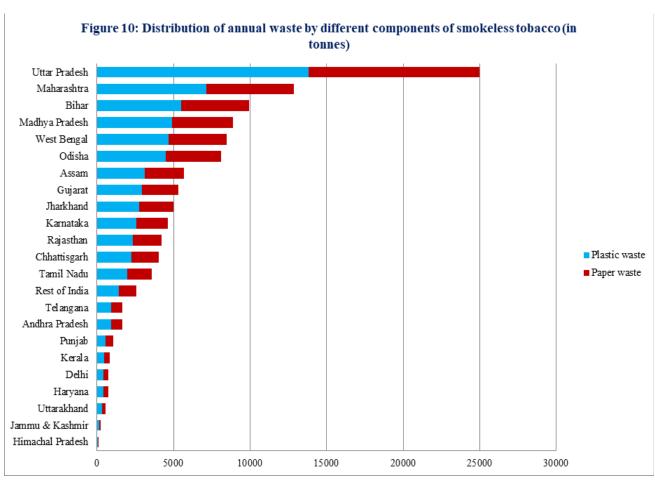






*contribution of filters in Bidi - generated based waste is 0.001% (Figure 3)





On approximation of the figures obtained from the study, it could be summarized as below:

- 1. The annual **Plastic waste** corresponds roughly to weight of **73 million standard plastic buckets.**
- Over 2.2 million trees are utilised per year for the Paper used in packaging of these products leading to excessive carbon emissions contributing generously to greenhouse effect. This weight of paper also corresponds to 119 million standard notebooks.
- 3. The **Filters** littered into the environment correspond to the weight of approximately **9** million standard adult-sized t-shirts.
- 4. The non-biodegradable aluminium Foil used weight equal to 33 Boeing 747 Aircrafts.

Policy Recommendations and Conclusion

- Tobacco product wastes are diverse in nature, ranging from paper, plastics, foils and filters.
 There is a need for a comprehensive policy deterrent and a financial levy, that is borne by the manufacturers.
- Given the enormous cost incurred for cleaning of the tobacco product wastes (TPWs), the strategies for greater sensitization of various stakeholders (users, supply chain, regulators, civil societies, academias, researchers, public health bodies etc) for effective implementation of existing regulations and adopting stronger norms to reduce its environmental impact are needed.
- Currently, no tobacco product fully complies with environmental laws. Tobacco companies and their shareholders must take full responsibility to reduce the environmental burden of their products.
- The violations of the existing environmental laws and policies related to solid wastes/packaging should be strictly monitored, reported and regulated to ensure compliance.
- Given the irreversible impact of plastics on the environment and the human body, the unnecessary plastic waste generated from the tobacco products, needs stronger and urgent policy shift for its effective elimination.

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Appendix – A

States and Union Territories involved in the data collection process

- 1. Jammu & Kashmir
- 2. Punjab
- 3. Chandigarh
- 4. Karnataka
- 5. Uttarakhand
- 6. Rajasthan
- 7. Gujarat
- 8. Madhya Pradesh
- 9. Tripura
- 10. Assam
- 11. Bihar
- 12. Uttar Pradesh
- 13. Kerala
- 14. Tamil Nadu
- 15. Jharkhand
- 16. Chattisgarh
- 17. West Bengal

Appendix – B

List of Union partners

S. No.	Name
1.	State Tobacco Control Cell, Directorate of Health and Family Welfare Services, Government of Karnataka
2.	Faith Foundation, Gujarat
3.	State Tobacco Control Cell, Directorate of Health and Family Welfare Services, Government of Chhattisgarh
4.	Uttar Pradesh Voluntary Health Association (UPVHA), Uttar Pradesh
5.	Balajee Sewa Sansthan, Uttarakhand
6.	Socio Economic and Educational Development Society (SEEDS), New Delhi, Bihar and Jharkhand
7.	Shikshit Rojgar Kendra Prabandhak Samiti, Rajasthan
8.	Kerala Voluntary Health Services, Kerala
9.	Mary Anne Charity Trust (MACT), Tamil Nadu
10.	Marathwada Gramin Vikas Sanstha (MGVS), Maharashtra
11.	Madhya Pradesh Voluntary Health Association, Madhya Pradesh
12.	Manbhum Ananda Ashram Nityananda Trust (MANT), West Bengal
13.	Generation Saviour Association (GSA), Punjab
14.	State Tobacco Control Cell, Directorate of Health and Family Welfare Services, Government of Jammu & Kashmir
15.	State Tobacco Control Cell, Directorate of Health and Family Welfare Services, Government of Assam
16.	Voluntary Health Association, Tripura
17.	Post Graduate Institute of Medical Education and Research, Chandigarh





