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A SUSTAINABLE UTILIZATION OF BIODEGRADABLE WASTE AS AN ECOFRIENDLY TOOL FOR TEMPLE TOURISM

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ABSTRACT

India is a religious country where worshiping and offering to deities is an important ritual. After the commencement of worship, offered leaves, loose flowers and garlands often become dry or decay and their disposal becomes a sore issue. Most temples dispose of leftover Prasad, flowers, incense sticks, coconut husks and more which ultimately become a part of either municipal solid waste or get directly thrown into water bodies. This paper investigates the amount of solid waste generated by the temples in a particular month of Monsoon or Sharvan according to the Hindi calendar from Shiva temples in the Bhilwara region. The total waste accumulation ranges between 220 kg to 230 kg on Mondays, 150 to 170 kg on Wednesdays and around 190 to 270 kg on Saturdays. The total amount of waste accumulated in around one month was 2470.43 kg with about 93% of it being biodegradable which can be easily decomposed or recycled thus reducing the waste management cost. The outcome of this study indicates that proper management of temple wastes can have several benefits like high-quality manure and reusability of biodegradable wastes, making temple tourism more sustainable and eco-friendlier.

KEY WORDS: Solid wastes, Cultural wastes, Biodegradable, Land degradation, Water pollution, Ecotourism.

INTRODUCTION

Temple waste forms about 25% of the urban green waste. Places of worship receive huge quantities of offerings from the devotees. It is estimated that some 800 million tonnes of flowers, garlands, food (milk, curd, and honey), fruits and sweets are offered at various Temples, Churches, Mosques, Gurudwaras and other places of worship (Gurav and Pathade, 2011; Yadav *et al.*, 2015). Along with bio-degradable waste, comes a large quantity of non-biodegradable waste like polythene packets, vermilion packets, plastic incense packets, bangles, textiles, etc. where these generous offerings turn into colossal waste.

Fresh flowers and leaves after being offered to the deity and coconut for good omen are a common sight in temple premises. These waste gets piled up in various corners of the temple or are discarded in water bodies that can barely take the weight of indiscriminate dumping of pollutants and garbage (Singh and Gupta, 2011).

Every day, these flowers are offered by devotees in temples and are left unused and therefore become waste. India is a country of festivals and many occasions are celebrated around the year which eventually leads to the generation of temple waste. This proportion of cultural waste is generally neglected and requires due consideration. Because of our religious beliefs, many of us avoid throwing flowers and other items that are used for prayers in the garbage and instead put them in plastic bags and throw them directly in the water bodies. Apart from this, flowers are also kept under the sacred trees and thus there is no suitable mode of disposal.

Since temple offerings are considered sacred, it is discouraged to dump them in landfills. Most temples throw their waste into local water bodies like rivers, ponds and lakes. The bulk of the flowers, leaves of different plants, coconut shells, milk and curd are piled up and then disposed of exclusively

in water bodies. The problem gets serious in the wake of festivals, functions and ceremonies (Jain, 2016). This is not the case for just one temple. India has over five million temples and it is hard to imagine how they must be disposing off their waste. Several temples in the country directly dump daily waste into the river, that too, without even segregating them into biodegradable and non-biodegradable components. The garbage also takes up the space on the road making the pedestrians struggle to navigate across the path. Due to lack of awareness among the devotees, the offerings are being piled on the ground at various places. Degradation of floral waste is a very slow process as compared to kitchen waste (Jadhav *et al.*, 2013). Being as harmful as any other type of solid waste, temple waste is often neglected and no strict rules and regulations are being followed regarding their collection and disposal. This investigation is an attempt to estimate the solid waste generated by the temples both biodegradable and non-biodegradable for increasing awareness and concern towards disposal of biodegradable waste which can rather be utilized as compost or can be easily recycled, thus helping in reducing environmental risks and pollution.

MATERIALS AND METHODS

For this study, three major temples were chosen from the Bhilwara region of Rajasthan, from where the waste samples were collected. Fig. 1 shows the location of all three sampling sites- Mahadev Mandir, Ram dham Mandir and Neel kanth mahadev mandir.

These temples were selected as they are the most popular Shiva temples of Bhilwara region, where a good gathering of devotees was observed round the year. A survey was conducted in these temples to study the waste accumulated every Monday, Wednesday and Saturday from July 4, 2023 to July 31, 2023 i.e., Shrawan month.

RESULTS AND DISCUSSION

The waste from all three temples was carefully

Fig. 2. Solid waste dump outside one of the temples in Bhilwara region.

Fig. 3. Samples of Biodegradable waste collected from the different temples under study.

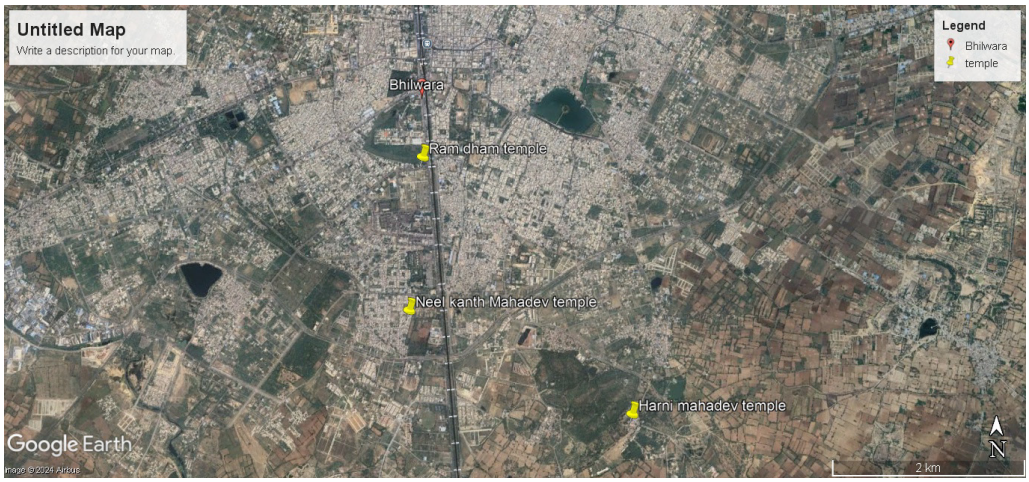

Fig. 1. Map of Bhilwara region showing the sampling sites.

collected in plastic bags and brought to the laboratory for weighing. After proper weighing of the sample, the entire solid waste was manually segregated into two categories- biodegradable and non-biodegradable wastes. A small sample of segregated wastes has been shown in Figures 3 and 4.

Fig. 4. Samples of Non-biodegradable waste collected from the different temples under study.

Table 1 shows the estimate of waste collected every Monday, Wednesday and Saturday falling between 4th July 2023 to 31stJuly 2023.

In the present study as shown in Table 1, it is estimated that a total of 913.33 kg of waste was collected from all the three temples - Harni Mahadev, Ram Dham and Neel Kanth mahadev mandir every Monday falling in between July 4, 2023 to July 31, 2023. The Table indicates that the maximum amount of waste was that of garlands followed by loose flowers, indicating that biodegradable solid waste holds the highest proportion among entire collected solid waste. The non-biodegradable waste mainly consists of milk packets and insence stick packets. The table clearly presents that the maximum waste was collected on Saturday 8th July which happens to be the first Saturday of *Shravan* month, which explains that the maximum people have visited the temple generated all time high amount of waste. The maximum amount of waste was collected on Saturdays, i.e., 322.6 kg of flowers, 502.8 kgs of garlands, 43.6 kg of polythene, 8.8 kg of insence sticks/ash and around 31 kg of thread followed by Mondays having 317.7 kg of flowers, 525.4 kg of garlands, 35 kg of polythene, 8.63 kg of insence sticks/ash and around 26.6 kg of thread and minimum on Wednesday having 254.75 kg of flowers, 346.6 kg of garlands, 25.7 kg of polythene, 6.99 kg of insence sticks/ash and around 14.86 kg of thread respectively.

Based on the result obtained, Table 2 presents the total solid waste which was collected during the entire month was 2470.43 kg which was either thrown directly into water bodies or became a part of municipal solid waste. Both ways it creates a serious problem of solid waste pollution for temple tourism. If we look at Figure 5 we can conclude that about 93% of the total waste is biodegradable in

Table 1. Total amount of solid waste collected from all the temples.

			MONDAY		
Date	Flowers	Garland	Polythene	Insence stick/ash	Thread
10th July	78.8 kg	131.9 kg	9 kg	2.29 kg	6.9 kg
17thJuly	83.9 kg	129.7 kg	8.2 kg	2.11 kg	5.7 kg
24th July	77.3 kg	125.7 kg	8.1 kg	2.09 kg	7 kg
31st July	77.7 kg	131.8 kg	9.7 kg	2.14 kg	7 kg
TOTAL	317.7 kg	525.4 kg	35 kg	8.63 kg	26.6 kg
			WEDNESDAY		
5th July	64.65 kg	92.1 kg	6.4 kg	1.74 kg	3.1 kg
12thJuly	68.7 kg	87.3 kg	5.8 kg	1.7 kg	3.6 kg
19th July	63.2 kg	79.2 kg	6 kg	1.82 kg	4.64 kg
26th July	58.2 kg	88 kg	7.5 kg	1.73 kg	3.52 kg
TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
			SATURDAY		
8thJuly	102.4 kg	143.8 kg	12.7 kg	2.34 kg	8.4 kg
15thJuly	71.1 kg	106.8 kg	9.8 kg	2.06 kg	7.5 kg
22ndJuly	75.4 kg	119.2 kg	10.6 kg	2.18 kg	6.8 kg
29th July	73.7 kg	133 kg	10.5 kg	2.22 kg	8.3 kg
TOTAL	322.6 kg	502.8 kg	43.6 kg	8.8 kg	31 kg

Table 2. Total waste and percentage of biodegradable and non-biodegradable waste collected from temples

Type	Total waste collected from all the temples	Percentage
Flower/leaves	894.45 kg	36.2%
Garlands	1374.8 kg	55.6%
Polythene	104.3 kg	4.22%
Incense stick/ash	24.42 kg	3.95%
Threads	72.46 kg	2.93%
TOTAL	2470.43 kg	

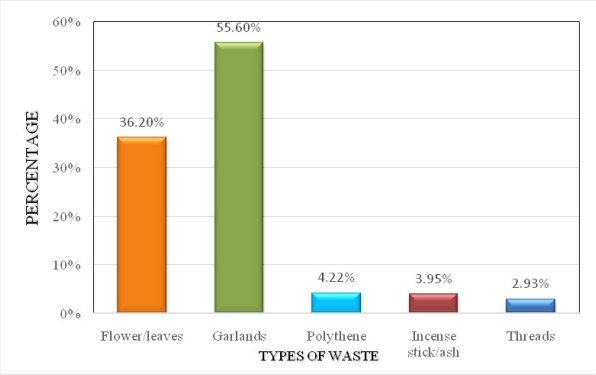

Fig. 5. Percentage of solid waste collected from various temples..

nature which can be easily recycled and managed.

A little effort in keeping this waste separated and then utilizing the biodegradable waste as compost or recycling will not only reduce the pollution load but also indirectly be more cost-effective thus reducing the cost of temple waste management. Hence commoners, the government and on local level and community level must make efforts and policies to combat this problem of temple tourism.

CONCLUSION

Solid waste management has attained enough global attention due to its ill effects and expensive management however places like tourist, religious and famous spots are mostly affected. This study provided a very small picture of how three temples can generate so much waste in just a single month. Considering it we can now have an idea about the waste all religious places are generating and not treating them properly thus causing various environmental problems like air, water and soil pollution. Therefore, a serious effort towards developing a solid waste management plan for such religious activities is the need of an hour. A well-developed environmental impact assessment can be framed where the government and local people can work as a team to assess the social and environmental studies which will not only be economically beneficial but will be more hygienic, aesthetic and eco-friendly.

Conflict of Interest- None

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