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A STUDY OF THE PRODUCTION OF ENVIRONMENTAL WASTE FROM TEMPLES: NIRMALYA – A CASE STUDY

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INTRODUCTION

Nirmalya originally means 'pure.' It also means of garland of flowers.

A flower is a symbol of love & if is offered to people as a gesture of love, affection, respect etc. Whether there is a birth or demise, joy or sorrow flowers are an integral part of it. Both rich &poor, people from all caste, creed & sex have accepted flowers as a single most effective means of expressing one's emotions.

From ancient times people around the world have been offering flowers to god irrespective of their religion to show their love & devotion to god.

Worship is an integral part of human life and floral offerings are an integral part of worship. Enormous quantities of flowers are used for worship in all the parts of India. The "mantras" chanted during Pushpanjali (the act of **offering flowers**) literally is a prayer of world peace. **Floral offering** is an important part of Hindu worship as different **Gods**& goddesses are known to love certain **flowers**. ... **flowers** are used for their good fragrance & aesthetic appeal.Since flowers are the most beautiful things found in nature, they have been offered to Gods during their worship. Some people also believe that by offering flowers, the deity grants good health, wealth and prosperity.

But it does not matter what one is or where one is situated. The process is so easy that even a leaf or a little water or fruit can be offered to the Supreme Lord in genuine love and the Lord will be pleased to accept it.

Unfortunately, when the flowers dry or decay, disposal of these once-beautiful offerings become a sore issue. These are now considered waste material and thus, dumped into landfills etc. The matter is now attracting the attention of the media as a recent newspaper report proves.

However, these waste flowers have an enormous, and largely unexploited, potential of being turned into wealth using existing, simple and inexpensive technologies.

NEED OF THE STUDY

The main concern of this study is to understand the production of environmental waste from temples through a case study.

The main objective of this study is to minimize the problem of solid waste management by treating nirmalya solid waste and reducing the environmental degradation. Solid wastes in the farm-runoff join sweep into the ground poisoning the ground water. As the stream snakes down from the farmers it gathers pace and volume, joined by hundreds of others bringing along the hazardous chemicals from the alluvial plains into the rivers and other water bodies. Huge amounts of flowers are offered in temples in India creating a large amount of flower waste. The temple wastes are released in the water bodies or dumped at the available places of land, which creates severe environmental pollution and health hazards.

Hence the Researcher felt the need of this study.

STATEMENT OF THE PROBLEM

"A Study of Production of Environmental waste from temples (Nirmalya): A Case study"

OBJECTIVES OF THE STUDY

a. To study the waste from temples (Nirmalya) affecting the environment.
b. To understand the utilization and significance of flower offering in temples.
c. To understand the utilization of flowers after being degraded.
d. To identify the best available technologies for the treatment of various waste materials(flowers) from temples
e. To increase the recovery of materials and energy from used solids, by means of recycling, composting, waste-to-energy, and, sanitary landfilling with landfill gas utilization.
f. To create a niche for the budding solid waste management sector in India
g. To bring together the industry, government, academia and citizen activist groups to solve the current solid waste management crisis in India
h. To act as a swiveling point to funnel important decisions related to solid waste management in India in the right direction
i. To disseminate the latest information by means of its web page, and periodic meetings

SCOPE AND LIMITATIONS OF THE STUDY:

The scope of the study elaborates what the investigator actually attempts to study.

The present research covers the study of Nirmalya (temple wastes), in greater Mumbai.

The present research study describes how to recycle the temple wastes.

The study further covers the use of items offered to the deity, how it should be.

The study also covers the temples situated in greater Mumbai.

The study covers the geographical area of greater Mumbai under western, central and Navi Mumbai railway routes.

Limitations of the study draw the boundaries of the study.

The present study does not cover the variables like other wastes like coconuts, fruits and other materials offered in temples.

The temples situated in interior Maharashtra, are not covered.

Religious tombs like Mosques, Madrassas, Agiaris, Gurudwaras, are not covered.

SIGNIFICANCE OF THE STUDY

Significance of the Study

The study will be of immensely beneficial to the different stakeholders in education.

Head of the Institutions

The findings of the study will benefit the heads of the institutions because it will successfully create awareness about how to protect environment through various means. It will further enlighten them to design a matured structure and processes of environment and education for holistic development.

Women Professional Teachers

The study will be immensely beneficial to the professional teachers who are the key drivers for educational delivery. Empowerment of women towards education and environmental studies is valuable in today's scenario. How well this value will be inculcated in the grass root level can be observed from these findings.

The findings of this study will be of great significance to the professors of medical institutions to understand the worth of higher studies and research in education and environment.

Society:

The findings of the study will be an eye opener to the Indian society. It will be immensely beneficial to the present generation to know and analyze their attitude towards protection of

environment, its flora and fauna, because an egalitarian society forms an integral part of environmental peace and harmony.

REVIEW OF RELATED RESEARCH

INTRODUCTION: -

The review of related literature is an indispensable step for a researcher as it gives her a deeper understanding of the problem. The investigators become familiar with various trends and phases in various researches in her area and formulate a rational for the development of the study to be undertaken by her. It provides an empirical basis for defining her problems and its key concepts.

RESEARCH DONE IN INDIA

Production of Vermicomposting from Temple Waste.

Vermicomposting is the phenomenon of compost formation by earthworms. Earthworms play an important role in the cycling of plant nutrients, turnover the organic matter and maintain the soil structure. The temple wastes consist of vegetable material (mainly flowers, leaves, fruits, sugar, jaggery etc.), milk and milk products, grains and water most of which are biodegradable and contain elements required for growth of microorganisms and the temple wastes are released in the water bodies or dumped at the available places of land which creates severe environmental pollution and health hazards, hence it was thought to attempt use temple waste for ecofriendly treatment methods like Biomethanation and vermicomposting. **Extraction of Useful Products from Temple Flower Wastes: - (INDIA)**

The flowers being offered to deities in temple all over India stands at a rough estimate of 1450 tons per day, these are termed as temple wastes once they are discarded with other floral components such as leaves, stems etc. When these flowers are dumped into water as solid waste they create water pollution and environmental pollution by harboring microbial growth which are unwanted. They at times are also responsible for clogged drains, blocked channels etc., which again creates municipal related problems. Based on survey the flowers coming out as temple wastes include: 1. Rose; 2. Jasmine; 3. Marigold; 4. Chrysanthemum; 5. Hyacinth; 6. Hibiscus and 7. Tuberose. These flower wastes can be utilized to get various products such as Dyes, Essential oils and Perfumes. Raw materials are collected at the source i.e. temples and segregated based on the types of flowers. The flowers are then subjected to drying both naturally and artificially based on the flower and method employed.

Temple Waste Management: -

Worship is an integral part of human life and floral offerings are an integral part of worship. Enormous quantities of flowers are used for worship in West Bengal every day, not to mention other decorative uses of flowers. Unfortunately, when the flowers dry or decay, disposal of these once-beautiful offerings become a sore issue. These are now considered waste material and thus, dumped in landfills etc.

The matter is now attracting the attention of the media as a recentnewspaper report proves. However, these waste flowers have an enormous, and largely unexploited, potential of being turned into wealth using existing, simple and inexpensive technologies.

RESEARCHES DONE IN ABROAD:

Eco friendly Dyeing and Antibacterial Finishing of Soyabean Protein Fabric Using Waste Flowers from Temples: - Soyabean Protein Fibre (SPF) is considered to be important regenerated protein fibre for various applications in textiles because of its unique properties. However, the lack of antibacterial properties of such protein containing polymers is held as a severe limitation for its applications in hygienic textiles and the need to make it antibacterial is quite intense. A lot of marigold (which is antibacterial), used in Idol worship forms a temple waste and there is tremendous potential to use this waste as a good source of natural dye. In the current study, the tannin mordants were extracted from tamarind seed coats, amla (Indian gooseberry) and harda (Myrobalan fruits) and their application in natural dyeing using temple waste marigold as a dye was carried out. Marigold dyeing using most commonly found alum mordant was also carried out for comparison of the purpose. The dyed SPF fabrics were then evaluated for colour values, fastness properties, antibacterial activities as well as durability of the same. The results clearly indicated the advantages of using such mordants both in case of achieving antibacterial functionality as well as eco-friendliness.

The extraction process and antioxidant properties of patuletin dye from wasted temple French marigold flower: -The patuletin dye generally used in textile for colour to texture but it is not used as antioxidant agent in industries after that it thrown in river and causes the river pollution. So in this work we have use the wasted French marigold flower and minimize the river pollution. An interesting outcome of this work is that, the patuletin dye was show high antioxidant capacity than base and below the catechol. But due to easily available, low coast, no hazardous effect, easily degradable so the patuletin dye is more economically beneficial in antioxidant treatment.

RESEARCH METHOD FOR THE PRESENT STUDY

In the present study the current status of the floral wastes from temples in greater Mumbai are studied.

SAMPLING TECHNIQUES

Sampling is a process of selecting units (example people, organizations) from a population of interest so that by studying the sample the researcher can fairly generalize the results to the population from which it was chosen. In any research ideally it is essential to cover individuals, institutions or in animate units in the study to draw generalizations concerning educational phenomena under consideration. Ideally in any research it is essential to cover individuals, institutions or inanimate units, in order to draw generalizations concerning finite subset of individuals in a population that has been studied.

SAMPLING TECHNIQUE OF THE PRESENT STUDY:

In the present study the researcher has used the simple random sampling. The sampling process in the present study involves selection of Hindu temples randomly in greater Mumbai.

SAMPLE: SIZE AND NATURE

The sample size for the present study is twenty-five. Twenty-five temples were studied through case study method.

TOOLS FOR RESEARCH:

For each and every type of research we need certain instruments to gather new facts or to explore new fields. The instruments thus employed as means for collecting data are called tools.

The selection of suitable instruments or tools is of vital importance for successful research. Different tools are suitable for collecting various kinds of information for various purposes.

TOOLS USED IN THE PRESENT STUDY FOR DATA COLLECTION

For the present study researcher has prepared interview schedule for conducting case study of various Hindu temples.

PROCEDURE OF THE STUDY:

The Researcher has taken prior appointment from the higher authorities of the temples to be visited and thereafter visited the temples on the stipulated timing.

Area wise distribution of Temples under present case Study

Zone	**Area**
North Mumbai	Shri Vasupujya Swami Jain Mandir, BAPS Swaminarayan Temple, ShriDham Mandir, Jalaram Temple, Shri Hanuman Temple.
South Mumbai	Ganesh Temple, Shri Chandreshwar Temple, Ambe Ma Temple.
Central Mumbai	Kalika Mata Mandir, Ganapati Temple, Shri MumbadeviMandir.Kali Mata Temple
East Mumbai	Sai Baba Temple, Shri Lakshmi Narshimha Temple, Jai Santoshimata Temple, Ayyappa Temple, Jalamukhi Temple
West Mumbai	ESKON Temple, Ram Mandir, Kali mata Temple
Navi Mumbai	Gaondevi Temple, Shri Guruvayur Temple, Balaji Temple, Jagannath Temple Kamakshi Amman Temple.

FINDINGS:

Temple waste normally contains floral offering, leaves& milk products i.e.; "Abhishek waste water", & this solid waste management is one of the important issues in the world, because of shortage of dumping sites & strict environmental legislations.

There are many environmental issues in India. Air pollution, water pollution, garbage, and pollution of the natural environment are all challenges for India. Pollution remains a major challenge and opportunity for India. Environmental issues are one of the primary causes of disease, health issues and long-term livelihood impact for India.

Environmental degradation is a major threat confronting the world. The primary causes of environmental degradation in a country could be attributed to rapid growth of population, over utilization of environmental resources, establishment of different multinational companies and local industries which adversely affect the natural resources and environment. Air pollution, water pollution, deforestation, thinning of the ozone layer, global warming, sanitation and outbreaks of diseases are the problems that are endangering human lives. Besides these, the problem of waste disposal cannot be ruled out. Waste gets generated from almost each and every activity and eventually degrades the quality of human health and accelerates the deterioration of the environment in an alarming proportion. Wastes according to Tchobanoglous and Kreith are discarded tangible products of human activities that are regarded as unwanted and useless.

In fact, waste is a misplaced resource and it is not possible to destroy it. Actually, there is no waste in the natural world; every possible substance used and thrown away comes back as a new and different material. Material discarded after use may come to only two possible ends; either it is discharged into the environment or is reused, reclaimed or recycled.

Flowers come as waste from hotels, marriage gardens, temples, *dargah*and various cultural and religious ceremonies. However, bulks of flowers are available from religious places (temples, *dargah*etc.) where they are used on daily basis thus making them a regular source of floral waste. Flowers are considered as holy entities and hence are offered by pilgrims to their gods and goddesses. Every day these flowers offered by the devotees in temples are left unused and therefore become waste. This flower waste gets accumulated at religious sites like Temples, Mosques and *Gurudwaras*due to a number of religious practices and is also generated in places like Residential areas, Community centres, etc. India is known for its festivities and has many occasions celebrated round the year when solid waste is generated like religious festivals and the cultural functions associated with them. This portion of community waste is generally neglected and requires due consideration. Because of our religious beliefs many of us avoid throwing flowers and other items which are used for prayers in the garbage and instead put them in the plastic bags and throw them directly in the water bodies, apart from this; it is also thrown near sacred trees with no suitable mode of disposal. For instance, Banaras, one of the holiest cities of the country, has no policy for the disposal of the tonnes of waste that comes from its many temples. Each day waste material weighing 3.5-4 tonnes is left behind in the city of temples. Such disposal of waste creates problems like eel and worm development, water pollution, foul odour, land pollution; moreover, it is not good aesthetically. Solid waste and littering can degrade the physical appearance of water bodies and cause deterioration of water quality.

EDUCATIONAL IMPLICATIONS

It has been observed that Floral waste from temples should no more reach the dumping ground as it can be converted to manure.

This floral wasteswascan be collected by the NGO, which, during Ganesh Chathurti had urged the citizens to give the Nirmalya (floral waste) and take back the fertilizer made out of floral waste.

The NGO recently distributed fertilizers made out of floral waste collected from the

Ganpatimandals and other citizens. The NGO is now planning to carry forward this process throughout the year by not just restricting it to the Ganesh festival.

The initiatives to convert floral waste into manure, which can be used for various purposes, were successful after its launch during the Ganesh festival. During the Ganesh festival, the NGO collected Nirmalya from immersion sites to see to it that no flowers are thrown into water bodies.

During the day of immersion, a slogan for the citizens that read **'Give us Nirmalya and take back fertilizer can be uttered'.**Around 10 tons of floral waste at different locations, can be then segregated to gather non-biodegradable wastes.

UTILIZATION OF FLOWER WASTE

Apart from coconut shell, the foremost used offering in temples is flower. After fulfilling their purpose, these flowers also become environmental menace just like the other offerings. Such flower waste can be used indifferent manners to produce valuable products and thereby may also contribute towards saving the environment from pollution caused by inadequate disposal of flowers offered to the deities.. Techniques like vermicomposting, composting, dyes extraction, extraction of essential oils, making of holicolours and biogas generation have been reported in the literature.

VERMICOMPOSTING

Vermicomposting of temple waste (Nirmalya) can be obtained from Ganesh temple, theycan be used effluent produced from biogas digester and mixed it with temple waste and cattle dung which was then allowed to decompose for a period of 30 days at 30°C. The prepared vermicomposting canalso beused to for pot culture study as a fertilizer with five flowering plants. Good growthparameters can be obtained in terms of height, flowering time as well as number of flowering time and thenumber of flowers produced as compared to the control sets, which were not treated with vermicomposting. Hence, vermicomposting of flower waste is an excellent and ecofriendly method of flower waste management.

A microbial consortium for the effective degradation of flower waste can be generated from temples. Collected soil samples from the areas near and around the temples can be used and isolate bacterial cultures from them. Flower waste can be collected anddried and mixed with agar medium and streaking was performed with selected soil samples for isolation. It was observed that microbial consortium enhanced the digestion of the waste and the bio

manure consortium was found to have good quality without posing any harm to the environment.

Collected flowersfrom temples can be converted into vermicomposting. The nutrient of the flowers also can be checked, status and microbiological enumeration of vermicompostingcan be prepared. It is observed that growth rate of plants grown in vermicomposting was more as compared to the respective control.

Vermicomposting contains plant hormones like auxin and gibberellins and enzymes which believed to stimulate plant growth and discouraged plant pathogens. Thus, vermicomposting resulted into good plant yield.

Enter a temple, mosque, gurudwara or church in India and the first thing you'll probably notice is the abundance of flowers at the place of worship. There are flower sellers at the entrance, flowers strewn all over the shrine's floor, devotees receiving flowers in the form of blessings – there seems to be no limit. Ever wonder what happens to those sacred flowers once we are done with our prayers?

According to many religious beliefs, flowers that are offered during prayers are sacrosanct and cannot be dumped into the garbage once they've wilted. This is one of the reasons why people prefer to discard them in rivers, lakes and other water bodies. But not many of us think about the fertilizers and pesticides that might have been used to grow these flowers, which then mix with the water and pollute it.

WOMEN FROM SELF HELP GROUP

Women can take the flower dough home and work for about four hours a day.

Most temples and mosques should have management committees that collect the flowers inside the shrines and put them in bins. From here they are sent to be thrown into the river. It could be collected directly from the places of worship.

The discarded packets of flowers also will grow into beautiful plants when they come into contact with soil.

For flower waste vermi-composting flower waste and cow dung were mixed in equal quantity (each 5 kg.). For vermicomposting, flower waste should due to low availability of low nutrients and be mixed with other organic wastes preferably cow dung. About 60 g of earthworms were introduced into partially digested material kept in a varied and moisture level was maintained at 60 per cent. After the 45th day, when the composting process was over the worms' weight increased by 85 per cent. The amount of finished vermicomposting

obtained is 2.57 kg. Vermicomposting is one of the ecofriendly technologies for flower waste management., since it overcomes the problem of organic waste disposal and also alleviates the odour problem. Vermicomposting cleans the environment and also provides remunerative organic manure. Hence awareness should be created among flower growers, sellers, consumers and waste handling persons to adopt vermicomposting in a large scale to have better income and clean environment.

CONCLUSION: -

Thus the exhaustive review of various methods of utilizing temple waste for one or the other useful product like vermicomposting, biogas, dyes, incensesticks, concrete aggregate replacement etc. suggest that the temple waste can not only be disposed safely in an environmental friendly manner but can also be utilized for making diversified products. This study will propose an alternative approach to waste management since the waste will neither be land filled nor burnt but would be used as a resource that will be recycled. It will throw light on reducing volume of temple waste which wouldeventually generate additional revenues for temples. Floral waste utilization would eventually be beneficial to the society as people would get to live in a cleaner and a healthier environment. The "green temple concept" can prove to be helpful in Government policy formulation for waste management and in promoting sustainable development approach towards temples.

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