



# Investigating the Role of Tourists and Impact of Knowledge, Behaviour, and Attitude Towards Plastic Waste Generation

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## Abstract

Tourism is one of the lifelines in nations for their strong economy. Through the expansion of tourism industry, enormous amounts of plastic materials are disposed that have detrimental effects on environment, animal and human health. The present study demonstrates the role of tourists on generation of plastic waste and further statistical approach was used to investigate the impact of knowledge, behaviour, and attitude of tourists towards generation of plastic waste. Result shows that the tourists play key role in generating plastic waste at outdoor places which is a serious issue that could block drainage ways in city which leads to many waters born disease. The study highlights that the awareness can make certain changes in plastic waste generation and can bridge the knowledge–practice gap. Moreover, the circular economy can offer opportunity to exploit plastic waste into various decorative and useful products that can generate income to local community and help to reduce plastic wastes. It is also important to highlight that the government needs to take care of surveillance in the market on using plastic bags either by sellers or consumers.

**Keywords** Tourism · Plastic waste · Waste management · ANOVA · Circular economy

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## Introduction

Tourism is an indispensable part of any economy that serves as lifelines in nations for their strong economy (Dixon, Hamilton, Pagiola, & Segnestam, 2001; Song, Li, & Cao, 2018). Many major as well as minor economies have heavy reliance on tourism and travel industry (Lee, Hampton, & Jeyacheya, 2015). With tourism contributing 10.4% (\$9.2 Trillion) to the global GDP, it is an industry to invest and bolster by the government of any country (Mallick, MALLESH, Behera, & Economics, 2016; Rwigema & Management, 2021). The Indian tourism industry itself was worth \$240 billion in 2018, contributing of 9.2% to the GDP, but a huge portion of this industry is controlled by the top 5 states in the country [6], Parida, Bhardwaj, & Chowdhury, 2017; [31]. Tamil Nadu occupying the first place followed by Uttar Pradesh and Uttarakhand, Karnataka, Andhra Pradesh, and Maharashtra, respectively. Nevertheless, tourism also contributes heavily to the growing heaps of trash. With such huge amount of movement, the scale of waste creation is gigantic, and it becomes worse with mismanagement of the waste [4].

Various solid wastes generated from tourist ends include metals, food waste, food packages, paper and cardboard, glass, metals/metal packaging, and plastics/plastic packaging [2, 5, 15]. Among them, plastic-related wastes are considered most serious pollutants having severe impact over environment and aquatic species [25]. Many cases have been highlighted which is influenced by tourist activities such as the island of Boracay. The Philippines temporarily closed the island of Boracay to clean up dumped sewage and to upgrade its drainage systems to make them free from plastic blockage [7]. Thailand has stopped Maya Bay, to allow it to recover from pollution and other damage caused by tourists [14]. Moreover in 2017, Indonesia declared a “garbage emergency” in parts of Bali to combat with plastic waste and its impact [34]. In context to India, Malra (2015) had studied the impact of tourism on environment in Mussoorie region. Madan and Rawat [18] studied that higher number of tourists imposed a great stress on the natural environment. Furthermore, Payal and Jangid (2021) demonstrated the guiding policy towards sustainable management of tourist destination by developing tourist behaviour and experience central to the discourse as it is quintessential to see how a tourist travels, stays and experiences her tourism activity and how can it implicate the sustainability especially in relation to climate change, while some studies (Gupta, Gupta, & Chauhan, 2022) also highlighted those inefficient strategies for tourism development and weaker infrastructure which becomes a hindrance in sustainable development of the destination along with the well-being of local communities and the environment.

Undoubtedly, Mussoorie, a hilly region of Uttarakhand state, has its environmental importance and significance and also considered one of the favourite places to visit and enjoy the stunning picturesque beauty. Mussoorie is very near to New Delhi, capital of India; it has an all-season charm, wherein winters bluster bone chilling winds with frequent snow showers, summers are incredibly pleasant with fluctuating temperatures, monsoons make the place all the more adoring with clouds sheathing all over, and the greenery is at its full bloom from September to November (Sundriyal, Shridhar, Madhwal, Pandey, & Sharma, 2018). This constitutes around 1.52% of total domestic tourists and 0.52% foreign visitors in 2018. Out of these, Mussoorie alone had over 2.7 million domestic tourist traffic and 1865 foreign visitors which establish Mussoorie at 18th in the number of tourists visiting annually in India; Table 1 shows the number of tourists travelling to Uttarakhand.

With higher number of tourists, much packed items (food, snacks, beauty products) which are purchased result to higher amount of generation of solid waste (in Mussoorie,

**Table 1** Tourist's arrivals in Uttarakhand (in millions)

Year	Figures
2017	34.49
2018	35.76
2019*	37.73

Sources: Indian Brand Equity foundation Uttarakhand June 2021 report, \*Means provisional data. Data for 2020–2021 is not included due to COVID-19

12 tonne of solid waste increases to 20 tonnes in high peak tourist's season (Malra, 2015). The amount of solid waste generated in major cities of Uttarakhand is presented in Table 2. Among many solid wastes, increase in plastic waste has compounded the problem greatly. Nowadays, maximum items/products are well packed in a plastic or plastic-related materials to increase its life span, maintain the product quality, and protect it from damage (Marsh & Bugusu, 2007). After purchasing these products, utility plastic materials become wastes which are either disposed to the dustbins or thrown away in the surroundings. The generated wastes enter into the aquatic ecosystem and degrade its water quality, and sometimes these plastics are eaten by animals (Dutta, Ghosh, Debnath, Ghosh, & Studies, 2020; [39]). It is also observed that in a high wind speed, they are blown to the air and impact the atmosphere, whereas they release carbon and other toxic gases if burned and impact lower atmosphere if burned in open area (Simoneit, Medeiros, Didyk, & technology, 2005; [38]). Moreover, this plastic waste may also reduce the beauty of the queen of hill, i.e. Mussoorie and can reduce the tourism which is one the major sources of income for the local people. Even though polythene is banned in Mussoorie, Uttarakhand, India, its practice has not stopped which leads to water pollution, air pollution, and posing a sever health risks to resident (Pant).

Few research are documented that reveal the tourism's role in plastic waste generation. In the best of our knowledge, there is no insight study that has been reported to the surveillance and to monitor the activity of tourist at its destination place for a particular period about the role to generate and manage plastic waste. Hence, the main thrust of the present study is to evaluate and assess the role of tourists in generation of plastic waste in the

**Table 2** Solid waste generated in major towns of Uttarakhand

Name of district	Name of town	Municipal solid waste generated (kg/per day)	Treatment and disposal facility
Dehradun	Mussoorie	18,000	Dumping
	Vikasnagar	9000	
	Rishikesh	24,000	
Haridwar	Mangalore	6000	Dumping
Nainital	Ramnagar	3000	No facility for disposal of waste
	Nainital	15,000	
Almora	Almora	10,200	Land filling composition
Pithoragarh	Pithoragarh	15,000	Thrown away from the city

Sources: Urban Development Directorate, Govt. of Uttarakhand (2017): Urban Municipal Solid Waste Management Action Plan for State of Uttarakhand

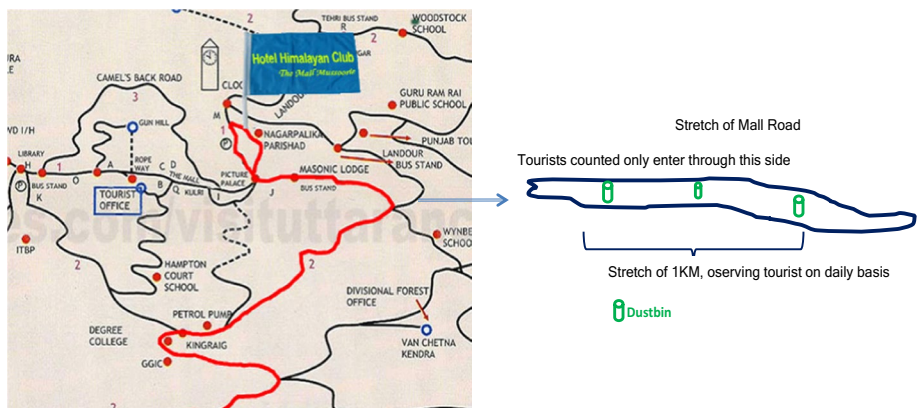
Mussoorie region of Uttarakhand, India. The present study is divided into three parts: (a) the first part highlights the tourists which play key role in generating plastic waste and secondly; (b) the second part includes the survey to figure out the role of tourists; (c) and the third part is to support the evidence of the results with the help of statistical analysis. In this, impact of knowledge, behaviour, and attitude of tourists was related with plastic waste generation.

## Methodology

Mussoorie is known among most visited place by tourist in Uttarakhand Province, India. This region is also known for its higher population density in weekend's days, and due to its environmental significance, fragile nature, and natural beauty, Mussoorie (30.4598° N, 78.0644° E) was selected as the research area. A mixed study approach was used, where both qualitative and quantitative data were derived. Primary data were collected through surveys and informal discussions. In this, a deductive approach was preferred and selected to congregate the data. The target population was comprised with 625 tourists and 265 shopkeepers in Mussoorie region because it was not feasible to have investigation with the whole population (Fig. 1). Moreover, considering such a large number within a limited time period and inadequate financial budget was impossible. Research was focused to pursue with a multi-stage random sampling technique to select an appropriate sample to evaluate the objectives of this study. Our study consists the generation of plastic waste in hotels, road side, and at local shop.

In this, we have separated the Mussoorie community in 4 parts: (A) tourists living in hotel, (B) local shopkeeper, (C) tourists behaviour at shop, and (D) tourists at sightseeing: how they dispose their plastic at roadside.

Furthermore, we evaluated that knowledge about plastic, behaviour towards disposal of plastic waste, and attitude have impact on plastic waste generation. In this context, a structured questionnaire was used in the study with three focused segments: (a) knowledge about the plastic usage, impact on environment, and reduction of plastic waste; (b) behaviour towards the utility of plastic products and waste generated; and (c) attitude towards the plastic waste disposal as independent variable with plastic waste considered dependant



**Fig. 1** Region in the Mussoorie for the observational studies

variable. Prior to sharing questionnaire, the objective of the study, i.e. impact of knowledge, behaviour, and attitude of tourists on plastic waste generation, was explained to the participants. Furthermore, each question in the questionnaire was also well explained to the participants, and participants were asked them if they have any doubts to develop understanding about the questionnaire or changes in questionnaire, if needed. On the willingness of the participants, 140 respondents agreed to fill the questionnaire and had no doubt on the questions; therefore, the questionnaire was selected as final. Those respondents who were willing but not able to attend the questionnaires by themselves were also helped. The sample size or population was selected on the basis of their academic qualification among the tourists selected for the observation. In the survey, questionnaires were shared with 140 individuals, and among them, 70 individuals are graduates or have higher academic qualification in any stream and the rest have academic qualification as senior secondary or less. Among them, only 110 people reply on their questionnaires which include 67 individuals who are graduates or higher academic qualified individuals and 43 from the rest. Therefore, the total sample size from the selected population was 110.

## **Observation**

An observation team (10 number, consist of two person) was diploid over 10 different shops (provision store, restaurants, bakery shop) at different places of Mussoorie (Mall Road, Camel Road). The team observed the people coming at shops for 12 h for 2 months to evaluate the amount of plastic waste generated at shops. One additional working team (consist of 5 person) in that period has 12 h observation on Mall Road, Mussoorie, at the stretch of 50 m. In region of 1 km, 3 dustbins were diploid for the disposal of different solid waste, especially for plastic. In 2 months, more than 2000 individuals including male, female, and children were counted and observed while disposing their plastic waste. The local people were hired and trained for the observational data collection.

## **Data Management and Statistical Analysis**

We are intended to evaluate the results by means of central tendency; the associations between behaviours of plastic waste reduction with independent variables are analysed by ANOVA test. In addition, the independent variables with a  $p$ -value  $< 0.05$  in bivariate analysis were included in the full model of simple linear regressions along with their 95% confidence interval. All the analyses were performed by using IBM SPSS V 20.

## **Results and Discussion**

### **Plastic Waste Generation Survey**

For the evaluation and assessment of knowledge, behaviour, and attitude of tourists towards plastic waste generation, a questionnaire was shared on the basis of their academic qualification. The survey data was collected through the one-to-one interview with tourists and making observation during their stay in hotels. Additionally, many shopkeepers and tourists were also interviewed for the assessment of their role in generation of plastic waste. Among the 140 individuals, only 110 people returned the filled

**Table 3** Includes the name, address, and number of resident tourists in hotels to assess the generation of plastic waste at indoor environment

S.No	Name of hotel/residence	Address	Number of tourists (81)
1	Mall Palace	Ropeway, Mussoorie, Uttarakhand	28
2	Honeymoon Inn	Near Gun Hill, Mussoorie, Uttarakhand	23
3	Pushp Home Stay	Backroad, Mussoorie, Uttarakhand	17
4	International Hotel	Kurli, Mussoorie, Uttarakhand	13

**Table 4** Questionnaire items

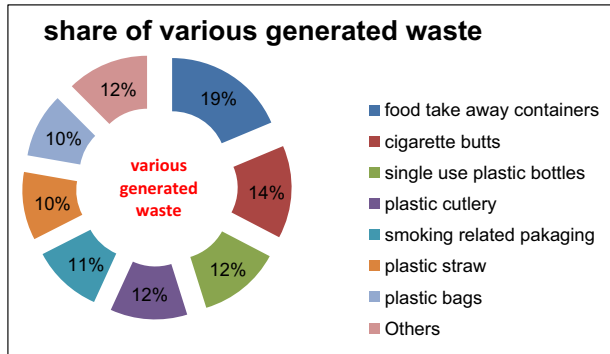
Knowledge	Plastic is a serious issue
	Plastic degrades environmental and human health
	Plastics are banned in Mussoorie
Behaviour	I dispose plastic waste properly
	I avoid using plastic where not needed
	I try to follow 3R approach (reduce, reuse, and recycle)
Attitude	I try to make awareness among others to not use plastics because of negative impact
	Maximum plastic like polyethylene, customer take in free of cost
	I favour ban on using polyethylene and single-use plastic like water bottle
Plastic waste in a day	I favour to have special permission from government to synthesize polyethylene
	I generate < 25 g plastic waste
	I generate 25–50 g plastic waste
	I generate 50–100 g plastic waste
	I generate 100–200 g plastic waste
	I generate > 200 g plastic waste

questionnaires which include 67 individuals having qualification more than being a graduate and 43 from the rest who passed senior secondary or less.

Survey and observation were started on January 6, 2021, focusing over 4 resident hotels with 20 numbers of tourists at different locations in Mussoorie, as shown in Table 3. The result shows that the tourists produce many types of solid wastes in their indoor environment in which food wrappers, food take away containers, cigarette butts, plastic bottles, plastic cups and plates, smoking-related packaging, plastic straws, and plastic bags are important (Table 4).

However, these wastes are easily segregated at their source, managed and transported to the dump site or treatment site. Figure 2 illustrates the share of generated waste in hotels. Tourists asked about their waste produced in indoor and their disposal at proper place and bins. Among the considered public, 83% respond to proper disposal of their waste and they are regularly collected by the concern person presenting good garbage collection services. But the waste they produced at outdoor place is a more serious issue where this agreement turns down 31%. In this polyethylene, food wrappers and containers, cigarette butts, disposable plates and cups, and single-use plastic bottles are important plastic litter that could be eaten by animals, and can choke water ways in city [23].

**Fig. 2** Share of various generated waste in hotels (percentage)

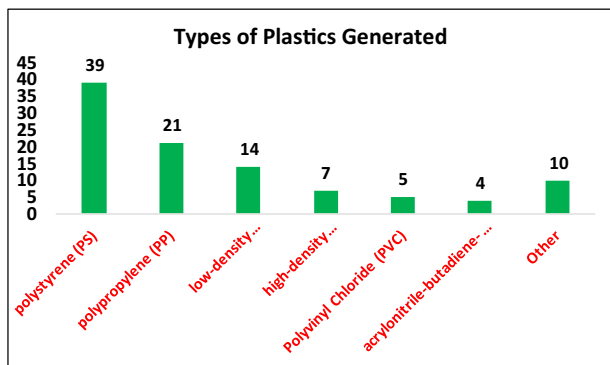


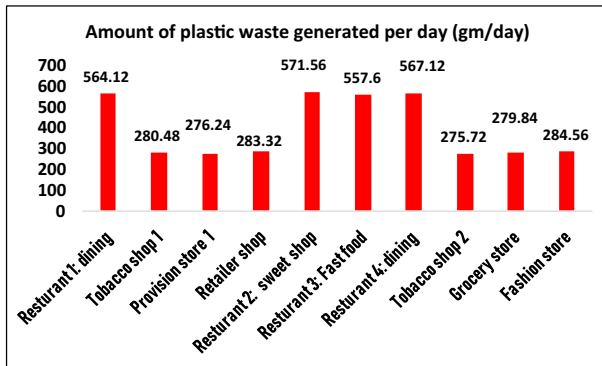
Here, Fig. 3 presents the contribution of types of plastic waste in generated waste at indoor environment.

In the discussion with shopkeepers, more than 80% supports that tourist do not use preplaced dustbins at shops and drop their plastic waste near roadsides. We had observations on 10 shops for 12 h for 25 days to evaluate the amount of plastic waste generated at shops. The local people were hired to count number of tourists who visit a shop and the plastic waste they generate at the shop. The selected shops were restaurants (dining, sweet, and fast-food shop), tobacco shop, provision stores, grocery, and fashion shop. The daily generated plastic waste at each shop was measured using weighing machine. Data illustrate that on an average, more than 300 g/day of plastic wastes was generated at each shop, presented in Fig. 4, and the maximum people visiting to the shops are tourists, whereas this amount drastically reduced at the time of lockdown highlighting the role of tourists in plastic waste generation (Hayati, Adrianto, Krisanti, Pranowo, & Kurniawan, 2020; [33]).

Furthermore, working team in that period has 12 h observation on Mall Road, Mussoorie, at the stretch of 50 m. In 25 days, more than 2000 individuals including male, female, and children were counted and observed while disposing their plastic waste. Among them, only 381 were observed disposing their plastic waste into the placed and prescribed dustbins. More than 439 individuals carry their plastic waste with themselves into their own carry bags (especially females with 306 numbers).

**Fig. 3** Types of chemicals contributed to plastic waste





**Fig. 4** Average plastic waste generated (g/day) at each shop

## Generation of Plastic Waste

Although a number of tourists being a graduate as their minimum qualification have good knowledge about the plastic waste, 65.3% of the respondents agreed that plastic wastes is a serious issue, which possess adverse impact on environment and human health and are banned in many parts of country. The seriousness of plastic after its utility is over as waste was rated on a 5-point Likert scale from 1 (strongly agree) to 5 (strongly disagree). Most tourists (98%) show their agreement that millions of tons of plastics (especially single-use) are thrown out openly, and 99% agree that single-use plastics are scattered on roads and choke city drainage systems or other water ways, and it takes several years to degrade. Moreover, 78% tourists think that plastic ultimately ends in oceans where it enters to the food chain and can be eaten by fishes or other aquatic organisms. Many research articles published produced evidence about the presence of plastics and microplastics in the gut of fishes and other organisms (Andrady, 2011; [12, 24].

In context to behaviour towards plastic waste generation, 83% of the respondents agreed to dispose their plastic waste properly in dustbins in indoor environment, whereas this agreement turns down 31% at outdoor owing their convenience and unavailability of dustbins at shops or roadside. Less than half (41%) of the respondents surveyed supports to avoid plastic usages when not needed, and only 39% of the respondents agreed to use carry bags when they are out for shopping. Results reflect strong willingness among tourists to reduce plastic waste. The majority of the respondents expressed their desire to prefer to reusable alternatives (94.8%) and pay extra for their use (73%). Cloth bags, reusable food containers, paper bags, and glass water cans were the most preferred environmentally friendly packaging materials and alternatives [8, 27]. The present study also illustrates that more than 60% of tourists support that shopkeeper shares polyethylene to customers for free of cost, whereas they ask charges for the paper carry bags.

Study reveals that the tourist is considered the key player to boost the plastic in a hilly region; as a result, plastic load has been increased. Especially, polyethylene that was in maximum number provided by shopkeepers even for any particulars either small or large, such as for small cookies and candy they use different plastic carry bag.



## Statistical Analysis

In this segment of the study, the role of tourists on generation of plastic waste was evaluated using ANOVA statistical approach which is used to state the comparison between the two variables, i.e. independent and dependent variable (Battineni, Sagaro, Chintalapudi, Di Canio, & Amenta, 2021). In this statistical technique, three samples, i.e. knowledge, behaviour, and attitude, are used to depict how different these variables are from one another. Such a technique, which compares the samples on the basis of their means, is called ANOVA. The role of tourists is considered an independent variable, whereas its impact on plastic waste generation is termed as dependent variable. Moreover, different levels of independent levels (knowledge of tourists, behaviour and attitude) are used to assess the impact on dependent variable, i.e. generation of plastic waste. Hence, ANOVA are used to prove/disprove if all the variables, i.e. knowledge of tourists, behaviour, and attitude, were equally effective or not in generation of plastic waste.

Therefore, two hypotheses are assumed:  $H_0$ : tourists do not have significant impact on plastic waste generation; and  $H_1$ : tourists are major factor in generation of plastic waste. Table 5 show the descriptive analysis of the data where it presents the average of the sum-mated scores of each factor along with their corresponding standard deviation. A standard deviation lower than mean value depicting the more utility of plastic products and materials means there are more chances of plastic waste generation. The mean value of tourists having good knowledge, behaviour, and attitude towards mean value of generation of plastic is found greater than standard deviation. This depicts that the respondents which have good knowledge along with better behaviour and attitude generate plastic waste more frequent in higher amount, even if not needed.

Table 6 shows the model summary, indicating R square value of 0.019. The results designate that a total variance of 1.9% is shown by the independent variables, i.e. knowledge, behaviour, and attitude, on plastic waste which is the dependent variable. The results of ANOVA analysis indicate an  $F$ -value of 0.689 with a corresponding  $p$ -value of 0.560, being greater than 0.05. This result attributes to the tourist respondents who use plastic products in spite they are much aware about the impact of plastic waste in the environment and human health. Hence, the null hypothesis is rejected. Moreover, tourist does not practice 3R approach especially when in outdoor.

Table 7 shows the coefficients table. The results indicate that none of the independent variables (knowledge, attitude, behaviour) has a significant impact on the dependent variable (plastic waste generation). The  $p$ -value of knowledge, attitude, and behaviour is 0.994, 0.299, and 0.288, respectively, all above the threshold limit of 0.05, indicating

**Table 5** Descriptive statistics

Descriptive statistics			
	Mean	Std. deviation	Number of respondent (N)
Plastic waste generation	17.67	3.879	110
Knowledge	4.84	1.392	110
Behaviour	8.75	2.830	110
Attitude	5.65	2.169	110

**Table 6** Model summary

Model summary <sup>b</sup>										
Model	R	R square	Adjusted R square	Std. error of the Estimate	Change statistics		F change	df1	df2	Sig. F change
<b>1</b>	.138 <sup>a</sup>	.019	-.009	3.896	R square change	.019	.689	3	106	.560

<sup>a</sup>Predictors: (constant), knowledge, behaviour, attitude

<sup>b</sup>Dependent variable: plastic waste generation

**Table 7** Coefficients<sup>a</sup>

Model		Unstandardized coefficients		Standardized coefficients	t	Sig
		B	Std. error			
1	(Constant)	15.421	1.997		7.722	.000
	Knowledge	-.002	.270	-.001	-.007	.994
	Behaviour	.139	.133	.102	1.045	.299
	Attitude	.184	.173	.103	1.068	.288

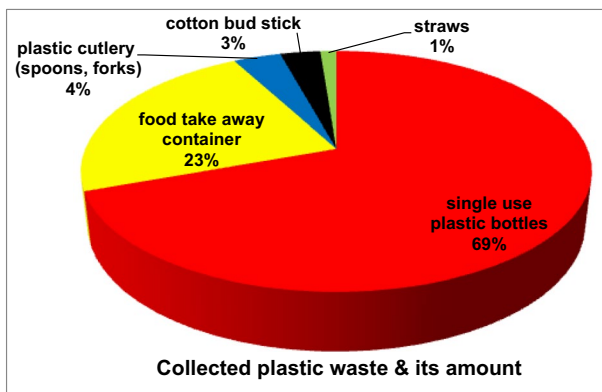
<sup>a</sup>Dependent variable: plastic usage

non-significant impact on plastic waste. In other words, tourists with good knowledge, behaviour, and attitude are in practice to generate plastic wastes in the Mussoorie.

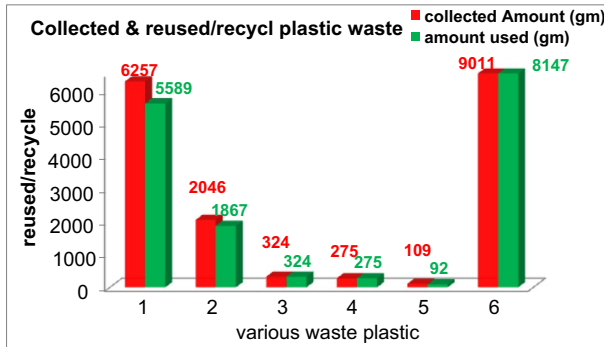
### Approach Towards Circular Economy

This section focusses towards application of circular economy approach, which creates awareness about the approach to reduce the amount of generated plastic waste. Circular economy is an approach to reduce the amount of plastic after its utility is over, designing them for optimal reuse/recycling, and recuperate for use in new products (Leslie, Leonards, Brandsma, De Boer, & Jonkers, 2016; [40]). In the present study, different types of plastic waste were collected from the city generated by tourists. Figure 5 illustrates their share in total collection of plastic waste (9011 g) which was in order: single-used plastic bottle > food takes away container > plastic cutlery > cotton stick > straws. These materials were considered because of their high volume and amount.

The collected waste (9011 g) was reused and recycled into various useful products such as pots, key rings, and other decorative items (8147 gm), which are depicted in Fig. 6. Among this, 864 g plastic was left over, which was ground and used as raw material for decoration. Therefore, it could be concluded that, this approach leads towards zero waste generation.



**Fig. 5** Different types of plastic waste collected and its share used for designing various products



**Fig. 6** Illustration of the amount of collected plastic waste and used for various product

### Limitations of Study

The present study has few of limitations which involves scope of respondents which was limited to tourists and shopkeepers. Respondents from various groups such as local community, government, and non-governmental population would be ideal to obtain information about the knowledge, behaviour, and attitude towards plastic waste generation by tourists. Nonetheless, the information deduced from the survey was robust and it offers unprecedented insights onto the role of tourists on plastic waste generation. Furthermore, the study was limited to few measures to evaluate the impact of knowledge, behaviour, and attitude for plastic waste generation even broad-spectrum parameters could enrich more to the study.

### Suggestions and Future Aspects

Undeniably, plastic is a wondrous material that is used in almost every industry from food packaging to space exploration. This ultimate commodity of convenience offers consumers cheap goods but its durability offers them for hundred years in environment. In the first instance, opportunities to reduce unnecessary use could be seized where this is feasible especially at shops like restaurants. In this case, policies should be incorporated to avoid disposable plastic items at restaurants and need to pay penalty in an offence [28].

Promoting reuse and recycle approach, by creating circular plastic economy. This could minimize the plastic wastes in tourist's areas because the linear plastic economy adopted sees 90% of products used once and are then discarded [22]. In this, plastic waste materials could be used as raw material by local people to design various beautification products such as pots, key rings, and decorative items, as shown in Fig. 7. This approach could offer income for local people and reduction of plastic waste.

However, this strategy remains slow which needs support from governments, non-governmental organizations, and leading manufacturers, and human behavioural changes to achieve targets. It is important to make socially and environmentally conscious populace towards plastic usage. The school curriculum should be included with consciousness on plastic pollution and its consequences, in order to create awareness since childhood (OECD., 2018).



**Fig. 7** Various key rings and pots made from plastic waste. These products are used by local people to sell in market

## Conclusion

Mussoorie is known among most visited place by tourist in Uttarakhand Province, India; with environmental significance and fragile nature, it was important to evaluate the impact of tourists in generation of plastic waste.

The results conclude that tourists are the key factor in generation of plastic waste materials in Mussoorie region. Tourists (83%) inside the hotels properly segregate and dispose their waste, whereas at outdoor place is more serious issue, and this agreement turns down 31%. Around 80% shopkeepers support that tourist do not use preplaced dustbins at shops and drop their plastic waste near roadsides. On an average, more than 300 g/day of plastic wastes was generated at each selected shop in which tourists were the major source for generation. While making observations on tourists over road among 2000 individuals, only 381 were observed disposing their plastic waste into the placed and prescribed dustbins. More than 439 individuals carry their plastic waste with themselves into their own carry bags (especially females with 306 numbers). Furthermore, tourist community are in well practice to use plastic products and contribute significantly in generation of plastic waste in Mussoorie, even though tourists are having good knowledge about plastic waste, better behaviour, and attitude. Additionally, the present article demonstrates the pilot over view on generated plastic waste could be used as a raw material even at smaller scale of the society. The waste could be collected and exhausted for developing some useful products such as key rings, pots, and pen stands. Such approach is found to be helpful in waste management and protection of environment from degradation which helps in strengthening of the circular economy and sustainable development of the city. The study highlights that the awareness can make certain changes in plastic waste generation. Different awareness campaign can be used to bridge the knowledge–practice gap. The finding also recommends banning the polyethylene in markets and to put taxes or extra charges for the polyethylene which is a free of costs at shops. This study can contribute towards developing adequate communication and governance strategies to reduce plastic pollution.

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## Declarations

**Conflict of Interest** The authors declare no competing interests.

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