

## Attitude Towards Disposal of Plastics as a Health Barrier

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The objective of the study was to understand the attitude towards the unsustainable usage and disposal of plastics that will be detrimental to the health of people. Hence, the Plastics Usage and Disposal Attitude Scale (PUDAS) measuring four subscales of usage and disposal of plastics namely (a) "Self" – which is intended towards the role of the respondent in the unsustainable usage and disposal of plastics, (b) "Others"- which measures the extent to which the individual thinks about the role of other stakeholders of plastics, such as producers of plastics and retailers who use plastic bags and pouches to sell products, (c) "Government" – which involves statements expressing the role of Government in the management of plastics waste and (d) "Collective Action" - which includes statements on the collective action in local governance, community participation etc. were used. The data of the Plastics Usage and Disposal Attitude Scale (PUDAS) was analysed using ANOVA. Post-Hoc analyses were done to examine the differences in the Plastics Usage and Disposal Attitude among the respondents in terms of Age, Gender, Education, Geographical Locale and Occupational Status.

**Keywords:** Attitude, plastic disposal, plastic usage, unsustainable usage.

Plastics, primarily derived from non-renewable petroleum and natural gas resources, have become integral to nearly every sector of the global economy. Their widespread use in everyday life has grown significantly, fuelled by increasing economic prosperity and the adoption of Western consumer lifestyles. Plastics are commonly used in applications such as packaging films, polythene carry bags, containers, footwear, water bottles, disposable tableware, shopping bags, medicine packaging, household items, and personal care products like toothbrushes, combs, and pens.

### Plastic Usage in India

India's plastic consumption has seen a dramatic rise over the years. As outlined in the "Report of the Committee to Evolve Road Map on Management of Wastes in India" (March 2010), A study published

in *Nature* has revealed that India has become the world's largest contributor to plastic pollution, accounting for nearly **20%** of the total global plastic waste. India's annual contribution to this environmental disaster is greater than that of entire regions, with 9.3 million tonnes of plastic trash produced. The amount of plastic consumed annually per person in India has increased to almost 11 kg, and as industrialization and consumerism increase, this amount is predicted to rise even more.

While an estimated 60% of plastic waste is recycled in India, the remaining 40% is either littered or left uncollected, exacerbating environmental challenges. Rapid urbanization and economic growth are projected to worsen this issue, with total waste quantities expected to grow from 46 million tons in 2001 to 65 million tons by 2010

(Kumar & Gaikwad, 2004). Furthermore, India's plastic consumption ranks among the highest globally. According to studies by the Plastic Development Council under the Department of Chemicals and Petrochemicals, India is poised to become the world's third-largest consumer of plastics. The goal of the 2016 Plastic Waste Management Rules was to encourage recycling and phase out multi-layered plastic (MLP). However, there is a lack of infrastructure to facilitate the required adjustments, and enforcement has been uneven between states.

However, deficiencies in plastic waste management persist, including expanding urban areas that generate higher quantities of waste, limited resources, inefficient collection technologies, high labor costs, and societal apathy. Inadequate garbage collection leads to plastic waste littering roads, clogging drainage systems, and preventing rainwater absorption into the ground (Kumar & Gaikwad, 2004) leading to health hazards. Similarly Deng, Lu Cai, Fengyun Sun, Gen Li, and Yue Che (2020) investigated the public's perceptions and attitudes towards microplastics in Shanghai and used an ordered regression model to explore the public's willingness to reduce microplastics and its influencing factors.

In response, the National Plastics Waste Management Task Force under the Ministry of Environment and Forests has recommended a strategy for managing plastic waste. These recommendations include labeling recyclable or biodegradable plastic products as "environmentally friendly" under the Ecomark Scheme, issuing guidelines for plastic waste recycling, and mandating the use of food-grade plastics for packaging consumables. However, questions remain about the compliance of micro-retailing industries with these regulations.

To address these challenges, the Indian Centre for Plastics in the Environment (ICPE) was established in 1999. Its role is to bridge the gap between the plastics industry, policymakers, and society to resolve social, environmental, and technical issues related to plastic waste. Despite these efforts, studies from Western countries reveal that plastics, regardless of whether they are food-grade, can have severe carcinogenic and long-term effects on human health. Plastics are known to leach harmful substances into food, posing significant environmental and health risks, including threats to marine ecosystems, biodiversity, and human well-being.

### **Plastic Usage and Human Health**

The pervasive presence of plastics has far-reaching implications for human health. Plastics account for 16% of chlorine in the environment and contain over 50 carcinogens. When irresponsibly burned, plastic waste releases hazardous toxins such as phosgene, carbon monoxide, chlorine, sulfur dioxide, nitrogen oxides, and dioxins (Sikka, 2004). One of the most concerning chemicals found in plastics is Bisphenol-A (BPA).

BPA, a synthetic compound produced in large quantities, is a key ingredient in manufacturing polycarbonate plastics and epoxy resins. It is found in various products, including water bottles, food can linings, dental materials, eyeglasses, DVDs, baby bottles, and plastic utensils. Studies indicate widespread human exposure to BPA. For instance, a national survey in the United States (US National Toxicology Program, 2008) and similar studies in Canada found BPA in the urine of over 92% of individuals tested, including children as young as six years old (Calafat et al., 2008). The data also revealed higher BPA concentrations among women, individuals with lower incomes, and children, particularly infants and formula-fed babies.

BPA poses significant health risks as it mimics estrogen, potentially disrupting the endocrine system. This hormone disruption is linked to adverse health effects, including early puberty, developmental abnormalities, and an increased risk of diseases such as breast cancer, prostate cancer, Type 2 diabetes, coronary heart disease, and metabolic disorders (Sekizawa, 2008). BPA exposure during early development has also been associated with reproductive anomalies, behavioural changes, and trans-generational health impacts (Uzumcu & Zachow, 2007).

Emerging evidence also suggests a link between BPA exposure and neurological and behavioral disorders, such as schizophrenia-like abnormalities (Brown, 2009). Hugo et al. (2008) found that BPA inhibits the release of adipokines, which play a critical role in protecting against metabolic syndrome. These findings underscore the urgent need for stricter regulations and a comprehensive approach to addressing plastic usage and its implications for human and environmental health.

Therefore, the attitude of general public towards the usage of plastic products despite the knowledge of its ill effects needs to be assessed further. Joana Soares, Isabel Miguel, Cátia Venâncio, Isabel Lopes, and Miguel Oliveira (2021) studied the perceptions about plastic pollution, its impacts as well as sociodemographic and psychological factors predicting individuals' pro-environmental behaviours were analysed, in the Portuguese context. The participants of the study perceived the bio-ecological impacts of plastics as a greater threat than the socioeconomic impacts.

### **Objective of the Study**

With an increasing body of research highlighting the harmful effects of plastic usage, particularly in contact with food, this study seeks to evaluate the level of attitudes towards the unsustainable use and disposal

of plastics in India regarding the consequences of plastic use. Specifically, the research focuses on the carcinogenic risks posed by plastics in food contact scenarios and their broader environmental impacts. The primary objective is to assess the extent attitudes towards the unsustainable use and disposal of plastics that affect both human health and the environment.

Drawing from a comprehensive review of existing literature and the conceptual framework underpinning the study, the following hypotheses were formulated to guide the research:

### **Hypotheses**

There will be a significant difference among respondents in their awareness of the harmful effects of plastics.

- H1: Respondents from different age groups will demonstrate significant differences in their attitudes towards the unsustainable use and disposal of plastics.
- H2: Attitudes towards the unsustainable use and disposal of plastics will vary significantly between respondents of different genders.
- H3: Respondents with differing educational backgrounds will exhibit significant differences in their attitudes towards the unsustainable use and disposal of plastics.
- H4: Geographical location will play a significant role in the variation of attitudes towards the unsustainable use and disposal of plastics among respondents.
- H5: Respondents with varying occupational statuses will show significant differences in their attitudes towards the unsustainable use and disposal of plastics.

## Tools Used

*Plastics Usage and Disposal Attitude Scale* (PUDAS): The attitudes of participants toward plastic waste management and disposal were assessed using the Plastics Usage and Disposal Attitude Scale (PUDAS), developed by Velayudhan (2010). This scale consists of 25 statements presented in a Likert-type format, with response options ranging from Strongly Agree (5) to Strongly Disagree (1). The scale is designed to evaluate public attitudes toward plastic waste management across four key dimensions:

1. Self: This subscale examines the individual's role and personal efforts in addressing the problem of plastic waste. It focuses on the extent to which individuals take responsibility for reducing their use and ensuring the proper disposal of plastics.

2. Others: This dimension evaluates perceptions of the responsibilities of other stakeholders in the plastic waste ecosystem, such as plastic manufacturers and retailers who distribute plastic products, including bags and packaging materials.

3. Government: This subscale assesses attitudes toward the role of government in managing plastic waste through policies, regulations, and legislative measures. It also highlights perceived shortcomings and the degree to which participants believe plastic waste is a governmental responsibility.

4. Collective Action: This dimension measures attitudes toward the importance of collective efforts by all stakeholders, including consumers, government authorities, and plastic retailers, in tackling the issue of plastic waste and working toward its eradication.

The PUDAS demonstrated a satisfactory level of reliability, with an internal consistency coefficient (Cronbach's Alpha) of 0.75, indicating that the scale is a reliable tool for measuring attitudes toward plastic waste management.

## Sample

The total sample comprised 1,200 respondents drawn from the six regions of Tamil Nadu. Further subdivisions were made based on demographic variables, including age, gender, geographical locale, educational qualifications, and professional status.

## Results and Discussion

The results from the analysis of variance (ANOVA) provide insights into how attitudes toward plastic waste and its disposal differ across age groups for four distinct factors: Self, Others, Government, and Collective Action for the four age groups are presented in the table 1.

The factor Self reflects individual responsibility in addressing plastic waste and disposal. The mean scores for the four age groups—18-20 years (31.40), 21-40 years (31.76), 41-60 years (32.79), and 61 years and above (32.64)—indicate an increasing trend in personal responsibility with age, peaking in the 41-60 age group. The standard deviations are relatively consistent, ranging from 5.681 to 5.918, showing similar variability across age groups. ANOVA results reveal a statistically significant difference among age groups ( $F = 3.30$ ,  $p = 0.02$ ), significant at the 0.05 level. This suggests that age influences the perception of individual responsibility for managing plastic waste. Respondents aged 41-60 scored the highest, reflecting a greater sense of personal accountability, possibly due to their life experience and environmental awareness.

The factor Others evaluates perceptions of the role of external stakeholders, such as plastic manufacturers and retailers, in plastic waste management. The mean scores show a clear progression across age groups: 18-20 years (30.44), 21-40 years (31.97), 41-60 years (32.97), and 61 years and above

(34.49). Respondents in the oldest age group scored the highest, indicating greater expectations from other stakeholders. The ANOVA results demonstrate a highly significant difference among age groups ( $F = 21.63, p < 0.01$ ). This suggests that older individuals are more likely to hold external stakeholders accountable for plastic waste management. This trend might reflect an increasing awareness of collective responsibility as individuals age.

This factor examines perceptions of the government's role in managing plastic waste through policies and initiatives. The mean scores indicate a gradual increase with age: 18-20 years (17.24), 21-40 years (18.00), 41-60 years (18.37), and 61 years and above (19.26). Respondents in the 61+ age group showed the highest mean score, suggesting a stronger belief in the government's responsibility in this regard. The ANOVA results highlight a significant difference among age groups ( $F = 12.60, p < 0.01$ ). The findings suggest that older respondents,

particularly those above 60 years, are more likely to emphasize the need for government involvement. This may reflect their greater reliance on systemic interventions to address environmental challenges. The Collective Action factor assesses attitudes toward the joint efforts of consumers, the government, and other stakeholders in tackling plastic waste. The mean scores show an upward trend: 18-20 years (15.41), 21-40 years (15.85), 41-60 years (16.51), and 61 years and above (16.87). The older age groups, especially those 61 years and above, had the highest scores, indicating a stronger inclination toward collaborative approaches to solving plastic waste issues. ANOVA results reveal a significant difference among age groups ( $F = 11.96, p < 0.01$ ), reinforcing the idea that age influences perceptions of the importance of collective action. Older individuals may value collaboration more due to their broader perspective on the interconnected roles of different societal entities in addressing environmental problems.

Table 1: Mean, S.D. And ANOVA Among The Age Groups In The Attitude Towards Plastic Waste And Disposal

Factors	Age Groups	N	Mean	S.D.		Sum of Squares	Mean Square	F	Sig.
Self	18-20	184	31.40	5.918	Between Groups	328.01	109.33	3.30	0.02*
	21-40	581	31.76	5.681					
	41-60	265	32.79	5.798	Within Groups	39595.01	33.10		
	61 and above	170	32.64	5.752					
	Total	1200	32.06	5.770					Total
Others	18-20	184	30.44	5.627	Between Groups	1631.48	543.82	21.63	0.00**
	21-40	581	31.97	5.132	Within Groups	30069.95	25.14		
	41-60	265	32.97	4.947					
	61 and above	170	34.49	3.877					
	Total	1200	32.31	5.142	Total	31701.43			
Government	18-20	184	17.24	3.371	Between Groups	385.40	128.46	12.60	0.00**
	21-40	581	18.00	3.275					
	41-60	265	18.37	3.268					

Collective Action	61 and above	170	19.26	2.515	Within Groups	12189.36	10.19	11.96	0.00**
	Total	1200	18.15	3.238	Total	12574.77			
	18-20	184	15.41	3.258	Between Groups	268.89	89.63		
	21-40	581	15.85	2.708					
	41-60	265	16.51	2.550	Within Groups	8956.35	7.48		
	61 and above	170	16.87	2.484					
	Total	1200	16.07	2.774	Total	9225.25			

\*\* = Significant at 0.01 level\* = Significant at 0.05 level

The table 2 presents the results of a comparison between males and females regarding their attitudes toward plastic waste and disposal, measured across four dimensions: Self, Others, Government, and Collective Action. This dimension assesses personal responsibility in managing plastic waste and disposal. The mean score for females (32.57) is higher than that for males (31.60), indicating that women exhibit a stronger sense of individual accountability toward plastic waste management. The

standard deviations for both genders (5.72 for males and 5.78 for females) indicate a similar level of variability in responses. The ANOVA results reveal a statistically significant difference between males and females ( $F = 8.52, p < 0.01$ ), confirming that gender plays a role in shaping personal responsibility toward plastic waste. This difference could be attributed to women's traditionally stronger involvement in household and environmental management activities, which might increase their awareness and accountability in such matters.

Table 2: Mean, S.D. And ANOVA Among The Gender In The Attitude Towards Plastic Waste And Disposal

Attitude	Gender	N	Mean	S.D.		Sum of Squares	Mean Square	F	Sig.
Self	Male	633	31.60	5.72	Between Groups	281.95	281.95	8.52	0.00**
	Female	567	32.57	5.78	Within Groups	39641.07	33.08		
Others	Male	633	31.83	5.34	Between Groups	309.56	309.56	11.81	0.00**
	Female	567	32.85	4.85	Within Groups	31391.86	26.20		
Government	Male	633	18.03	3.28	Between Groups	16.28	16.28	1.55	N.S.
	Female	567	18.27	3.18	Within Groups	12558.48	10.48		
Collective Action	Male	633	16.03	2.71	Between Groups	2.34	2.34	0.30	N.S.
	Female	567	16.12	2.84	Within Groups	9222.90	7.69		

\*\* = Significant at 0.01 level N.S. = Not Significant

The Others dimension evaluates perceptions of the responsibility of external stakeholders, such as plastic manufacturers and retailers, in managing plastic waste. Females again scored higher (32.85) than

males (31.83), indicating that women are more likely to hold external entities accountable for addressing plastic-related issues. The standard deviations (5.34 for males and 4.85 for females) suggest that

responses among females are slightly more consistent than among males. The ANOVA results show a significant gender difference ( $F = 11.81, p < 0.01$ ), emphasizing that females are more likely to expect action and responsibility from external stakeholders. This could stem from a stronger tendency among women to advocate for shared and systemic solutions to environmental problems.

This dimension explores perceptions of the government's role in managing plastic waste through policies and regulations. The mean scores for males (18.03) and females (18.27) are very close, with females showing only a slightly higher score. This indicates minimal gender differences in attitudes toward the government's responsibility for plastic waste management. The ANOVA results confirm that the difference is not statistically significant ( $F = 1.55, p = N.S.$ ). This finding suggests that both genders have similar expectations of the government's role, which could reflect a generally shared reliance on systemic interventions to address

the plastic waste crisis. The Collective Action dimension measures attitudes toward the combined efforts of consumers, government, and other stakeholders in tackling plastic waste. The mean scores for males (16.03) and females (16.12) are nearly identical, with only a marginal difference. The ANOVA results indicate no statistically significant gender difference in this dimension ( $F = 0.30, p = N.S.$ ). This suggests that both men and women equally value the importance of collaborative efforts to address plastic waste issues. The similarity in scores could reflect a broader societal consensus on the importance of collective action for environmental sustainability.

The results from table 3 the ANOVA analysis highlight significant variations in attitudes toward plastic waste and disposal based on educational level, geographical locale, and occupational status. The discussion below examines the findings across the four key attitude dimensions: Self, Others, Government, and Collective Action.

Table 3: Mean, S.D. And ANOVA On Educational Level In The Attitude Towards Plastic Waste And Disposal

Attitude	Educational Level	N	Mean	S.D.		Sum of Squares	Mean Square	F	Sig.
Self	Below 10 <sup>th</sup> Standard	103	31.38	5.88	Between Groups	137.04	27.40	0.82	N.S.
	10 <sup>th</sup> Standard	158	32.13	5.74					
	Up to 12 <sup>th</sup> standard	158	31.70	5.71					
	Graduate	388	31.96	5.76	Within Groups				
	Postgraduate	271	32.52	5.69					
	Professional	122	32.30	5.98	Total				
	Total	1200	32.06	5.77					
Others	Below 10 <sup>th</sup> Standard	103	31.36	4.95	Between Groups	917.26	183.45	7.11	0.00**
	10 <sup>th</sup> Standard	158	32.39	5.73					
	Up to 12 <sup>th</sup> standard	158	31.20	5.25					
	Graduate	388	31.96	5.30	Within Groups	30784.17	25.78		
	Postgraduate	271	32.89	4.79					

Government	Professional	122	34.31	3.70	Total	31701.43	54.74	5.31	0.00**				
	Total	1200	32.31	5.14									
	Below 10 <sup>th</sup> Standard	103	17.18	3.64						Between Groups	273.72		
	10 <sup>th</sup> Standard	158	18.24	3.72						Within Groups	12301.04	10.30	
	Up to 12 <sup>th</sup> standard	158	17.65	2.94									
	Graduate	388	18.18	3.05									
	Postgraduate	271	18.21	3.16						Total	12574.77		
Professional	122	19.20	2.99										
Total	1200	18.15	3.23										
Collective Action	Below 10 <sup>th</sup> Standard	103	15.60	3.03	Between Groups	233.47	46.69	6.20	0.00**				
	10 <sup>th</sup> Standard	158	16.08	2.81	Within Groups	8991.77	7.53						
	Up to 12 <sup>th</sup> standard	158	15.30	2.90									
	Graduate	388	16.14	2.69									
	Postgraduate	271	16.18	2.86	Total	9225.25							
	Professional	122	17.02	1.96									
	Total	1200	16.07	2.77									

\*\* = Significant at 0.01 level N.S. = Not Significant

The analysis reveals significant differences in three dimensions (Others, Government, and Collective Action) across educational levels, while the Self dimension showed no significant variation. The mean scores across educational levels for the Self dimension were relatively similar, ranging from 31.38 (below 10<sup>th</sup> standard) to 32.52 (postgraduates). The lack of significant differences ( $F = 0.82, p = \text{N.S.}$ ) suggests that personal responsibility for plastic waste management does not vary substantially with education. For the Others dimension, significant differences were observed ( $F = 7.11, p < 0.01$ ). Respondents with higher educational qualifications, such as professionals (34.31), showed a stronger tendency to hold external stakeholders (e.g., manufacturers, retailers) accountable for plastic waste management. In contrast, those with lower education levels, such as respondents below the 10<sup>th</sup> standard (31.36), demonstrated less awareness of this responsibility.

The Government dimension also showed significant differences ( $F=5.31, p<0.01$ ). Professionals (19.20) and postgraduates (18.21) had the highest scores, indicating a greater reliance on the government's role in managing plastic waste. Lower scores among respondents below the 10<sup>th</sup> standard (17.18) suggest reduced expectations from governmental policies or a lack of awareness about their significance. Significant differences were found in the Collective Action dimension ( $F=6.20, p<0.01$ ). Professionals (17.02) exhibited the strongest belief in the importance of collaborative efforts involving all stakeholders, while respondents with lower education levels (e.g., below the 10<sup>th</sup> standard, 15.60) showed less inclination toward collective action. This pattern suggests that higher education enhances the understanding of collective responsibility in addressing plastic waste.

The analysis (table 4) also reveals significant differences across geographical locales in all four dimensions.

Table 4: Mean, S.D. And ANOVA On Geographical Locale In The Attitude Towards Plastic Waste And Disposal

Attitude	Geographical Locale	N	Mean	S.D.		Sum of Squares	Mean Square	F	Sig.
Self	Metropolitan City	208	32.71	5.49	Between Groups	465.25	93.05	2.81	0.01*
	Cities	201	32.48	6.12					
	Towns	200	32.24	5.72	Within Groups	39457.78	33.04		
	Villages	199	30.76	5.83					
	Small Towns	198	32.08	5.76					
	Tribal Areas	194	32.03	5.45	Total	39923.03			
	Total	1200	32.06	5.77					
Others	Metropolitan City	208	33.61	4.37	Between Groups	972.93	194.58	7.56	0.00**
	Cities	201	33.40	4.89					
	Towns	200	31.69	5.17	Within Groups	30728.50	25.73		
	Villages	199	31.19	5.67					
	Small Towns	198	31.82	4.98					
	Tribal Areas	194	32.10	5.27	Total	31701.43			
	Total	1200	32.31	5.14					
Government	Metropolitan City	208	18.43	3.03	Between Groups	223.20	44.64	4.31	0.00**
	Cities	201	18.88	3.00					
	Towns	200	18.17	3.16	Within Groups	12351.56	10.34		
	Villages	199	17.64	3.32					
	Small Towns	198	17.67	3.43					
	Tribal Areas	194	18.05	3.32	Total	12574.77			
	Total	1200	18.15	3.23					
Collective Action	Metropolitan City	208	16.50	2.58	Between Groups	155.72	31.14	4.10	0.00**
	Cities	201	16.63	2.54					
	Towns	200	15.85	2.79	Within Groups	9069.52	7.59		
	Villages	199	15.66	2.80					
	Small Towns	198	15.93	2.80					
	Tribal Areas	194	15.86	2.98	Total	9225.25			
	Total	1200	16.07	2.77					

\*\* = Significant at 0.01 level \* = Significant at 0.05 level

The Self dimension showed significant differences ( $F = 2.81, p < 0.05$ ). Respondents from metropolitan cities (32.71) had the highest scores, indicating greater personal accountability for managing plastic waste. In contrast, those from villages (30.76) scored the lowest, reflecting less personal engagement with waste management practices. This variation may stem from differences in exposure to environmental awareness campaigns or access to waste

management infrastructure. Significant differences were observed in the Others dimension ( $F = 7.56, p < 0.01$ ). Respondents from metropolitan cities (33.61) and cities (33.40) scored significantly higher than those from villages (31.19). Urban respondents are likely more aware of the role of external stakeholders due to their proximity to industries and retailers that contribute to plastic waste.

Table 5: Mean, S.D. And ANOVA On Occupational Status In The Attitude Towards Plastic Waste And Disposal

Attitude	Occupational Status	N	Mean	SD		Sum of Squares	Mean Square	F	Sig.
Self	Student	330	31.76	5.77	Between Groups	601.31	100.21	3.04	0.00**
	Agriculture	57	29.68	4.77					
	Business	73	32.10	5.66	Within Groups	39321.71	32.96		
	Service	370	32.11	5.92					
	Housewives	247	33.04	5.56					
	Professional	36	31.53	5.46					
	Retired	87	31.91	6.03	Total	39923.03			
	Total	1200	32.06	5.77					
Others	Student	330	31.42	5.42	Between Groups	2126.94	354.49	14.30	0.00**
	Agriculture	57	28.00	5.50	Within Groups	29574.48	24.79		
	Business	73	31.79	5.40					
	Service	370	32.52	4.93					
	Housewives	247	33.31	4.53					
	Professional	36	34.58	4.02	Total	31701.43			
	Retired	87	34.29	4.11					
	Total	1200	32.31	5.14					
Government	Student	330	17.68	3.31	Between Groups	535.27	89.21	8.84	0.00**
	Agriculture	57	16.30	3.37	Within Groups	12039.49	10.09		
	Business	73	17.38	2.73					
	Service	370	18.35	3.42					
	Housewives	247	18.55	3.09					
	Professional	36	18.89	1.72	Total	12574.77			
	Retired	87	19.46	2.34					
	Total	1200	18.15	3.23					

Collective Action	Student	330	15.72	2.78	Between Groups	354.72	59.12	7.95	0.00**
	Agriculture	57	14.46	2.43					
	Business	73	16.04	2.74	Within Groups	8870.52	7.43		
	Service	370	16.16	2.90					
	Housewives	247	16.38	2.76					
	Professional	36	15.94	1.98	Total	9225.25			
	Retired	87	17.32	1.93					
	Total	1200	16.07	2.77					

\*\* = Significant at 0.01 level

The Government dimension also exhibited significant variation ( $F = 4.31, p < 0.01$ ). Respondents from cities (18.88) and metropolitan areas (18.43) had higher scores, indicating stronger expectations from the government. Villages (17.64) and small towns (17.67) had lower scores, which may reflect limited exposure to governmental policies or programs addressing plastic waste in rural areas. The Collective Action dimension revealed significant differences ( $F = 4.10, p < 0.01$ ). Respondents from metropolitan cities (16.50) and cities (16.63) scored higher, indicating a stronger belief in the need for collaboration among stakeholders. Villages (15.66) scored the lowest, suggesting a lower inclination toward or awareness of collective action initiatives.

Significant differences (table 5) were observed across occupational groups in all four dimensions, with notable trends emerging based on employment type. For the Self dimension, significant differences were found ( $F = 3.04, p < 0.01$ ). Housewives (33.04) and service workers (32.11) scored the highest, indicating stronger personal responsibility. In contrast, those in agriculture (29.68) had the lowest scores, possibly reflecting reduced awareness or fewer opportunities for involvement in waste management practices.

The Others dimension showed significant variation ( $F = 14.30, p < 0.01$ ). Professionals

(34.58) and retired individuals (34.29) scored the highest, indicating greater awareness of external stakeholders' roles in managing plastic waste. Agricultural workers (28.00) had the lowest scores, suggesting limited understanding or interaction with external stakeholders such as manufacturers and retailers. Significant differences were also observed in the Government dimension ( $F = 8.84, p < 0.01$ ). Retired individuals (19.46) and professionals (18.89) scored the highest, reflecting stronger expectations from government interventions. In contrast, agricultural workers (16.30) scored the lowest, possibly due to reduced exposure to governmental initiatives. The Collective Action dimension showed significant differences ( $F = 7.95, p < 0.01$ ). Retired individuals (17.32) scored the highest, indicating a stronger belief in the importance of collaborative efforts. Agricultural workers (14.46) had the lowest scores, suggesting less awareness or inclination toward collective action.

### Conclusion

In conclusion, the findings highlight the significant influence of demographic factors such as age, gender, location, and occupation on attitudes toward plastic waste management across four dimensions: Self, Others, Government, and Collective Action. The results demonstrate that age plays a pivotal role in shaping perceptions, with older

individuals exhibiting a greater sense of personal responsibility, heightened expectations from external stakeholders, stronger beliefs in governmental roles, and a greater appreciation for collective action. Gender differences were also evident, with women displaying higher levels of accountability and expectations across most dimensions, reflecting their traditionally active roles in household and environmental management.

Geographical variations underscore the impact of urbanization and access to resources on attitudes, as respondents from metropolitan areas and cities consistently showed higher scores across dimensions compared to those in rural areas. This suggests that urban residents may have greater exposure to environmental awareness campaigns and infrastructure supporting waste management. Similarly, occupational differences revealed that professionals, retirees, and housewives exhibit stronger engagement and expectations regarding plastic waste management, while agricultural workers showed comparatively lower scores, likely due to reduced exposure and resources.

Overall, the study underscores the multifaceted nature of attitudes toward plastic waste management and highlights the importance of tailored interventions that consider these demographic variations. Promoting environmental awareness, enhancing access to waste management infrastructure in rural areas, and fostering collaboration among stakeholders can help address the challenges of plastic waste more effectively and sustainably.

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