



# प्रकृति और स्वच्छता

## स्वच्छता के माध्यम से पर्यावरणीय स्थिरता



# ‘PRAKRITI AUR SWACHHTA’

## Environmental Sustainability through Cleanliness



INSTITUTE OF HOTEL MANAGEMENT CATERING TECHNOLOGY &  
APPLIED NUTRITION, CHENNAI

EDITORS

Dr. Jitendra Das

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प्रकृति और स्वच्छता—स्वच्छता के माध्यम से पर्यावरणीय स्थिरता

*'Prakriti Aur Swachhta'—Environmental Sustainability through Cleanliness*

First Edition, April 2023

ISBN: 978-81-960940-3-4

**Published by**

Teenu Publications

#2/34, Saivamuthaiya 5th Street

Royapettah, Chennai 600 014

Phone: +91-82485 26126 / 94445 80781

Printed in Chennai, India

### Foreword



IHM Chennai in tandem with its mission statement is determined to develop the research quotient among its students and faculty to produce research-oriented professionals. This is manifested in papers published by IHM and the many seminars and conferences that are organized every year. The seminar this year was held on December 16, 2022, with the theme **"Prakriti aur Swachta—Environmental sustainability through cleanliness"**.

The seminar was a meticulously planned the event and attracted more than 50 paper presenters from various parts of the country. These papers are now compiled into a single book that will serve as a reference book for students, academicians, industry professionals, and the public at large.

The articles cover a variety of topics including Swachh Bharat Abhiyan. It includes facets like people in Swachh Bharat, Solid waste management, the role of village panchayats, the latest trends in sustainability, sustainable hotels, and so on. This is the essence of the scholarly discussions held during the seminar.

I commend the team for this fruitful endeavor. All the very best for a bright year ahead.

Thank you.



**(Dr. Chandra Mohan B)**  
**Chairman,**  
**Board of Governors**  
**Institute of Hotel Management**  
**Catering Technology &**  
**Applied Nutrition, Chennai**







### Message

The best investment one can make is in their health. A wealthy nation must have a healthy population as its foundation, and this must begin with individual attention to personal cleanliness and sanitation. In his Independence Day address to the nation on August 15, 2014, the Honorable Prime Minister Shri Narendra Modiji became the first Prime Minister of India to address the issue of open defecation from a national stand. He was determined to eradicate the practice in just five years.

The Swachh Bharat Mission (SBM), which was established to put this vision into action, faced a difficult task when it began but has since proven to be one of the most significant achievements of the government. Over the course of the past eight years, more than 10 crore toilets have been constructed as part of the SBM-Grameen programme, and the percentage of rural areas that have access to sanitation has increased from 39% in 2014 to 99.0% in June 2019. More than 60 crore people, or nearly half of India's population, have been encouraged to alter their behaviour as a result of the mission's extensive public outreach efforts.

I am happy to see the zeal with which IHM Chennai is supporting the vision and mission of SBM by organising a one-day national seminar on Swachh Bharat and also publishing an edited book on **"Prakritiaur Swachhta - Environment sustainability through cleanliness."** This makes me happy because it shows that IHM Chennai is committed to SBM's vision and mission. The research papers cover virtually every facet of the environment and how it relates to the Swachh Bharat initiative.

I have no doubt that those who read this book will appreciate the opportunity to gain exposure to a diverse range of information. I'd like to offer my congratulations to everyone at the IHM Chennai for all of the hard work, dedication, and commitment that went into producing the fourth edition of the book based on the Swachh Bharat initiative.

I wish all the very best for their future endeavours!

Thank you!

(SANDEEP NANDURI)







## Foreword

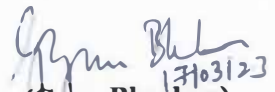
India will be cleaner and healthier thanks to the Swachh Bharat Abhiyan, which is now in its ninth year of implementation and has made a significant impact on common people's lifestyle. By convening a national level seminar on "**Prakriti aur Swachhta - Environmental sustainability through cleanliness**," IHM Chennai has appropriately embraced the opportunity to strengthen understanding in this realm. The seminar garnered the most impetus as an outcome of the discussions and debates on the themes.

The seminar, which was held successfully on December 16, 2022, featured a number of sub-themes that drew a lot of interest in both the academic community and industry. Full-length research papers were presented, and the participants discussed the underlying issues, limitations, and possibilities. The degree of interest demonstrated by the paper presenters from various organisations with a diversity of research findings was commendable.

I truly appreciate the paper presenters' enthusiasm and efforts towards the advancement of the Nation as a whole. My best wishes to the session chairs for steering the plenary discussions with a commitment to objectivity. Now that these articles have been edited, they will be available in a book that will serve as a knowledge base and intellectual treasure trove.

I commend the editorial board for going above and beyond in preparing this compendium. I wish team IHM Chennai continued concerted and collective efforts in all spheres of academics in the days ahead to earn more value for this prestigious Institute.

Thank you !

  
(Gyan Bhushan)



## Message



I am glad to provide the message to this edited book, "*Prakriti aur Swachhta - Environment sustainability through cleanliness*," which is research-oriented and rich in information. This volume, which comes in the shape of an intelligent recognition of the central notion by IHM Chennai, is a follow-up to the magnificently organised National Seminar. As a member of BOG, I can state with confidence that the team of IHM Chennai worked with lot of zeal and enthusiasm to streamline and achieve the objectives. Without doubt, this compendium marks a significant new step in IHM Chennai's academic development.

I am totally impressed by the outstanding contributions of many researchers from various fields. This curated book contains information on a wide variety of topics, from basic cleaning to Nation building. The researchers of this book had made a sincere effort to compile their research findings on a variety of subjects, including new trends in sustainability, solid waste management, corporate social responsibility, how cleanliness affects employee performance, the role of women in the Swachhta Mission, and others. This broad range of subjects provides a forum for debating and discussing many facets of the seminar's theme.

I am confident that this edited book will shed light on the less-emphasized areas of environmental sustainability and cleanliness, serving as an important reference material for hospitality students, faculty, and hoteliers.

I must express my profound gratitude to the team responsible for editing and publishing this book for their hard work and dedication. I send my best wishes to the team for an excellent next year!

Thank you.

(Mohamed Farouk)

Regional Director



होटल प्रबंधन खानपान प्रौद्योगिकी और अनुप्रयुक्त पोषण संस्थान, चेन्नई  
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R. PARIMALA  
Principal i/c

### Message

IHM Chennai is a Center of Excellence that is committed to cultivating research acumen among the faculty and students, apart from nurturing their intellectual prowess. A solid sway toward building this research quotient apparently appears in this edited book "*Prakriti aur Swachhta – Environmental Sustainability through Cleanliness.*" This edition comes as a collection of research papers presented by researchers during the National Seminar hosted on December 16, 2022. This book's one end of the spectrum displays the dynamics of research, and the other end virtuously venerates the technical contents of the themes.

A glimpse into the framework of this edition shows how the book serves as a pendulum of research swung between multi-faceted researchers and the underpinning concept of Swachh Bharat. Prominent topics have been studied in depth by various researchers from across the country. The rhythm of researchers has worked wonders in adding knowledge to the existing literature.

This edition is an exceptional emporium of knowledge and serves as a reference material for students, faculty, industry professionals, policymakers, and government officials.

I congratulate the seminar organizing team, the editors, members of the technical committee, and the reviewers for shaping this volume into a fine reservoir of information.

I wish the team great success!

Thank you,

*Parimala e*  
R. PARIMALA  
Principal i/c





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**NATIONAL SEMINAR  
'PRAKRITI AUR SWACHHTA'**  
Environmental Sustainability through Cleanliness

स्वच्छता कार्य योजना 2022  
SWACHHTA ACTION PLAN 2022  
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Welcome  
The Delegates for

**NATIONAL SEMINAR  
'PRAKRITI AUR SWACHHTA'**  
Environmental Sustainability  
through Cleanliness  
under  
स्वच्छता कार्य योजना 2022  
SWACHHTA ACTION PLAN 2022  
on  
16th December 2022























Open Air SwatchItta Awareness Programme for the student of RHA VIIVA Tamilnadu Chapter &





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**ISBN: 978-81-960940-3-4**

# **RRR - The Waste Warriors in “Sustainable Waste Management”**

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## **Abstract**

Waste is generated anytime anywhere. As human life goes on, it is not possible to avoid the generation of waste. The aim, in this situation, is not to avoid the generation of waste –minimize, maybe-but separate it according to the types and avoid paying necessary costs for useless treatment and (just the opposite) get the advantage of gaining income from the waste. Waste reduction can be supplied at the individual level by consuming less, organizing the shopping & daily life consciously, and encouraging re-use and re-recycling at the industrial level; newer techniques which are supported by green technologies such as co-generation in order to regain the energy, zero-waste manufacturing processes, the processes that require less material in the end products, not depending on raw materials. Sustainability can only be executed only if the waste allows getting beneficial revenue. By Separating processing, the wastes accordingly, will give great advantage in solving the waste problem and also derive profit.

**Keywords:** Solid waste management, treatment methods, sustainable waste management, municipal solid waste, recycling, energy recovery, integrated waste management.

## Introduction

The population around the world is increasing, Ireland ted to that, protecting public health and the environment becomes crucial problem. Increasing population means also, increasing garbage which is technically called as “solid waste” or only as “waste”. Semisolid food wastes and municipal sludge may also be included in solid waste. Liquid wastes such as lavatory and bathroom wastes are called as “grey water” or “waste water”, which should also be collected and removed from the public life through sewer system. As there is water supply system to a house, then there should also be sewer system for that house. It is under the ground and if there is no leakage or blocked pipe problem, nobody is aware that their waste water is collected through pipes. However, solid waste is not as lucky as waste water, because it is always in front of the people occupying a great space even in front of their houses. If there is a delay of collecting and removing the solid wastes from the public life, it causes a great social problem that should be avoided. Same as before, if the solid wastes are quickly removed from the public life, then nobody cares of where their waste is going. In order to supply the social peace, local governors spend great effort and high costs for these services to refrain from any problem.



On the contrary, waste can earn money or at least decrease the high cost of treatment by integrated waste management system (IWM). This chapter will discuss the possibilities of sustainability through integrated waste management.

The definition of waste can be very subjective, what represents waste to one person may represent a valuable resource to another (Williams, 2005). All the materials thrown to the garbage will not be taken as waste. Some portion of them can be considered as important

and can be feedstock to some other groups. Technically; “solid waste” means garbage, refuse, sludge, and other discarded solid materials, including solid waste materials resulting from industrial, commercial, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage or other significant pollutants in water resources, such as silt, sand and gravel, dissolved or suspended solids in industrial wastewater effluents, fly ash, cement kiln dust waste, dissolved materials in irrigation return flows or other common water pollutants, drilling fluids, densified-refuse-derived fuel and any toxic or radioactive waste (EPA, 2012).

## **Background**

The discharge of wastes reflects people’s life styles and social activities. Garbage is generated from daily life and social activities and therefore, the district-wise differences may result from industrial structure, physical distribution and people’s consciousness about garbage. In general, the amount of wastes is larger in cities than rural areas. In high economical level communities produce less organic material and ash, ceramics, etc. This gives the idea of “reuse”, before the process of “recycle”, that will be explained further in the following parts. There is a trend as “3R”; as Reduce, Reuse and Recycle. Reducing the amount of the waste should be the first step. Later on, reuse and recycle processes starts. Recently this trend has already turned to “4R” with the inclusion of “recovery” as energy regain.

## **Solid Waste Management & Treatment Methods**

There are many different types of wastes, the classification of waste is difficult since, in many cases, waste is very heterogeneous and there can be great variation in composition. They can be classified according to the generation places as this gives almost same types of wastes and as a result of this, the managing processes are almost similar in each case. The classification of the waste can be done in many different ways and may vary according to who is describing it. However, the best classification can be done according to wherever it has generated although it is heterogeneous, the general characteristic is almost same when generated in the same source. There are mainly four groups (Goren, 2005).

1. Domestic (Municipal Solid Waste-MSW)
2. Medical
3. Industrial
4. Hazardous

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The details of the solid waste types are explained further at below:



##### 1. *Domestic Waste (Municipal Solid Waste-MSW)*

Domestic waste is commonly known as trash or garbage and consists of everyday items such as food wastes, product packaging, garden wastes, durable and non-durable goods like furniture, clothing, bottles, containers, newspapers, appliances and miscellaneous inorganic wastes. This type is generally produced from people's homes, but also comes from commercial, institutional and industrial sources (some certain types). For that reason they are known as municipal solid waste. Municipal solid waste does not include wastes from sources such as water and wastewater treatment plant sludge, combustion ash and such types.

##### 2. *Medical Waste*

Medical wastes also known as clinical waste, normally refers to waste products that cannot be considered general waste, produced from healthcare premises, such as hospitals, clinics, doctors' offices, labs and nursing homes, such as;

- infectious (body parts, medical devices)
- pathological (diagnostic samples, blood, chemicals)
- cutter-driller (needles and syringes)
- miscellaneous (radioactive materials)

Medical wastes are not available for recycling as they have pathological effects. Source separation will bring the biggest advantage to the medical waste for waste management. Usually, they are incinerated and incineration is the most expensive method for treatment. Infectious waste usually comes from a medical care or related facility. It includes all waste materials resulting from the treatment of a patient on isolation (other than patients on reverse or protective isolation), renal dialysis, discarded serums and vaccines, pathogen-contaminated laboratory waste and animal carcasses used in research (including bedding and other waste), and other articles that are potentially infectious such as hypodermic and intravenous needles. Most infectious waste can be treated for disposal by incineration or autoclaving. The residue can be disposed of in an approved landfill. Liquids may be chemically disinfected; pathological wastes may also be buried, if permitted, or cremated; and blood wastes may, under controlled conditions, be discharged to a municipal sanitary sewer provided secondary treatment is employed. Infectious waste may also be rendered innocuous by shredding– disinfection (sodium hypochlorite), thermal inactivation, and gas–vapor treatment. Infectious waste is only one component of medical waste. (Tchobanoglous 2002). The management of medical wastes is directly related with the public health, because of the possibility of spreading the viruses. The cost of healing and therapy is much more expensive than precaution.

### 3. *Industrial Waste*

Any types of wastes come out from manufacturing process. For example; factory wastes, sludge from wastewater treatment plant. There is little similarity in the types of wastes discarded by different industries; however, it can generally be assumed that wastes from industries within the same sector will produce similar wastes. Accurately predicting industrial waste productions is more difficult than predicting residential waste; less information is available because wastes are frequently handled either by the industries themselves or by private disposal contractors and not by municipal or public sources.



The composition of industrial waste is highly dependent upon the industrial practices undertaken at the district. Much industrial waste is relatively similar to commercial and domestic wastes involving packaging, plastics, paper and metallic items.

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However, a proportion of industrial waste arises from chemical operations and uses and this is usually called as “hazardous waste”, “special waste” or “radioactive wastes”. The disposal routes for hazardous and nonhazardous wastes are not same. The procedures for the hazardous wastes may also be different according to the chemical composition of the waste, in order to reduce the toxicity.

#### 4. Hazardous Waste

Hazardous waste is a term used throughout the world to describe waste which is dangerous or difficult to keep, treat or dispose of, and may contain substances which are corrosive, toxic, reactive, carcinogenic, infectious, irritant, or otherwise harmful to human health and also which may be toxic to the environment. Within the countries of Europe, the highest proportion of hazardous waste is derived from manufacturing industry (European Commission 2003). Hazardous household waste is any product that can cause injury or is harmful if handled improperly. These chemicals pose a threat not only to people, but to our environment as well. When chemicals are disposed of improperly, they can find their way into our waste systems and plants that our wildlife need, polluting their food source as well. Hazardous waste can be found in many different areas of your home; from under your sink, out by the pool, and in the garage. They can include but are not limited to: antifreeze, used auto oil, auto filters, car and rechargeable batteries, propane tanks, fluorescent light bulbs, paint, pesticides, some household cleaners, solvents and paint thinners and pool chemicals.



All the wastes should not go to landfill areas, as they occupy too much space in the nature, and also a great percentage of them are available for reusing by direct or indirect methods. On the other hand, there are some infectious, dangerous or hazardous wastes that should be handled with special procedures and technology. The common treatment methods for the wastes in general are as follows;

1. Composting & Biodegradation
2. Incineration
3. Reduce, Reuse, Recycle & Recovery (Energy Regain)
4. Sanitary Landfill

This section will describe the different treatment methods used for the wastes, according to the types of them;

### 1. *Composting & Biodegradation*

Composting is the controlled biological decomposition of organic matter, such as food and yard wastes, into humus, a soil-like material. In this sense, composting can be accepted as another form of recycling. Organic materials inside the wastes start reaction by the help of microorganisms with enough amount of oxygen to form heat and gas. Composting is nature's way of recycling organic wastes into new soil used in vegetable and flower gardens, landscaping, and many other applications. Composting involves conservation of the organic component of solid waste into humus rich material which is a valuable soil conditioner for both agriculture and gardening. Both aerobic and anaerobic microbial decomposition may be used. Solid wastes are decomposed by manpower in the stations and fresh vegetables; kitchen wastes and such kind of wastes are used for composting. This very rich-in-organism compound, is used for soil improvement by adding nitrogen and phosphate. The source of the organic materials in the city life is the food waste and the fresh vegetables that are remaining of the groceries. Grass chipping and the bushes from the trimming also give a great contribution. Organic materials inside the wastes start reaction by the help of microorganisms with enough amount of oxygen to form heat and gas.



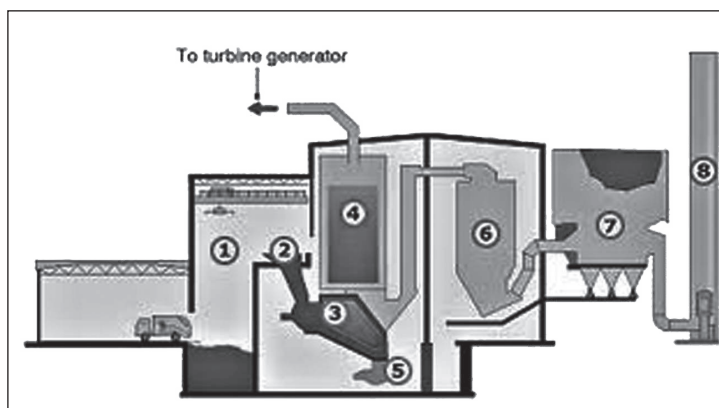


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The composting process implicates preparation of solid waste, decomposition and product preparation for marketing. The solid waste preparation involves receiving, sorting, separating, shredding; removing of plastic, rubber, leather and the like; and moisture and nutrient addition. The composting activity starts with the decomposition of the wastes; however this decomposition should be controlled different than the deposition at the landfill site. The simplest method is windrow composting, in which long piles are prepared that are 1.5-2.0 m high and 2.0-2.5 m wide. Finished compost is ready in two to three weeks. Many proprietary composting processes utilize mechanical digesters with forced aeration, seeding, moisture and nutrient adjustment to accelerate compost production to less than a week. The production of landfill gas from the biodegradation of the organic fraction of wastes such as domestic waste and sewage sludge in a landfill site produces a gas consisting mainly of methane which can be collected in a controlled, engineered way and can be used in a suitable process to form energy and it supplies volume reduction of the organic wastes.

### 2. *Incineration*

To reduce waste volume, local governments or private operators can implement a controlled burning process called combustion or incineration. In addition to minimizing volume, combustors, when properly equipped, can convert water into steam to fuel heating systems or generate electricity. Many wastes, including municipal solid waste, sewage sludge and scrap tires, contain an organic fraction which can be burnt in an incinerator (Williams, 2005). With or without energy recovery, this method is the second largest means of waste disposal in the world. The main problems caused by incineration of municipal wastes are air pollution and the disposal of ash residues. Incinerators exhausted all combustion gases and particles directly to the atmosphere. A variety of pollution control technologies reduce the toxic materials emitted in combustion smoke.



Among these are scrubbers—a device that uses a liquid spray to neutralize acid gases in smoke—and filters, which remove tiny ash particles from the smoke. Burning waste at extremely high temperatures also destroys harmful chemical compounds and disease-causing bacteria. Regular testing ensures that residual ash is nonhazardous before being land filled (Goren, 2005). In modern refuse-derived fuel plants, incineration occurs at extremely high temperatures around 900- 1200 °C (1800-2100 °F) for long enough to minimize the release of pollutants. The combustion of unprocessed solid waste releases 10,000 to 17,000 J/g (coal releases about 23,000 Joule per gram). The volume of the waste can be reduced to about 90 percent in volume and 75 percent in weight. However, most of the developed countries had been using this technology for the treatment of municipal waste for many years. For example, the incineration rates for the whole municipal waste are 80% for Swiss, 70% for Switzerland and 60% for Japan (McBean, et al., 1994).

### 3. *Reduce, Reuse, Recycle & Recovery (Regain Energy)*

All the effort should be spent firstly, not to produce too much waste and using it for some other aims to utilize the unnecessary goods. For that reason, the process is reducing, reusing and then recycling the resting part, nowadays by the technological improvements; regaining energy becomes possible with lower costs that make a system feasible. Source reduction, often-called waste prevention, means consuming and throwing away less.



Waste reduction should start from industry by requiring less material and producing less waste during the manufacturing processes. It can be enlarged to individual by, using long lasting products, producing less waste by conscious shopping and conscious

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kitchen strategy, etc. like purchasing durable, long-lasting goods and seeking products and packaging that are as free of toxics as possible. Reusing, when possible, is preferable to recycling because the item does not need to be reprocessed before it can be used again.

### **Ways to Reuse**

- Using durable coffee mugs.
- Using cloth napkins or towels.
- Refilling bottles.
- Donating old magazines or surplus equipment.
- Reusing boxes.
- Turning empty jars into containers for leftover food.
- Purchasing refillable pens and pencils.
- Participating in a paint collection and reuse program.

Recycling is the collection and separation of materials from waste and subsequent processing to produce marketable products. Recycling turns materials that would otherwise become waste into valuable resources and generates a host of environmental, financial, and social benefits. After collection, materials (e.g., glass, metal, plastics, and paper) are separated and sent to facilities that can process them into new materials or products.

### **Recycle is very important due to the following reasons;**

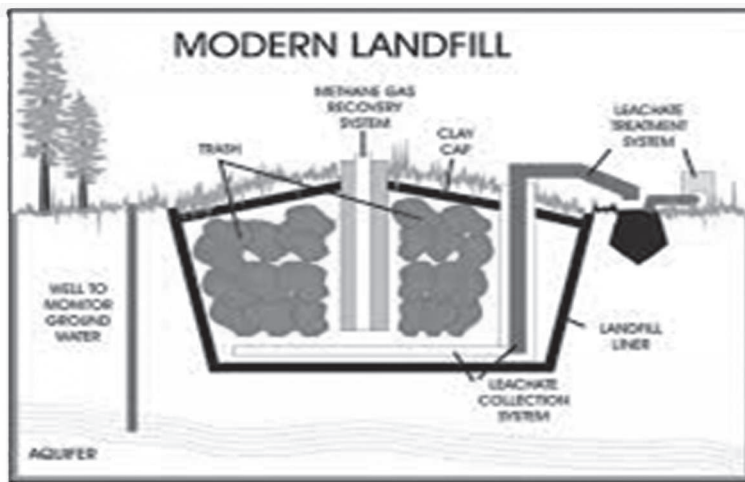
- Recycling reduces the demand for raw materials by extending their life and maximizing the value extracted for them,
- It supplies valuable raw materials to industry and reduces the demand for raw materials by extending their life and maximizing the value extracted for them,
- It reduces disposal impact (if more waste is recycled, less waste goes to landfill or incinerators).
- It prevents the emissions of many greenhouse gases and water pollutants,
- It reduces emissions to air and water in the production process,

- It stimulates the development of greener technologies,
- It saves energy in the production process when compared with the energy consumed in using raw materials,
- It conserves resources for future generations, and reduces the need for new landfills and combustors (if more waste is recycled, less waste goes to landfill or incinerators),
- It reduces the waste and habitat damage associated with the extraction of raw materials,
- It promotes personal responsibility for the waste,
- It creates jobs with no capital,
- Separate collection enables to use the materials which are possible to reuse and recycle,
- Use the material again for other processes as raw material or additive.

Energy can be recovered from waste incineration or the combustion of landfill gas. The energy is recovered via a boiler to provide hot water for district heating of buildings or high temperature steam for electricity generation.

#### **4. *Sanitary Landfill***

Although source reduction, reuse, recycling, recovery and composting can divert large portions of municipal solid waste (MSW) from disposal, some waste still must be placed in landfills. Modern landfills are well-engineered facilities that are located, designed, operated, monitored, closed, cared and 15 controlled for after closure according to the regulations. All the regulations were established to protect human health and the environment. The main problem with waste has come from increased urban population and waste generation, insufficient and limited resources being available for solid waste management and the low professional status of waste management staff. Waste management is an important municipal service and requires high-caliber managers to make complex, authoritative decisions to ensure that a good quality, sustainable operation is achieved.



Landfill gas should be removed and collected from the landfill site to prevent any pollution and explosions. This safety behavior also allows gaining energy from the landfill site. A sanitary landfill is not only an acceptable and economic method of solid waste disposal, it is also an excellent way to make otherwise unsuitable or marginal land valuable. Sanitary Landfill Technology has its own advantages and disadvantages.

**The advantages are;**

1. Where land is available, a sanitary landfill is usually the most economical method of solid waste disposal.
2. The initial investment is low compared with other disposal methods.
3. A sanitary landfill is a complete or final disposal method as compared to incineration and composting which require additional treatment or disposal operations for residue, quenching water, unusable materials, etc.
4. A sanitary landfill can be put into operation within a short period of time.
5. A sanitary landfill can receive all types of solid wastes, eliminating the necessity of separate collections.
6. A sanitary landfill is flexible, increased quantities of solid wastes can be disposed of with little additional personnel and equipment.
7. Sub marginal land may be reclaimed for use as parking lots, playgrounds, golf courses, airports, etc.

Disadvantages of the sanitary landfill technology are related with the applicability of the method to urban areas. The method itself and the results do not have any disadvantages.

1. In highly populated areas, suitable land may not be available within economical hauling distance.
2. Proper sanitary landfill standards must be adhered to daily or the operation may result in an open dump.
3. Sanitary landfills located in residential areas can result in extreme public opposition.
4. A completed landfill will settle and require periodic maintenance.
5. Special design and construction must be utilized for buildings constructed on completed landfill because of the settlement factor.
6. Methane, an explosive gas, and the other gases produced from the decomposition of the wastes may become a hazard or nuisance problem and interfere with the use of the completed landfill.

The cost of a sanitary landfill project consists of not only the capital cost needed for the construction, but also consultation cost of the project before and after the construction. Operating expenditures for the estimated life of the project is one of the main items for the cost. There could be a number of potential sites from which a choice can be made. Site selection must be done after a wide range of investigation with necessary data under the experienced staff. These are some of the main parameter in doing this;

- Site Investigation and Decision,
- Optimum distance to city center
- Conditions; climatic, topographic, geological, etc.
- Safe Efficient disposal of quantities and types of solid waste that are expected,
- Controlling water pollution and movement of produced gas,
- After completion service (park, picnic area, etc.).

## Sustainable Waste Management

In all communities, people produce domestic wastes. Domestic wastes consist of putrescible food wastes, animal manure, ashes from fires, broken tools and utensils and old clothing. In an agricultural community this waste is readily reabsorbed into the natural cycle. Domesticated animals consume the food remains and the other waste materials rapidly decompose. According to the statistics, waste generation per person is around 0.4-0.6 (kg/cap/day) for lower-income countries, 0.5-0.9 (kg/cap/day) for middle-income countries and 0.7-1.8 for higher-income countries. It is a general fact that, the municipal waste generation per person in high-income countries is much greater than for lower-income countries, it is almost double in higher-income countries. However the waste densities and moisture contents decrease in higher-income countries. The suitability of the waste for recycling is called as “quality of the waste”. It is directly related with the moisture content, biodegradability, calorific value and densities (Goren, 2005). The moisture content is the percentage of the weight of water in the waste.



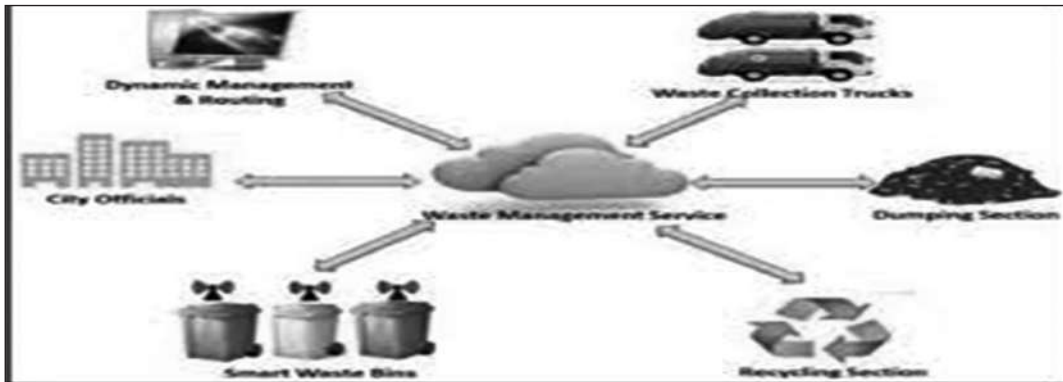
The proportion of biodegradable material in the total waste is a good measure of the amount of bio-degradation possible and hence the potential leachate or gas production that the waste is likely to produce once put into a landfill. Calorific value is the amount of heat energy that can be produced if all of the combustible components of the waste are burned. Waste prevention can be done by source reduction. It can be a successful method of reducing waste generation.

## Solutions and Recommendations

Most of the increase in municipal solid waste generation rate is due to population growth. However, day by day each person is also generating more waste on an average. The discharge of wastes reflects people's life styles and social activities. As larger numbers of people have become more dependent upon others for basic foods and services, and people have valued leisure time and convenience, the need for packaged goods has increased.



Municipal solid waste generation will continue in increasing unless source reduction starts. The discharge of wastes varies from district to district and time to time of the year. Factors influencing the characteristics of municipal solid waste are climate, social customs, per capita income and degree of urbanization and industrialization. In general, the amount of wastes is larger in cities than rural areas. In high economical level communities produce less organic material and ash, ceramics, etc.



**Solid Waste Management Solution**

The waste that contains high organic material, the compost technology itself can be a part of the solution by contributing the sustainability in such economic benefits;

- Results in significant cost savings by reducing the need for water, fertilizers, and pesticides.
- Produces a marketable commodity and a low-cost alternative to standard landfill cover and artificial soil amendments.
- Extends municipal landfill life by diverting organic materials from the waste stream.
- Provides a less costly alternative to conventional bioremediation techniques.

Gas is produced naturally when solid wastes decompose no matter it is sanitary landfill or open dumping site. Biological activity within a landfill follows a set pattern. Solid wastes initially decompose aerobically, but as the oxygen supply is exhausted, anaerobic microorganisms predominate and produce mainly 20 methane gas ( $\text{CH}_4$ ). The gas produced by decomposition of landfill wastes can be used for energy production. If production of gas proves commercially feasible, gas recovery facilities may be installed to the landfill sites. These facilities may produce electricity or upgrade them to pipeline quality by removing contaminants and sell as the natural gas.

Economists have defined that; it is cheaper to throw away any material than to use it again. In order to avoid such problem, nowadays one more “R” is added to the situation as “recovery”. The main idea behind this is to generate energy from the waste. Large-scale waste treatment and disposal projects, whether mass-burn municipal solid waste incineration, waste landfill, or hazardous waste treatment facilities, require a large-scale investment. Private sector finance, particularly for the larger projects, would require bank loans, secured against on-going company profits and assets. The risks for such a loan lie with the borrowing company (Chappell 1995).

Analysis of existing waste management systems, to assess the sustainability, is also very important issue in terms of efficiency. How can existing waste management systems be converted to sustainable waste management system. This question should be asked and analyzed in the sense of technical, financial, social, legislative and environmental aspects. This will help the system to brush up.

## **Future Research Directions**

Wastes caused by public or industrial activities are harmful to public health directly or indirectly. Uncollected or uncontrolled wastes may create many infectious with the respiration. Refuse disposal by the major towns is crude dumping, and where burial is practiced it is very minimal and does not serve the intended purpose. Site selection is usually based on a minimal understanding of the potential effects on surface and ground water resources. Some dumping affects both water quality, and the health of the people and domestic animals. Much of the rural population still depends on surface streams for drinking water. Rural, urban and peri-urban areas are at risk where uncontrolled dumping occurs because scavengers commonly scavenge for food, or other items useful to them.

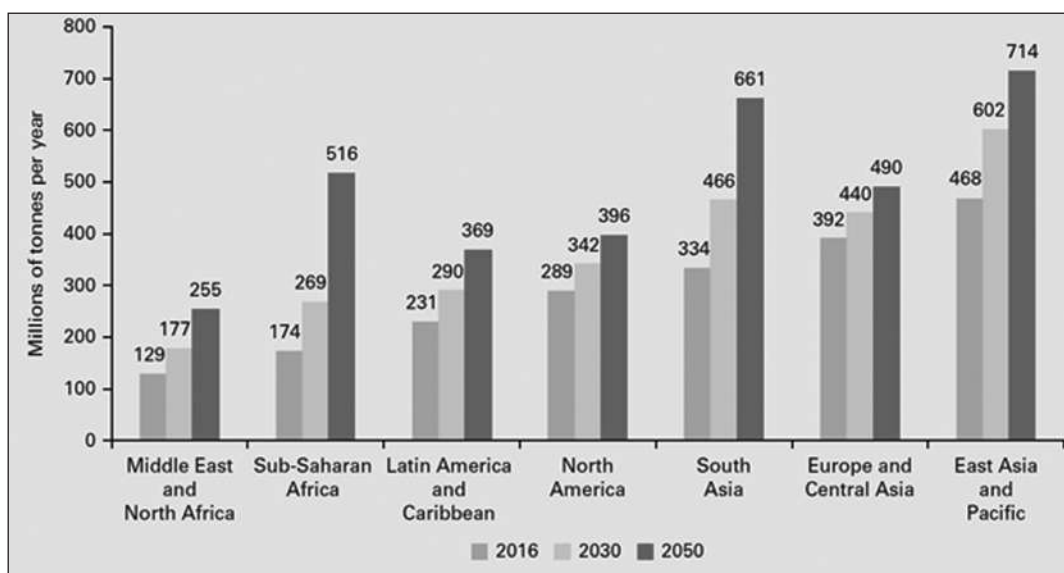
The possible presence of chemical, expired drugs or spoiled food poses a greater risk. The lack of such services is a cause of ill health. Insufficient control, monitoring and maintenance of many urban areas have had a detrimental effect on the natural environment

Every year more than five million human beings die from illnesses linked to unsafe drinking water, unclean domestic environments and improper excreta disposal. As a result, this problem is not only a matter of environment but also related public health aspect. For that reason, any precautions to be taken should be systematic, environmental friendly and cost-effective. These costeffective solutions are the key points for the sustainable waste management systemThe EU Waste Framework Directive defines waste as “any substance or object which the holder discards or intends to discard”. For recycled goods, when they change from being a “waste”, with the consequent legislative and handling requirements expected of a waste, to when they become a recycled product or “good”, is in some cases not clear cut.

## Conclusion

Environmental problems such as pollution, solid waste, waste water treatment always consume great amount of costs to handle with. However, the technological improvements made it possible to benefit from environmental issues with less cost and less problem. Further developments in technology will produce economically sustainable waste management system. Different techniques for treatment are now possible for the same type of wastes, and they can be evaluated easily according to the situation and type, quantity and specifications of waste. Environmental sustainability means that the options and integration of those options should produce a waste management system that reduces the overall environmental impacts of waste management, including energy consumption, pollution of land, air and water and loss of amenity.

The source separation for household and industrial waste is almost the key point for lowering the cost of the waste handling. This is the separation of household waste into recyclable and non-recyclable materials in the house. The activities of collection, separation, processing and transformation of solid waste bring great cost to the total management and also it is not possible to avoid or find alternatives for these items from the system.



**Projected Waste Generation, by Region (millions of tonnes /year)**

Depending on the technology, the waste can be processed to produce not only energy, but also gas or oil products for use as petrochemical feedstock and/or a carbonaceous char for use in applications such as effluent treatment or for gasification feedstock. The production

of storable end products such as a gas, oil or char, enables the possibility of de-coupling the end use of that product, either for energy production or petrochemical use from the waste treatment process (Williams 2005).

In order to achieve a sustainable waste management, all types of wastes such as sewage sludge, industrial and agricultural wastes and demolition wastes should be treated in order to embed them to economic life. The well-educated designers can use the advantage of choosing the viable treatment system to make the project feasible. From this, it is clear to understand that waste management is not only a technical issue, but also a political and economic issue.

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**ISBN: 978-81-960940-3-4**

# **Redesigning a Portable Biogas Plant for Households - Promoting Swachhata and a Sustainable Environment**

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## **ABSTRACT**

The world's supply of fuel is in danger due to the paucity of petroleum. The fact that biogas methane can be used to successfully combat this threat has led to the development of numerous biogas production techniques. To combat these dangers, typical biogas facilities using sewage, municipal solid waste, spent distillery wash, or animal dung are used. However, due to the decreased calorific value of the biogas and lower methane output, these plants are inefficient. It's crucial to highlight that, in contrast to cow dung or other animal waste, a lot of kitchen trash also has the potential to make biogas but is frequently not used properly. Our project's primary goal is to set up an experiment for the production of biogas using various kitchen wastes as feedstocks. These home digesters are a blessing for rural and agricultural communities to meet their energy needs. These digesters generate useful energy in addition to reducing waste, which is one of their two main functions. Even though they have been in use for a long time, upgrading is required to permanently remove the shortcomings. Household digesters may offer even more advantages if people are aware of their technical problems and if the government implements subsidy programs. And thus we have experimented the process through this research.

**Keywords::** Bio gas, Digesters, Energy, Experiment.

## **Introduction**

Biogas is a gas mixture consisting mainly of methane, carbon dioxide, and hydrogen sulfide, produced from raw materials such as agricultural waste, fertilizers, municipal waste, plants, sewage, green waste, and food waste. is a renewable energy source. Biogas is mainly methane ( $\text{CH}_4$ ) and carbon dioxide ( $\text{CO}_2$ ) a small amount of hydrogen sulfide ( $\text{H}_2\text{S}$ ), moisture, and siloxanes. The gases methane, hydrogen, and carbon monoxide ( $\text{CO}$ ) can be burned or oxidized with oxygen. This release of energy allows biogas to be used as fuel. Can be used for any heating application such as fuel cell or cooking. It can also be used in gas engines to convert gas energy into electricity and heat.

Biogas is produced by microorganisms such as anaerobic methanogens and sulfate-reducing bacteria. Biogas refers to natural and industrially produced gas.

Anaerobic digesters that process agricultural waste and energy crops are often called biogas plants. It can be made using anaerobic digesters (airtight tanks of various configurations). These plants can be fed with energy crops such as corn silage or biodegradable waste such as sewage sludge and food leftovers. During the process, microorganisms convert and digest biomass waste into biogas (mainly methane and carbon dioxide). Large amounts of biogas can be produced when wastewater is fermented together with other residues from the dairy, sugar, or brewing industries. For example, mixing 90% brewery wastewater with 10% cow whey resulted in a 2.5-fold increase in biogas production compared to biogas produced from brewery wastewater alone. It can stop possible sources of environmental contamination and the spread of infections because they also serve as a system for disposing of waste, notably human waste. The biogas method is especially useful for treating animal waste and kitchen waste in agriculture. There is a room in the anaerobic reactor where various chemical and microbial reactions happen; the chamber should be airtight and watertight. Several technological changes have been made in recent years to reduce the cost of producing biogas. Methods have been developed to, among other things, reduce the size of the digester, use durable materials for their production, alter the materials that the bacteria feed on to ferment, modify how the effluent is discharged for best employment, and increase the speed at which the bacteria produce gas. The tools used in housing were successfully designed.

## **Objectives**

- Create a family-sized biogas plant to make fertilizer and methane from organic waste like kitchen garbage (Plant leaves, Waste fruits).
- To avoid processing kitchen garbage at the plant, this biogas plant may be transported to any location.

- This project uses anaerobic digestion as a sustainable technique to reduce the amount of organic waste from kitchens that end up in landfills, to create a renewable energy source, and to potentially lower greenhouse gas emissions from landfills.

## Review of Literature

Biogas and its process has been known for a long time and has a great history as well. The first mention of biogas is mentioned by Pliny and relates to mystical flames emerging from swamps and other subterranean locations. At the time, this observation was attributed to dragons or other mythical phenomena. Additionally, anecdotal evidence suggests that biogas was used to heat bath water in the 10<sup>th</sup> century. The foremost attempt to explain the process of biogas was made in 1777 by the Italian physicist and chemist Alessandro Volta, who discovered methane in the marshes of Lake Maggiore. Cruikshank then proved the absence of molecular oxygen in methane in 1801, and Dalton provided the correct formula for methane in 1804. In the second half of the 19<sup>th</sup> century, a systematic investigation began in which the microbiological foundations of the AD process were laid. Bechan in 1868 was the first to show that methane originated from microbiological processes. Shortly thereafter, the polymer was hydrolyzed by enzymatic activity to produce an organic acid as an intermediate. In the early 20<sup>th</sup> century, in 1906 to be exact, Omelianski, especially the Dutch microbiologist Söhngen, demonstrated that methane-reducing bacteria could directly utilize the products of cellulose fermentation (formic acid, acetic acid, ethanol, etc.). showed hydrogen and carbon) carbon dioxide). Attempts have also been made to gain knowledge about the microbes involved in different stages of the Alzheimer's food chain. It is striking that the mechanisms of the recent trend in anaerobic digestion associated with biogas upgrades were first formulated over 100 years ago.

The first methanogenic microorganisms isolated in 1936 were *Methanobacillus omelianskii*, *Methanobacterium formicicum*, *Methanosarcinabarkerii*, and *Methanococcus Vannelli*. Since then, a deeper knowledge of the AD process has emerged. Coming back to technological progress, we know that septic tanks were introduced after 1860 to stabilize sewage. A septic tank was designed by Donald Cameron in 1890, and the biogas produced therefrom was reportedly collected and used to light the streets of Exeter, England. The first AD facility was built in 1859 at a leprosy colony in Bombay, India.

Indian biogas is traditionally based on dairy fertilizers as feedstock and these 'gobar' gas plants have been in operation for a long time, especially in rural India. Over the past two to three decades, research organizations focused on local energy security have improved the design of the system, resulting in newer, more efficient, and lower-cost designs such as the Deenabandhu model. The Deenabandhu model is a popular new biogas production model



in India. (Deenabandhu means “friend of the helpless”.) Units typically have a capacity of 2-3 cubic meters. It is made of brick or a mixture of iron and cement. In India, brick models are slightly more expensive than ferrocement models. However, India’s Ministry of New and Renewable Energy offers some subsidies for each model produced. Biogas, primarily methane/natural gas, is economical for villages to produce high-protein cattle, poultry, and fish feed by cultivating bacterial cultures of *Methylococcus* encapsulates on small land and water footprint. The carbon dioxide gas produced as a by-product of these plants can be used for the inexpensive production of algal oil or spirulina from algal crops, especially in tropical countries like India, which is expected shortly. The federal government of India is promoting the productive use of agricultural waste or biomass in rural areas to boost the rural economy and employment potential and has led several implementation programs. These plants convert non-edible biomass or edible biomass waste into high-value products without water pollution or greenhouse gas (GHG) emissions.

The collection and use of biogas, especially on a large scale, has steadily improved due to advances in technology, including materials and design, computerization, automation, and life sciences. But these efforts to improve the capacity of modern biogas plants add management complexity and additional costs. A modern biogas plant represents a significant investment and to maximize the return on that investment, each stage of the process must be carefully planned and managed.

### **Why Bio gas is the Need of the hour?**

The use of renewable energy has become important to reduce our environmental impact. Disposing of food waste in landfills is a major contributor to greenhouse gas emissions and climate change. The procurement of biogas is the perfect solution to face our environmental problems. Bioenergy is an environmentally friendly energy source, so it can significantly reduce greenhouse gas emissions. Biogas has the power to supply enough energy for the world. Even the small amount of food waste that we throw away can be put into a food waste disposal system to generate bioenergy. This energy can be used as cooking fuel, organic fertilizer, and most importantly generate electricity. It is toxic Free that is biogas burns without smoke. Therefore, harmful gases such as  $\text{CO}_2$ ,  $\text{CO}$ ,  $\text{NO}_2$ , and  $\text{SO}_2$  are not generated. Fertilizer accumulated after biogas production is used as field fertilizer and hence reduce landfill. The disposal process is safe and efficient, so no space is wasted in landfills. Biogas plants have very low installation costs and are self-sufficient within 3-4 months. It creates job opportunities for thousands of people, especially in rural areas as it is labor-intensive. Above all, it is a renewable energy source as its production relies on waste generation, a never-ending process.

## **Drawbacks of Biogas**

Biogas isn't universally accepted because of many reasons. The first con is that it is not efficient enough at a large scale because it is difficult to increase the efficiency of biogas. Biogas contains impurities, that are difficult to control even after repeated washing also compressed biogas used as fuel has proven to be highly corrosive to vessels and they are said to be highly unstable and dangerous as methane reacts violently with oxygen to produce carbon dioxide. The highly flammable nature of methane makes it prone to explosions. It also emits a foul odor if the plant is poorly designed or managed inefficiently.

Recent challenges in biogas production and its conversion to electrical energy. A pressing issue like "climate change" has captured the world's attention. Human burning of fossil fuels due to increased energy demand in various sectors is one of the main factors affecting climate change.

## **Methodology**

This research paper is experimental research followed by Qualitative analysis. The data is gathered from both primary and secondary sources, the primary sources are Questionnaires, Secondary sources are intermediate-level science books.

A good replacement for firewood, manure, agricultural waste, gasoline, diesel, and power is biogas. In college dorms and canteens, food scraps such as rice and posho, bakery scraps, raw leafy vegetables like cabbage leaves, fruit peelings such as sweet bananas, bananas, and papaya, etc. were thrown out since they were unnecessary and unwanted. Municipal solid waste was used to dispose of these wastes. It is possible to make an effort to use such wastes effectively to produce an eco-friendly fuel that can be used in college dormitories and canteens for cooking. Municipal solid waste was used to dispose of these wastes. It is possible to make an effort to utilize such trash successfully to produce an eco-friendly fuel that may be used in college dormitories and canteens for cooking. The leftover residue from the digester, known as digestate, is used as manure and for other agricultural applications. The kitchen wastes are used as inputs for the plant. The construction of the kitchen waste biogas plant, which provides enough fuel for the kitchen's needs, is located close to the college's dormitories and canteen facilities.

## **Principles for the Production of Biogas**

Organic materials come in a vast range, including both living and extinct animals. Carbon (C) and other elements like hydrogen (H), oxygen (O), nitrogen (N), and sulfur (S) combine to form a range of organic molecules, including carbohydrates, proteins, and lipids. In the natural world, MOs (microorganisms) break down complex carbon into simpler compounds

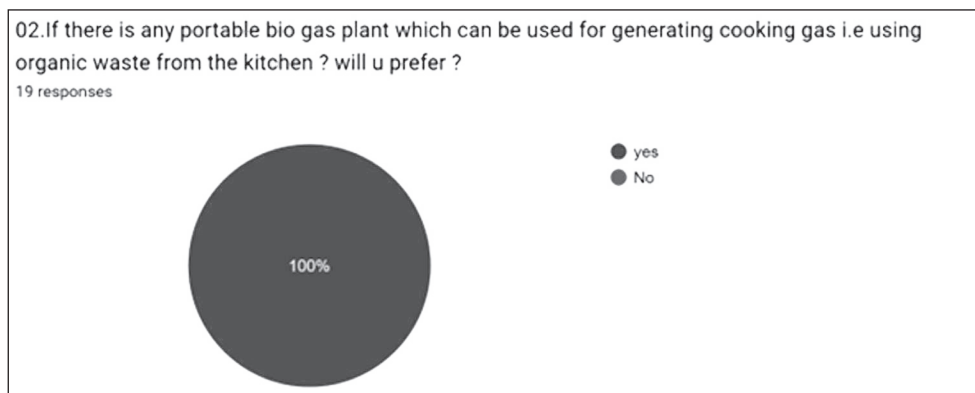
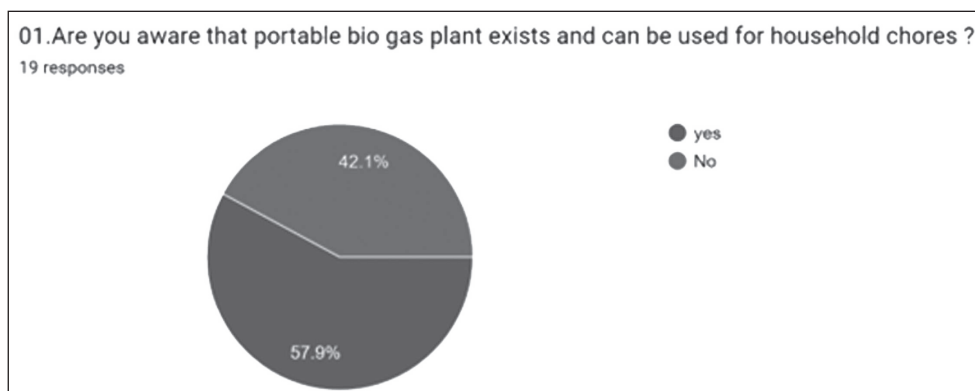
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through the digestive process. Anaerobic digestion and aerobic digestion are the two different types of digesting processes. Aerobic digestion is the term for the digestive process that takes place in the presence of oxygen and results in mixtures of gases that contain carbon dioxide (CO<sub>2</sub>), one of the main “greenhouses” responsible for global warming. Anaerobic digestion is a type of digestion that takes place in the absence of oxygen and produces a variety of gases. When burned at standard room temperature, the gas, which is primarily composed of methane, yields 5200–5800 KJ/m<sup>3</sup>, making it a viable alternative to fossil fuels that is also environmentally beneficial (non-renewable).

### Data Collection

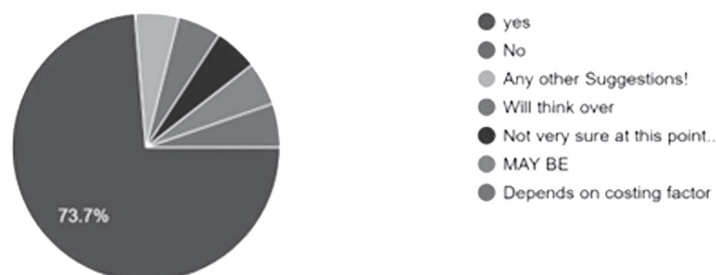
Data was gathered to determine awareness of the portable biogas plant and to understand each respondent's viewpoint.

The following are the queries we created to gather the data.



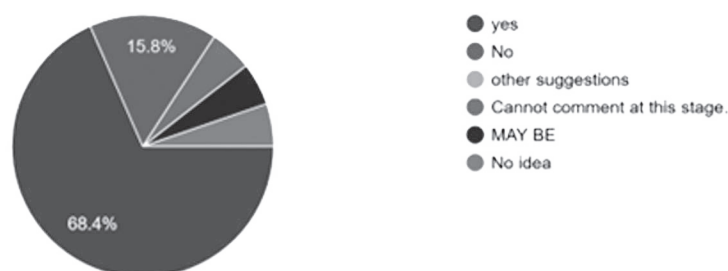
03.If it available in the market will u prefer it for your personal kitchen ?

19 responses



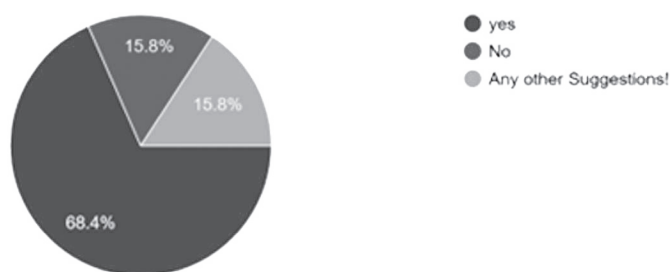
04.Do you think question of safety is being addressed in bio gas plant

19 responses

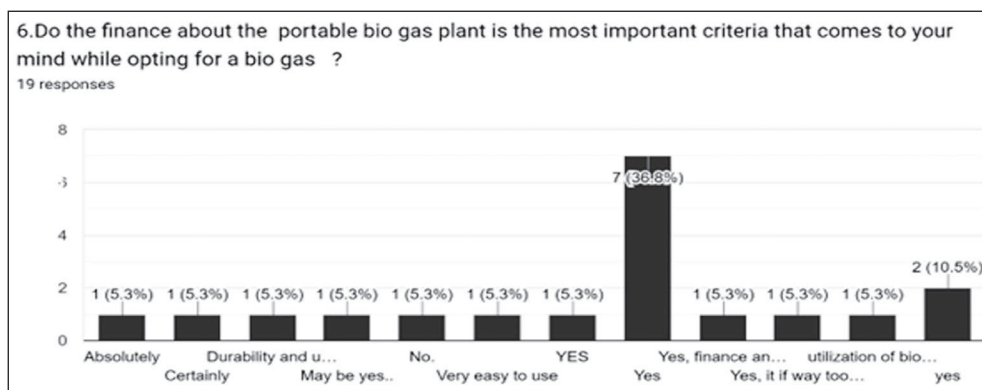
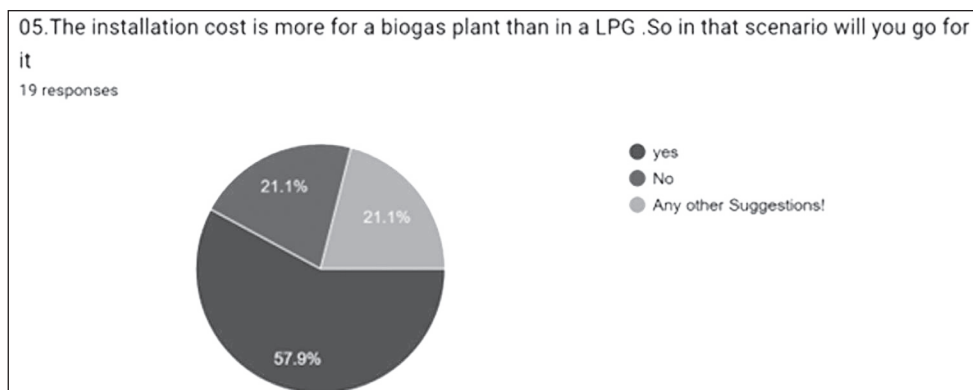


04.Do you think question of safety is being addressed in bio gas plant

19 responses



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## Result and Analysis

After analysis of the response, we got to know the level of awareness about portable biogas. According to the majority of respondents, people are intrigued by the idea of portable biogas plants that can turn organic kitchen waste into usable biogas because they want to play a role in sustainable development. In addition, over the long term, these plants have shown promising results and can lessen people's reliance on LPG cylinders.

The ideal way to manufacture biogas can be better understood through additional experiments.

### 1. Experiment

- 50 grams of kitchen waste and cow manure in a 2-liter bottle Rest water (1.5 liters)
- Gas production was discovered but not quantified as a result.

*Akash Halder & Jayitri*

## 2. Experiment

Different collections of 1 and 2-liter bottles.

As seen below, three distinct sets with various compositions are installed.

1. To make one liter of slurry, 200 grams of cow dung were combined with one liter of water.
2. To create a 1-liter solution, 50g of the ground-up kitchen was combined with 150g of cow dung. A 1-liter bottle was then filled with the solution.
3. To make a 2-lit bottle of slurry, 400g of cow dung was combined with water.

## Results

Gas is produced in each of the three sets, and the gas burns with a blue flame.

## The Makeup of Kitchen Waste

In several instances, the typical makeup of kitchen garbage was examined. Uncooked vegetable and fruit waste made up more than 50% of the garbage. At 1.5% and 1.2% of the mass, raw meat and eggs were the main sources of pathogens and there was also 15% cooked meat present.

## Discussions

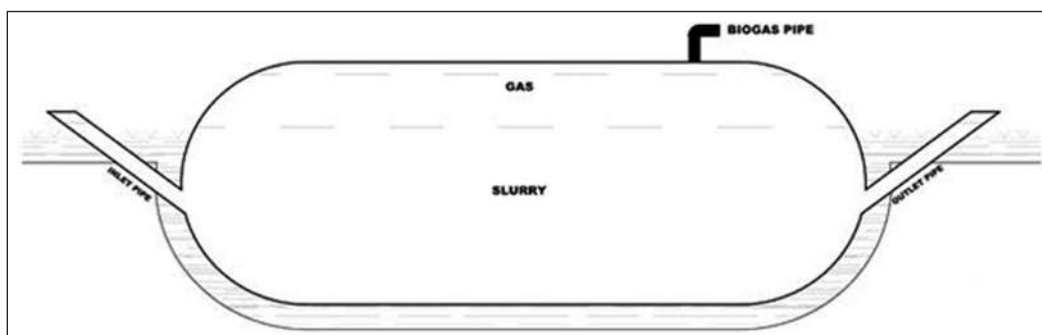
The results show that set 2, which includes kitchen garbage, releases more gas than the other two sets. The average amount of gas produced in set 2 with kitchen trash is 250.69% more than in set 1 (with 200gm cow dung) and 67.5% more than in set 3. (With 400gm cow dung). Consequently, because kitchen waste has more nutrients than cow dung, it creates more gas than the latter. Therefore, using kitchen garbage to produce biogas is a more effective way.

A portable biogas plant might be designed and installed similarly to how LPG cylinders are installed in kitchens once the data gathered and experiment performed were analyzed.

The facility's biogas plant is a two-part system. One is a fixed type, while the other is a floating gas holder type. The floating kind consists of two PVC water buckets, one larger than the other (with a capacity of 30 liters and 20 liters, respectively), with the tops of each bucket cut open to allow the smaller bucket to fit inside the larger one and move like a "telescope."

The smaller bucket (or drum), put upside down inside the larger one, serves as the gas holder. The larger bucket (or drum) acts as the digester. The bottom side of the larger tank is fitted with a flexible inflow pipe, which is somewhat longer than the height of the tank. The bigger tank's upper portion, where the effluent exit is installed, controls the tank's maximum level of matter. The smaller inner tank's gas outlet is attached to it and is pointed at a gas burner.

As a portable model, the plug flow type or tubular model was created. It consists of an inclined, long, thin tank with an aspect ratio of 5:1, with the intake and outlet located on the opposite side and over the ground. The digestate flows toward the outlet as a result of the inclination; this two-phase arrangement allows for the longitudinal separation of acidogenesis and methanogenesis. The system needs insulation to maintain a proper process temperature, and often the digester's top is covered with a shed roof.



**Figure 1: 30Kg Portable Bio Gas Plant**

Additionally, it was discovered that the family consumes 0.2 kilograms of LPG each day, or 12/60 kg. (Calorific value is a unit used to describe how much heat a certain quantity of fuel or food produces. Typically, it is stated in joule per kilogram.) Consequently, 10J of energy is used each day. Therefore, once the methane cycle is initiated, a small household will have enough gas to meet their needs for coking, and any extra gas can be used for other purposes, such as heating water.

## **Research Gap**

Due to time constraints, a thorough examination of the production of biogas from several alternative feedstocks was not possible; consequently, there is room for further in-depth studies, including

- Gas generation effects for various feedstock-to-energy ratios.
- A comparison of several biodegradable trash types.



## Conclusion

- Based on the outcomes, it is possible to draw the following conclusions:
- It was discovered that biogas may be produced from the following feedstocks even in low-temperature environments.
- Food scraps from the kitchen, including cooked rice and posho, peels from delicious bananas, vegetables, vegetable table, raw: (Tomato, cucumber, green chili, radish leaves, cabbage leaves).
- Even though there is a bigger amount of food and vegetable waste created in hostels, it can still be degraded through the production of biogas.
- Kitchen garbage dumped in a public space encourages the growth of harmful bacteria and insects, which lowers the quality of living conditions for people.
- Biogas produced in this way can be used as a fuel for cooking and, if produced in big enough quantities, can be used to produce electricity.
- Sludge that is periodically removed serves as excellent organic manure and is highly effective at fertilizing the land.

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**ISBN: 978-81-960940-3-4**

# **Rethinking Hospitality Sustainable and Tourism Clean Drive for Future**

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## **Abstract**

Numerous visitors calculate on internet reviews to decide whether to visit a business – and just a couple of displeased guests participating in their online can snappily put you out of business. Without compromising the overall guest experience to save cost and the terrain. To achieve this, hospices can consider espousing technologies that enhance effectiveness while conservating it. draw the terrain is the key to the actuality and survival of life on earth. Guarding the terrain, natural coffers, and wildlife. furnishing socio-profitable benefits for communities who live in sightseer destinations. Conserving artistic heritage and sightseer. A print that effects will be handled professionally and the sightseer lodestones are being taken care of and are in great condition which will attract indeed the people who are passionate about taking care of the terrain. Every other thing is done through online mediums, people prefer using contact-less styles. The major of the learning is to understand the Sustainability of tourism and cleanliness in the tourism sector. To determine the Competitiveness in the tourism sector and the arising digital technologies for unborn tourism and identify the Trials of Hospitality tourism and Effective tourism.

**Keywords:** Sustainability; Sustainable Tourism, Effective Tourism.

## Introduction

“Sustainability” is a tenure that has been interpreted in history as environmental issues that impact profitable growth. Recent understandings of sustainability include socio cultural factors (Dempsey et al, 2011). Sustainability involves the integration of social and environmental factors with profitable considerations; it’s an extension of the” triadic nethermost line dimension of sustainability performance (Stoddard, 2012). Supported offering classes that educate scholars to make business and fiscal opinions that consider social and environmental liabilities, as well as profitable enterprises (Giacalone, 2006) Sustainability education, thus, incorporates three major confines social, environmental, and profitable (Wade, 2008, Málovics 2008). Sustainable tourism is an important issue given the limits assessed on the mortal frugality by the ecological system., if any, man’s fancy, performing in the expansion and prolixity of antiseptic skills, increased the viability and sustainability of the Caribbean model of tourism diligence. “The use of cleaner machinery impacts approvingly upholding a justifiable tourism assiduity”. This analysis of the use of clean technology in the tourism sector is an important demand. Caribbean tourism needs to be sustained to insure the profitable survival of the region. Then, it’s future to show that the custom of pure technologies is causative, or can donate to the bearable this assiduity. This will encourage sweatshops to promote the use of these technologies (Yaw, 2005). Three investor groups of warmth scholars, assiduity professionals, and preceptors, (Deale, Barber, 2012) set up differences among the three groups in environmental stations and actions, as well as in beliefs about what and how sustainability motifs should be tutored. nonetheless, sustainability was perceived as pivotal in education by the three stakeholder groups. Another U.S. study that particularly examined the perspectives of hospitality assiduity directors indicated that hospitality sustainability education should be delivered in a further comprehensive way. The focus should go beyond a single dimension of sustainability, i.e., guarding the terrain; rather, it must consider realistic business surroundings, to effectively apply sustainability generalities to operations, finance, and socio-artistic operation (Millar & Park, 2013).

## Review of Literature

Adding demand for sustainable tourism and ecotourism products has come hand in hand with green washing exams and attempts to overcome these (Goodwin and Francis, 2003) instrument is one system of spelling out and operationalizing delineations of sustainable tourism. The paper explores the triumphs and encounters of five programs operating incompletely or wholly in developing countries that have introduced socio-profitable criteria to complete the analysis suggests that social norms are nebulous; the assessment methodologies are inconsistent and open to interpretation; there’s considerable variation on

what's understood as sustainable depending on the type of tourism companies targeted, and the programs working more intensively on social issues will have the topmost challenges to expand (Font and Harris, 2004). A major environmental issue, and sustainable tourism. The analysis of the case studies designates those uncontaminated technologies. It also set up that there a Caribbean tourism cluster concentrated on developing an environmentally sound tourism product (Yaw, 2005).

The converse of sustainable tourism highlights references to the pool within the United Nations' 2030 Schedule for Maintainable Development. The discussion follows the arising field of sustainable mortal resource operation and the donation that this can make to a meeting on the UN Workable Growth Goals and enhance the recognition of pool and service issues within the united debate in tourism. The body of the paper highlights exemplifications of crucial confines of effort and service across varied travel environments where sustainability is of added consequence and significance. Concludes by drawing together the counteraccusations of these "mini-cases" and locating them within crucial principles of the 2030 docket for Sustainable Development (Baum, 2016). Along with the mortal-affiliated problems associated with purlieus, slums beget serious impacts on the terrain and natural coffers. Adopts a conception of investing in the slums' community in confluence with emerging a thorough frame grounded on the trio masts of sustainability, frugality, society, and terrain. The investigation is guided by a set of successful practices of numerous developing countries. The objects of this paper are; slipping light on the positive mortal power of slum resides, propagating stylish practices on sustainable approaches, from which it can be developed and acclimated to fit in the environment of the civic slums of developing countries, and furnishing a comprehensive frame for developing sustainable slums (Elrayies, 2016) unnaturally embedded in real global issues, and frequently inadvertently and implicitly sustains the medium of ultramodern global capitalism. Though accountable travel has been an important unifier among tourism sponsors, haven't yet been given sufficient robust reflection (Burra et al, 2019)

Focuses on establishing an abstract grounding for the value of quality in tourism employment for achieving decent work as a share of the sustainable development docket. quality is extensively conceded as a crucial motorist for 'good' work, but little abstract grounding on the value of quality in tourism employment has been established. The theoretical debate on sustainable tourism by furnishing a critical review of fabrics for decent work, plant quality (or its absence), and understanding of identity. To offer staid and sustainable employment. This paper makes two original benefactions to knowledge. First, it introduces a psychosocial understanding of quality in tourism employment, shiny its extremely confirmed existent, organizational, societal, and policy aspects, and feting the actors involved. Second, the critical significance of quality in tourism engagement for realizing the (SDGs) is banded, with unborn exploration directions allied (Winchenbach et al, 2019).

Enforcing a vision of sustainable development in tourism has aroused great interest, especially in recent times (Williams et al 2020), (Jones, 2016). still, (Ertuna et al, 2019) point out that exploration of the perpetration of a feasible visualization in the field of tourism isn't veritably expansive, emphasizing the need for a comparable survey. The studies concentrated on distinct areas of tourism assiduity the hostel sector (Guix- Navarrete et al, 2019), the association of sails (Bonilla- Priego et al, 2014) the exertion of caffs (Cavagnaro and Gehrels, 2009), theme premises (Milman et al 2010) the association of events and lower (Boggia, 2018) on the entire sightseer exertion (Jørgensen et al, 2019). still, several papers study how sustainability has been addressed in the hospitality assiduity, papers that propose exploration motifs or fabrics to bolster sustainability in tourism (MacKenzie, 2019), (Jones, 2019), (Boluk, 2019), (Gössling and Hall, 2006) show that tourism has a significant donation to global climate change, although, through ecotourism, tourism can also appreciatively change the terrain on a small scale.

Challenges some demesne of the conventional belief that levy tourism is a form of sustainable tourism. Different levy tourism stakeholders, this paper examines levy tourism practices through the sustainability trio frame(frugality, culture, and terrain) and also extends the discussion to ethics of care by proposing the sustainability triangular aggregate. In doing so, this paper suggests the input of care can potentially strengthen the three pillars in the sustainability trio, which might in turn help to make a more flexible future for the individualities and host communities in levy tourism as a whole (Lee and Zhang, 2020) Tourism and hospitality preceptors have been virtualizing all aspects of their work for a long time. Some have also been experimenting with suberising their profession (Collins, 2020).

Tourist destinations have espoused exigency measures and restrictions that have affected the mobility of individuals around the world. strands and resorts were empty, metropolises were deserted, people's arrangements were stationary, and trip among different homes was rigorously controlled. COVID-19-caused counter blockade around the world has harmed people's livelihoods and the world's frugality. This study aims to dissect the goods of the COVID-19 wide-ranging tourism assiduity and overall profitable performance. Grounded on the exploration results and exploratory exploration of the works, manufacturing manner some events to insure the adaptability of the tourism sector during the COVID-19 prevalent period (Värzaru et al 2021). Produce farming that dodges a growth authoritative while still subsidiary mortal thriving. Tourism as a crucial hand of capitalism is intertwined in these issues and recent enterprises with "over-tourism" are only one indication of delinquency. This composition presents abstract supposed problems of de-growth in the vacation industry. It examines current pressures in transnational flexibility and contends just and sustainable degrowth will bear lesser attention to equity. Analysis advises that indispensable to such a docket is reconsidering tourism to concentrate on the truths of original communities and

rebuilding the social capacities of tourism. This composition argues for the redefinition of tourism to place the rights of original communities above the rights of excursionists for leaves and the rights of tourism corporates to make gains (Higgins, 2019). Research has exfoliated light on how to travel participants can create tourism programs to respond to sustainability issues using the recognized progression. To grow a positive bearable tourism operation plan, we propose that the plan should correspond to three aspects environmental, social, and profitable. The findings from this exploration offer assistance to holiday business stakeholders about the world for reforming supportable tourism operations to take care of magnetic tourism coffers after the COVID-19 eruption (Pongsakornrungrungsilp et al, 2022)

## **Objectives of the Study**

1. To understand the Sustainability of tourism and cleanliness in the leisure industry and Kindness sector
2. To determine the Competitiveness in the tourism sector and the arising digital technologies for unborn tourism
3. To identify the Trials of Hospitality tourism and Effective tourism.

## **Methodology**

Primary data on the motives were collected using a check system and the instrument used was an unprejudiced, structured questionnaire. Tributary statistics were together from colourful journals, books, and the internet. A quantitative check was proposed in December 2022 conforming to questions. The data series has been carried out via an internet hyperlink despatched to the replier's social networking debts and emails. The check link was transferred to 356 people, of which 186 people responded. An accessible slice was used in this exploration area.

## **Findings and Recommendations**

Among the attestant, Table-1. The results demonstrate that 59.1% of them are in the manly order, while, 40.9% of them are in the womanish order, 26.3% of them are falling into 19 – 29 times, while, and 17% of them are falling in the 30-39 times, 32.8% of them are falling into the 40-59 times, and 50-60 Times 9%, Above 60 is 14%. The designation of the respondents' Students is 16.1%, Government jobs 1.6%, Private Job is 27.4%, Own business 44.1%, and Retired / Unemployed 10.8%. Education qualifications are No formal qualification 25.3%,



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The diploma 26.9%, UG 36%, PG 11.8%, Members of the family, 1-3 38.7%, 4-6 49.5%, and above 7, 11.8%. Marital Status is Single repliers are 65% and married is 34.5%. Monthly income is Fewer than 10 K is 12.4 percent, 10K - 25 K is 19.4, 25K - 50K is 32.3%, 50K- 1L is 8.6%, More than 1,00,000 is 27.4%, Types of social media are Facebook 2.2%, Google 2.8%, Youtube 5.9%, Twitter 47.3%, LinkedIn 17.7%, Instagram is 12.4%, and Pinterest 10.8%.

**Table 1: Demographic Profile**

Mutable	Cataloging of the Variables	Frequency	Percent
Gender	Male	110	59.1
	Female	76	40.9
Age	19-29	49	26.3
	30-39	33	17.7
	40-49	61	32.8
	50-60	17	9.1
	above 60	26	14.0
Designation	Student	30	16.1
	Government job	3	1.6
	Private Job	51	27.4
	Own business	82	44.1
	Retired / Unemployed	20	10.8
Education qualification	No formal qualification	47	25.3
	Diploma	50	26.9
	UG	67	36.0
	PG	22	11.8
Members of the family	1-3	72	38.7
	4-6	92	49.5
	Above 7	22	11.8
Marital status	Single	121	65.1
	Married	65	34.9

Mutable	Cataloging of the Variables	Frequency	Percent
Monthly Salary	Less than 10 K	23	12.4
	10K - 25 K	36	19.4
	25K - 50K	60	32.3
	50K – 1L	16	8.6
	More than 1,00,000	51	27.4
Types of social media Use in Tourism	Facebook	4	2.2
	Google	7	3.8
	YouTube	11	5.9
	Twitter	88	47.3
	LinkedIn	33	17.7
	Instagram	23	12.4
	Pinterest	20	10.8

**Table 2: Emerging Digital Technologies for Future Tourism and Hospitality**

Future Tourism And Hospitality	Mean	Std. Deviation
Digital platforms	4.27	.943
AI and big data	4.34	.946
Service robots	4.31	1.080
Virtual reality	4.27	.891
Cyber security	4.18	1.029
MEAN SCORE	21.37	4.889

The above table influences the digital technologies for future tourism and hospitality Digital platforms 4.27 (0.943), AI and big data 4.34 (0.946), Service robots 4.31 (1.080), Virtual reality 4.27 (0.891), Cyber security 4.18 (1.029). All these factors are the highest factor that determines AI and big data. AI in kindness will help business owners distribute more modified and custom-made knowledge than ever before. This is a probable appreciation of data analysis and to robots taking care of humdrum, monotonous tasks whilst parting staff to deal with the more multifaceted areas of their job.

**Table 3: Gender \* Types of Social Media**

		TSM							Total
		Facebook	Google	YouTube	Twitter	LinkedIn	Instagram	Pinterest	
G	Male	0	2	7	50	17	14	19	109
	Female	4	5	4	38	16	8	1	76
Total		4	7	11	88	33	22	20	185

Chi-square Tests			
	Value	DF	Asymptotic Significance (2-sided)
Pearson Chi-square	20.369a	6	.002

The tables represent the chi-square Gender and the Types of social media of the respondents. Thus, the sig value is .002 and the value of the sign is lower than 0.05. Hence the insignificant proposition is rejected.

**Table 4: Sustainability of Tourism**

One-Sample Test						
	T	DF	Sig.	Mean Difference	95% Self-assurance Interval of the Alteration	
					Lower	Upper
Eco-friendly sustainability	19.294	185	.000	1.339	1.20	1.48
Cultural preservation	16.561	185	.000	1.312	1.16	1.47
Economic benefits	19.494	185	.000	1.274	1.15	1.40
No emissions	15.681	185	.000	1.183	1.03	1.33
Condense your carbon footprint	15.867	185	.000	1.204	1.05	1.35
Stabilizes energy costs over time	10.232	185	.000	.919	.74	1.10
Adds value to your property	14.608	185	.000	1.005	.87	1.14
Reduces your electric bill	11.404	185	.000	.968	.80	1.14

There is no difference in the sustainability of tourism the factors are Eco-friendly sustainability, Cultural preservation, Economic benefits, no emissions, condensing your carbon footprint, stabilizing energy costs over time, adding value to your property, Reduces your electric bill. All the variables are momentous. So that the null intention is rejected.

**Table 5: Difference Between the Age and the Trials of Hospitality Tourism**

ANOVA						
		Sum of Squares	DF	Mean Square	F	Sig.
Acquisition and retentive the staff.	Between Groups	12.104	4	3.026	3.567	<b>.008</b>
	Within Groups	153.557	181	.848		
	Total	165.661	185			
Change in promotion trends and subtleties.	Between Groups	24.591	4	6.148	5.816	<b>.000</b>
	Within Groups	191.323	181	1.057		
	Total	215.914	185			
Operational issues.	Between Groups	7.892	4	1.973	2.567	<b>.040</b>
	Within Groups	139.124	181	.769		
	Total	147.016	185			
The rising cost of day-to-day consumables.	Between Groups	10.543	4	2.636	2.575	<b>.039</b>
	Within Groups	185.242	181	1.023		
	Total	195.785	185			
Cleaning issues.	Between Groups	14.043	4	3.511	3.388	<b>.011</b>
	Within Groups	187.549	181	1.036		
	Total	201.591	185			
Change in guest prospects.	Between Groups	34.104	4	8.526	6.333	<b>.000</b>
	Within Groups	243.686	181	1.346		
	Total	277.790	185			
Asymmetrical cash inflows	Between Groups	13.368	4	3.342	3.991	<b>.004</b>
	Within Groups	151.578	181	.837		
	Total	164.946	185			
Climate awareness	Between Groups	9.349	4	2.337	2.104	<b>.082</b>
	Within Groups	201.065	181	1.111		
	Total	210.414	185			

Table 5 determines the age and the trials of hospitality tourism. Factors are Acquisition and retentive staff, change in promotion trends and subtleties, Operational issues, The rising cost of day-to-day consumables, cleaning issues, change in guest prospects, Asymmetrical cash inflows, and Climate awareness Out of eight factors, only one factor is higher than the p-value 0.82 so that the climate awareness variable is accepted the proposition and other p values are lower than the sig value. thus, the proposition is rejected.

**Table 6: Relationship Between the Designation and the Attractiveness in the Tourism Sector**

- ▶ A1-Attractions
- ▶ A2-Accessibility
- ▶ A3-Amenities
- ▶ A4-Available Packages
- ▶ A5-Activities
- ▶ A6-Ancillary Services
- ▶ D- Designation
- ▶ PC-Pearson Correlation
- ▶ Sig - Sig. (2-tailed)

Correlations								
		A1	A2	A3	A4	A5	A6	D
A1	PC	1						
	Sig							
	N	186						
A2	PC	-.157*	1					
	Sig	.032						
	N	186	186					
A3	PC	.075	-.057	1				
	Sig	.310	.438					
	N	186	186	186				
A4	PC	-.232**	-.247**	-.173*	1			
	Sig	.001	.001	.018				
	N	186	186	186	186			
A5	PC	.362**	-.030	.208**	-.266**	1		
	Sig	.000	.680	.004	.000			
	N	186	186	186	186	186		
A6	PC	.120	-.212**	-.016	.092	-.030	1	
	Sig	.102	.004	.824	.210	.686		
	N	186	186	186	186	186	186	
D	PC	.075	.022	.255**	-.100	.100	-.127	1
	Sig	.306	.766	.000	.176	.174	.085	
	N	186	186	186	186	186	186	186

## Conclusion

Sustainable tourism is about refocusing and re-adapting. An equilibrium must be found between restrictions and practice so that incessant change, monitoring, and preparation ensure that the service sector can be accomplished. The hospitality industry provides good service for their client with its variety of services. Tourism is a service industry, and thus, it is the whole traveling experience for the tourists to make it worthwhile of traveling. The subdivision is carrying back hope and prospect for people universally. Now is also the time to rethink tourism, where it is going, and how it impacts people and the planet,” said the UNWTO Secretary-General in a statement. The leisure industry assistances precautionary habitats and species – witness how the unexpected standstill in visitor arrivals has led to a growth in habitat annihilation and environment stealing in many parts of the world. Furthermore, tourism has also been the foremost instance in facing up to its weather responsibilities. To minimize a resurgence from the influence of the COVID-19 emergency, building consumer confidence in key source markets. With such a promising vision comes the responsibility of the hospice industry to adapt to evolving consumer needs. The emergence of new issues and inclinations in the tourism industry in the new century provides insight into the future.

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**ISBN: 978-81-960940-3-4**

# **Advancement of Cleanliness Approach: Impact of Application of Ergonomics on Increase Productivity of Cleaning Staff**

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## **Abstract**

“Cleanliness is next to godliness.” is a wise saying that emphasises the value of cleanliness in a person’s life. Workplace cleanliness and hygiene can affect productivity, performance, and well-being. In order to maintain strong staff morale and productivity levels high, workplace cleanliness is highly important. Nobody feels motivated in an unclean environment. It promotes the efficiency, health, and safety of the workforce. The main objective of this study is to explore the added value of a clean working environment in improving the ergonomic conditions for cleaning staff to enhance their efficiency. The data has been collected from hospitality industry employees of various sectors like hotels, spa, airlines and hospitality institutes etc. In this study, an online survey is used that includes questions about cleanliness and ergonomics and their impact on the efficiency of cleaning staff. The link between the cleaning staff, work, and the workplace setting is highly important, so it becomes a necessary component of the actual work. Employer personal motivation and the upkeep of a tidy workplace should be the key management priorities in ensuring an engaged staff.

**Keywords::** Cleanliness, Cleaning staff, Ergonomics, Efficiency.

## Introduction

The most significant assets of the company are acknowledged to be its employees in the competitive society of today. For many reasons, including employee health, staff sicknesses, safety concerns, workplace morale, and even your company's reputation, a clean workplace is crucial. The environment an employee works in has a big impact on their performance, productivity, and overall health. They approach a job in a different way if they enjoy going to work, feel comfortable, and are in an environment where they can be at their healthiest and most productive. An employee that is at ease in their office will work harder even when they have a heavy workload and are occupied. Numerous researchers have investigated the link between physical workplace factors and health and wellbeing. Most of the time, those who work in cleaning and maintenance are on their feet performing duties that need a lot of bending, stooping, pushing, pulling, hauling, and handling various objects of all sizes, shapes, and weights. The cumulative effects of all of this can be detrimental to one's physical health in a single day, let alone over years.

Safety, comfort, ease of use, productivity/performance, and aesthetics are the five components of ergonomics. The science of ergonomics is concerned with how well individuals and their jobs "fit." It considers the worker's strengths and limits in order to make sure that the activities, tools, information, and environment are appropriate for each worker. The physical environment, which is a component of the workplace, has an immediate effect on human perception and has the potential to gradually alter social interactions and productivity. Numerous research on the workplace have revealed that users and workers are content with particular workspace elements. Lighting, ventilation rates, access to natural light, and acoustic environment are the user preferences that are most important to their productivity and contentment with their workspace (Humphreys, 2005). Office spaces' ambient characteristics, such as lighting, temperature, the presence of windows, free air circulation, etc., imply that these environmental factors have an impact on workers' attitudes, behaviours, satisfaction, performance, and productivity. The safety, health, and psychological well-being of employees must be guaranteed in order to support human beings' physical, physiological, and psychological aptitude toward efficiency and efficaciousness in work systems. (Christy & Duraisamy, 2020). Following a thorough study of the literature, it was discovered that several Research has been done in the industrial, textile, contact centre, and construction industries, but very little has been done in the hospitality industry, and there hasn't been any done-on impact of ergonomics on productivity of cleaning staff.

## **Ergonomics**

The definition of ergonomics as a field is the theoretical and foundational knowledge of human behaviour and performance in intentional socio-technical systems, and the application of that knowledge to the design of interactions in the context of actual settings (Wilson, 2000). One person engaging with one equipment or job, or acting in a setting characterised by one specific key factor (heat, noise, time pressure, etc.) was the focus of many applications of ergonomics. The idea that ergonomics must be applied set it apart from its core sciences of anatomy, physiology, and psychology; this application was its fundamental purpose, and some people even considered the word “applied ergonomics” to be a tautology.

## **Types of Ergonomics in Working Environment**

The field of ergonomics is very wide and encompasses a number of factors that all affect workers' productivity. Safety, comfort, ease of use, productivity/performance, and aesthetics are the five facets of ergonomics. The science of ergonomics looks at how well individuals and their jobs “fit.” In order to make sure that activities, tools, information, and the environment are appropriate for each worker, it takes into consideration both their strengths and limits. Environmental ergonomics should, in theory, take into account the social, psychological, cultural, and organisational surroundings of systems, but up until now, it has only been thought of as focusing on the specific elements of the physical environment. (Parsons, 2000). An important realisation is the general awareness to the possibility that our personal actions may have broad repercussions that affect both other people and ourselves. (Corlett, 2000). A cluttered environment with many stuff piled up about in poorly managed workplaces causes confusion and delays in getting work done. Items that are either not used very often or are useless take up valuable space. When needed, employees have difficulty locating files or papers. Electrical cables that are drooping and loose make the environment dangerous. Workplaces are often considered dirty and unfriendly to productive work. (Verghese, K, & Ramalingam, 2018)

## **Physical Ergonomics**

The study of human anatomical, anthropometric, physiological, and biomechanical traits in relation to physical activity is known as physical ergonomics. Physical ergonomics is the study of how physical and physiological aspects of employment influence the body and how changes can help avoid long-term injury. Therefore, physical ergonomics includes concerns with sitting posture, movements, keyboard design, and general workplace safety.

## **Cognitive Ergonomics**

The study of how a device, system, activity, or environment affects a person's cognitive ability is known as cognitive ergonomics. It involves making user-friendly designs, implementing training programmes, making policies and brochures, and making sure that staff members are capable of completing the tasks required of them.

## **Organisational Ergonomics**

In a workplace, organisational ergonomics is crucial. It focuses on the overall organisation of the workplace. Organizational ergonomics can be implemented through setting work schedules, enhancing departmental communication, encouraging involvement, holding team-building activities, and other methods.

## **Impact of Clean Workplace on Employees**

### ***1. Increase the productivity of employees***

According to various research the unclean and dirty area creates distraction. Since interruptions at work can result in lost productivity. The best strategy to reduce distractions at work is to keep it neat and orderly.

### ***2. Ensure employee happiness***

Employees are pleased with themselves for keeping the workplace tidy; after all, who wouldn't prefer to work in a tidy office over a cluttered one?

### ***3. Protect the health of the employees***

Additionally, cleanliness lowers the likelihood that workers will become ill. Because people spend more of their time in workplace and if it is unhygienic and not clean it encourage the growth of bacteria's Therefore, keeping the workplace clean can reduce sickness, which in turn reduced missed work days. Therefore, keeping the workplace clean can lower sickness, which in turn lowers missed work days. Because of this, it's critical that the office has a solid cleaning plan in place.

### ***4. Reduce Risk***

Cleaning not only keeps workers healthy, but it can also save lives. Nobody wants, for instance, boxes in the hallways to slow down your staff as they exit the facility in the case of a fire. Maintaining a clean building will help you stay on top of any problems that can arise in an emergency.

### 5. *Maintain the efficiency of the office*

It's simpler to keep organised in a tidy, clutter-free workspace. One benefit of keeping your office organised is that documents are easy to locate and easier to keep track of.

## Objectives

- To study the impact of clean working environment on productivity of cleaning employees.
- To find the relationship between clean working environment with employee efficiency
- To find the relationship of clean work environment in ergonomic conditions of organisation

## Conceptual Framework

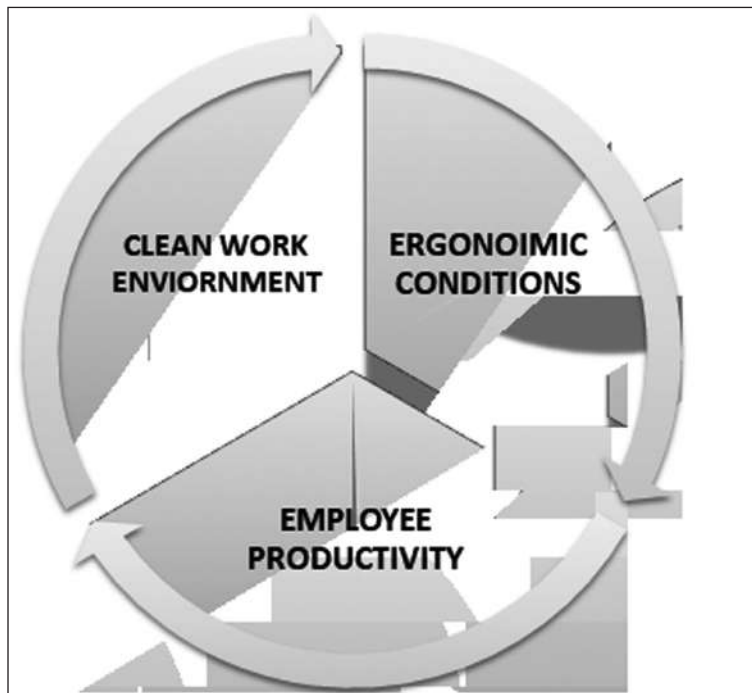


Figure 1: A Conceptual Framework Presenting the Relationship of Employee Productivity with Clean Work Environment and Ergonomics Conditions

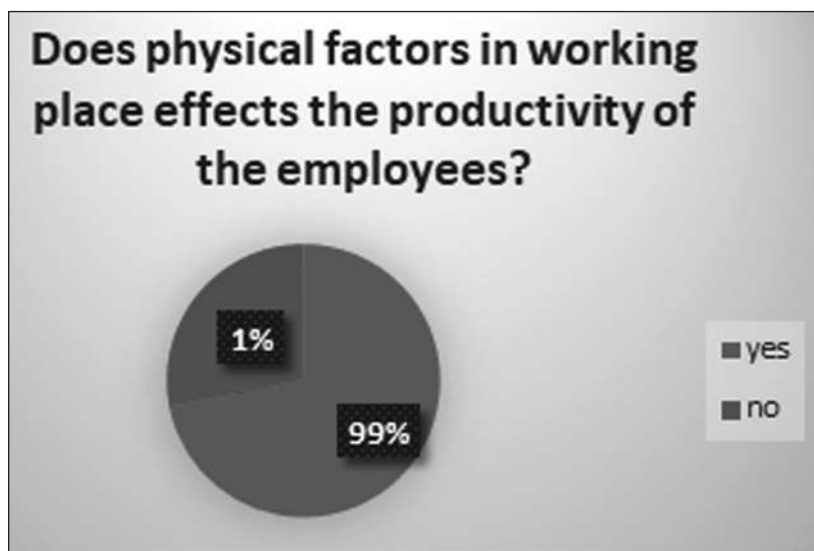
## Methodology

**Primary Data Collection:** The primary data has been collected with the help of information based on the structured questionnaire to the employees related to cleaning. This study has been done in Chennai. The questionnaires were provided to 50 cleaning-related employees at hotels in Chennai. The return rate was 100 percent. The survey asked 15 questions that includes 5 questions about the respondent's age, gender, designation and 10 questions related to various features of the workplace, how the workplace affected productivity, and how ergonomics affected productivity.

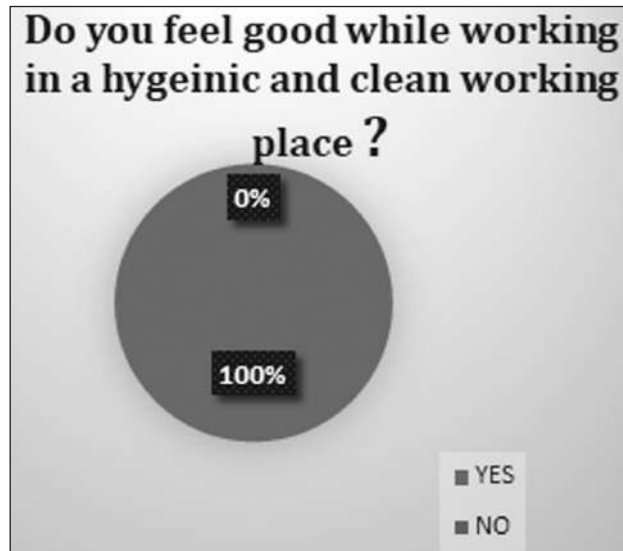
**Secondary Data Collection:** Secondary data is collected with the help of articles from literature reviews from published journals, published research papers, newspapers, magazines, etc.

## Analysis

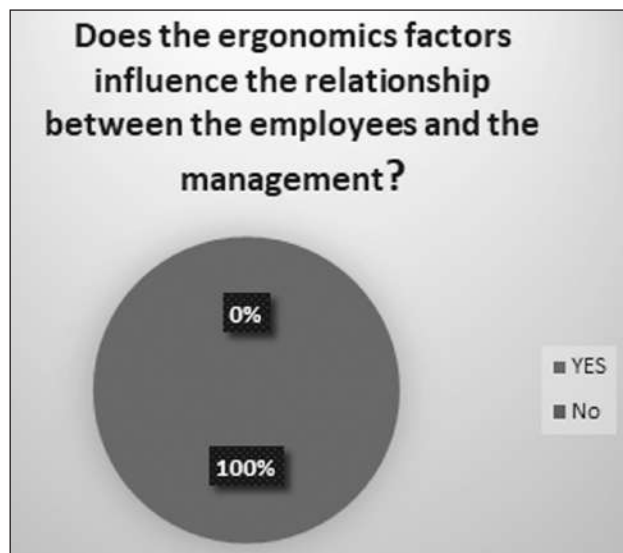
1. Effect of physical factors in working place on the productivity of employees.



2. Feel at work while working in Hygienic and clean working place.



3. Influence of Ergonomics factors on relationship between employees and management





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4. Importance of promoting cleanliness related ergonomics factor for better employee performance



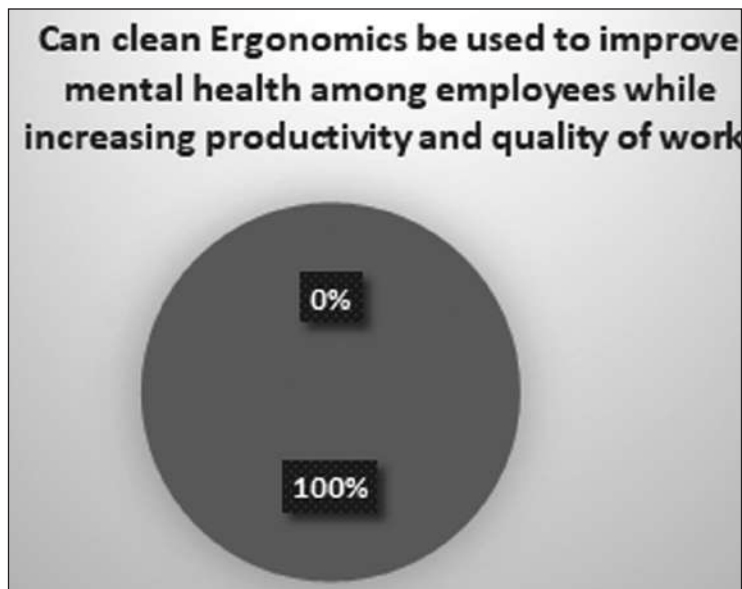
5. Role of Safe and hygienic environment on business competition



6. Is the present hospitality industry providing facilities and equipment keeping in mind the clean and hygienic work system for employees and their better performance?



7. Role of Cleaning in ergonomics to improve mental health among employees while increasing productivity and quality of work.



**8. Improper and unhygienic ergonomics work factors may lead to problems like**

Working conditions that might harm the body and cause wear and tear. Examples of these include monotony, unpleasant posture, violent motions, immobility, direct pressure, vibration, extreme temperature, noise, and job stress. These dangers can result in discomfort, impairment, or even death if they are not eliminated.

Ergonomic risks include

- Improperly adjusted workstations and chairs.
- Frequent lifting.
- Poor posture.
- Uncomfortable movements, especially if they are made repeatedly
- Excessive force, especially if used repeatedly.
- Vibration.

**9. Impact of clean ergonomics system over the employee's performance**

A clean ergonomic system will enhance the quality of work an employee is doing, thus, affecting the productivity of the society at large. It effects the thought process and emotions of the employee. For an individual a clean workspace helps in giving the best performance in their work with a happy mind. As per the analysis by the resources everyone agrees to the fact that clean work system brings confidence around the employers, lift their mood up, affect their work performance and productivity. Lack of communication and coordination in teams, Unhygienic ergonomic leads to loss of interest in working, health issues and health hazards. Also distrust over the management.

**10. Impact of technology in improving work ergonomic system of cleaning staff**

Availability of technology helps in immediate communication which saves a lot of time in terms of passing the information to respective destination physically takes time. This time saving helps in reducing the stress level of employees. It also create a great impact on reducing the chances of miscommunication by providing the reliable devices to be used as mode of communication which again enhance the quality of work and avoid mental load at work.

## Conclusion

Professional cleaning is a fundamental service activity that is performed all over the world in a variety of indoor and outdoor settings. Many cleaners are low skilled workers who come from disadvantaged socioeconomic and educational backgrounds. The way cleaning duties are organised varies significantly depending on the geographic location and dominant culture, and these variations are linked to variations in working conditions and therefore occupational hazards. Since environmental ergonomics is a crucial component of the field of ergonomics, that is how it should be understood and applied. Humans don't react to their surroundings in a way that is consistently correlated with direct measurements of the physical environment. Human sensibilities and responses are influenced by certain human qualities. The cost of absenteeism and health care due to stress at work is projected to cost businesses \$300 billion annually; this amount does not even include the cost of poorer productivity when there are dissatisfied employees. This study has proven that cleaning staff members are at a significant risk of injury and are exposed to a number of ergonomic risk factors. When formulating plans for the development of the working environment, risk factors connected to both physical and psychosocial health must be taken into account in order to reduce injuries. These ought to be focused on giving cleaning workers a clean working environment as well.

These tactics ought to concentrate on cleaning operations, recycling and trash management, handling of linens, mopping, bathroom cleaning, vacuuming, and lifting and moving of furniture.

In the end, this leads to problems like absenteeism, a high staff turnover rate for housekeeping, weariness, and low productivity. Inability of the personnel to perform to organisational standards is demonstrated in this way.

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**ISBN: 978-81-960940-3-4**

## **Culture of Cleanliness – The Soul of Swachh Bharat: Inspiring Illustrations from Incredible India**

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### **Abstract**

On October 2nd, 2014, Prime Minister Narendra Modi of India initiated the Swachh Bharat Mission in order to hasten the country's progress toward its goal of achieving universal sanitation coverage and to place a greater emphasis on sanitation. By the 150th anniversary of Mahatma Gandhi's birth on October 2, 2019, the mission aimed to have all of India's villages, Gram Panchayats, Districts, States, and Union Territories declare themselves to be "open-defecation free" (ODF). This was accomplished by the construction of over 100 million toilets in rural India. The mission is progressing towards the next Phase II of SBMG, which is known as ODF-Plus, in order to make certain that the behaviours that prevent people from defecating in the open are maintained, that no one is left behind, and that facilities for managing solid and liquid waste are easily available. The ODF Plus activities that will be carried out as part of Phase II of the Swachh Bharat Mission (Grameen) will work to instil more ODF behaviours and will place an emphasis on the provision of interventions for the secure management of solid and liquid waste in rural areas. These initiatives have served as a source of motivation for millions of Indian citizens, which has resulted in the cascading effect. This paper is an attempt to exhibit the efforts that have been made by the people to further this aim.

**Keywords:** Cleanliness, India, Motivation, People, Swachh Bharat

## Backdrop of the Study

Many were puzzled at the sight of Prime Minister Narendra Modi sweeping the floors and questioned the motives behind an initiative that was meant to further Mahatma Gandhi's vision of a clean India. The concept was implemented as the Swachh Bharat Abhiyaan effort, with a focus on creating a cleaner and healthier environment. People were hesitant to believe in the Abhiyaan when it was first introduced to the public in 2014, but eventually they came around. After seven years, India is now free of open defecation, all homes have access to clean and potable water, toilets have been installed in all homes, and India's cities are becoming cleaner on a daily basis (Sneh et al, 2018).

### Effect 1: Clean Cities

Under the Swachh Bharat movement, extensive waste collection and disposal efforts were launched door-to-door all over the country. The issue of rubbish disposal was helped to some degree by this solution. The Swachh Survekshan is an annual survey that evaluates the level of cleanliness, hygiene, and sanitation in cities and towns around India (The Hindu, 2022). For the fifth year in a row, the Swachh Survekshan has ranked Indore as the cleanest city in India. The fact that Indore was successful indicates that other cities in India are also moving in the direction of a cleaner India. After Indore come cities like as Surat, Vijaywada, and Navi Mumbai, among others. Vijaywada was at sixth place on the list in 2020, but by 2021 it had climbed all the way up to third place (Sonia Bhaskar, 2017).

The goal of the month-long Clean India Drive that was held across the country in October 2021 and managed by the Ministry of Youth Affairs and Sports was to collect a total of 75 lakh kgs of rubbish and plastic. Over 30 lakh kilogrammes of rubbish were collected in the first ten days of the programme, which took place all over the nation. In addition to that, the idea of turning trash into wealth is being spread around. As of right now, the Swachh Bharat portal reports that the mission has received involvement from 51,344 persons, that 6,106 pakhwada activities have been carried out, and that there has been additional activity. The Abhiyan has had a variety of effects, including those on society, the economy, and the environment.

### Effect 2: Elimination of Public Urination and Defecation

On October 2, 2019, the Open Defecation Free (ODF) status was officially awarded to all 6, 03,175 villages in the country by the Ministry of Jal Shakti as part of the Swachh Bharat Mission (Grameen) [SBM (G)]. In order to accomplish this goal, more than 100 million toilets were built in the rural areas of India. In addition, the government has instructed all of

the states to make certain that the SBM does not leave anyone behind (G). In addition, every urban local body has been proclaimed Open Defecation Free (ODF), and approximately seventy percent of urban garbage is currently being treated scientifically.

### **Effect 3: Toilet in Every Home**

Between October 2, 2014 and December 31, 2019, 10.24 crore individual household latrines (IHHLs) were built as part of the SBM (G). The government has given its approval to Phase-II of SBM(G) for the period of time spanning from 2020-2021 to 2024-2025, with the goal of achieving ODF sustainability through the provision of access to toilet facilities for newly eligible rural households across the nation as well as the implementation of Solid and Liquid Waste Management (SLWM) in the communities.

### **Effect 4: Improvements to Society**

The objective has not only resulted in clean and hygienic surroundings, but it has also given the people participating in the process a sense of empowerment and brought respect to them. Transgender people and people who sift through trash for a living have been actively involved in the waste management system in Paradeep, which is located in Odisha. It doesn't matter if it was the Prime Minister washing the feet of sanitation workers or whether it was engaging rag pickers and transgenders: the Swachh Bharat Abhiyan has given a new respect to the people, which was something that was lacking in the past.



**Figure 1: Hon. Prime Minister of India Cheering the School Children  
(Deshpee, 2022)**



## Recent Representation

The Swachh Bharat Mission-Urban 2.0, often known as SBM-U 2.0, was recently initiated with the objective of making all of the cities in India “Garbage Free” and ensuring the management of grey and black water in all cities outside of those that are covered by AMRUT. In addition, it seeks to achieve the vision of safe sanitation in urban areas by making all urban local bodies ODF+ and those with a population of less than one lakh ODF++. This will bring about the realisation of the vision. The primary goals of the mission include the source segregation of solid waste (which is currently being carried out in Indore), the application of the 3Rs (reduce, reuse, and recycle), the scientific processing of all different types of municipal solid waste, and the remediation of legacy dumpsites in order to achieve efficient solid waste management. The Clean India Mission is similar to a cycle in that it interconnects all of its components and can be seen to have an effect on rivers, households, the environment, and the everyday lives of people (Rupa Kumari, 2022).

We will be able to have a better understanding of the Swachh Bharat Abhiyan by looking at the following information, which is the outcome of several studies that were taken among the general people regarding the campaign: 18% of respondents said that since Swachh Bharat began, the quality of public toilets in their cities has improved. 32% of people had the opinion that Swachh Bharat has helped pupils become more conscious of the importance of cleanliness and overall civic sense. 22% of people think that municipalities have become more receptive to complaints about rubbish collection and street cleaning as a result of recent changes. In this country, there had been the construction of 500,000 residential toilets.

According to the Ministry of Drinking Water and Sanitation, the “Swachhta App,” which is a mobile application that was built by the government, has recorded 8.1 million users and 13.1 million complaints, of which about 90% have been handled (Vikaspedia, 2022). In a nutshell, the Swachh Bharat initiative has just begun to show signs of having a good influence, primarily in the metropolitan parts of India, but it has also had some successful developments in the semi-urban areas.

## Inspiring Illustrations

The administration of the Uttar Pradesh is currently committed to bringing cleanliness to an entirely new level. Beginning on December 1, it intends to build selfie points at 750 waste dumping stations across 75 districts, all of which must be completed within 75 hours. According to a release issued by the Government, a plan has been devised to turn “sensitive sites” and “garbage vulnerable spots” (GVPs) in Uttar Pradesh into places where rubbish is not allowed. After the areas have been made more aesthetically pleasing, this initiative

is being carried out as part of the “Swachh Bharat Mission” to cultivate the locations as selfie places. The selected spots will be beautified after they are cleaned. Following this, the area would be converted into selfie points with dedicated space for senior citizens or street vendors. To get things started, all urban local bodies will first mark garbage-vulnerable spots in their respective zones. These points will be removed from the system for better between the 1st and 3rd of December.

The garbage that has been gathered will first be sorted into dry and moist waste, both of which will then be processed before being thrown away. Officials have been given instructions to keep a record of the collections, which include garbage comprised of plastic bottles, glass bottles, and bottle glass. Before and after geotagged photographs of garbage-prone areas will be sent to the State Mission Directorate of the Swachh Bharat Mission. This will ensure that the campaign is carried out in an honest manner (Urban). The government has also given officials the directive to videotape the actions that are being carried out in conjunction with the campaign. On the basis of their respective populations, local bodies will be ranked according to one of three categories and awarded according to one of five subcategories (Kumar Devbrat, 2022).

In an another incident, a picture that was originally posted on LinkedIn but has now been shared widely online shows a young boy cleaning the floor of a Delhi metro station after he accidentally spilled his tiffin box on it. Ashu Singh, a LinkedIn user, was the one who uploaded the images and shared them with the community. According to the post, a small child was riding the Delhi metro when he accidentally spilled his tiffin on the floor while trying to remove his water bottle from his backpack. The young man tore a page out of one of his notebooks in order to gather up all of the food that had fallen on the floor, which is something that most people wouldn't bother doing. That wasn't it at all. In addition to that, he took his handkerchief and wiped the floor with it.

In a post on his LinkedIn profile, Ashu Singh detailed the entire event and referred to the individual involved as the “true brand ambassador of the Swachh Bharat initiative.” He wrote: “In Delhi Metro, a young guy who was seated with plugged headphones was taking out his water bottle from his backpack when his tiffin box toppled, and all of his food poured into the floor.” He was referring to an incident that took place in the metro system in Delhi. The young boy tore a page from one of his notebooks and then proceeded to pick up all of the food that had fallen to the ground. After that, he took his handkerchief and wiped the floor clean, restoring it to the condition it had been in prior to the incident.

Over 69 thousand people have liked the article since it was published early on Sunday morning, and there have been 700 people who have left comments. The young man's deed was praised by a great number of people. One of the users commented, “He was raised the

right way.” While someone else said that it was a “great illustration of ethics.” “He is going to be successful in life. A third person made the statement that “His attitude will take him places.” The post received a variety of further responses, including “amazing,” “very lovely,” “appreciated,” and “excellent job.” This is an excellent example of how Swachh Bharat spirit has been deeply engrossed amongst the youth of our nation (News18.com, 2022).

## **‘Swachh Bharat’ Model for ‘Swachh Vayu’**

The accomplishments and methods of SBM are deserving of being imitated, and the National Clean Air Programme (NCAP) of India would do well to examine the SBM model as a potential model to follow. The National Clean Air Programme (NCAP) was initiated by the Union Government in 2019 in response to the growing problem of air pollution in Indian cities. This has provided a boost to actions being taken on the ground to improve air quality, with the government making fervent efforts to guarantee that citizens have access to “Swachh Vayu.” However, if NCAP were to learn from SBM’s achievements, they could do considerably more than they have thus far.

To begin, the NCAP needs to go into what they call a “mission mode.” A well-defined set of objectives, scope, implementation milestones, and targets are typically part of what is meant by the term “mission.” The 2021 CEEW study found that although NCAP establishes a clear set of objectives and a schedule for achieving them, the sector-specific indicators and related emission reduction targets required to achieve the required 20-30 per cent decrease in Particulate Matter (PM) levels are not specified. This is despite the fact that NCAP does establish a clear set of objectives and a schedule for achieving them. It is much more probable that a programme will be swiftly and successfully implemented if it is designed with an output orientation, as opposed to a programme that is solely designed with an outcome orientation and no clearly specified outputs. For instance, in the case of SBM, there was a specified output target of constructing 65 lakh toilets by the year 2019, with the ultimate goal of putting an end to the practise of open defecation in India. The achievement of success by the SBM was facilitated by the presence of such a clearly defined output target.

Second, in order to bring back the clear sky, we need to encourage private partnerships for innovative and entrepreneurial endeavours. The City Action Plans do not specify any potential channels for participation from the commercial sector. In cities such as Indore, Jaipur, Nagpur, and Surat, numerous operations related to the Solid Waste Management Mission (SBM), including as the door-to-door collection of waste, street sweeping, treatment and disposal, and other similar tasks, were carried out through public-private partnerships (PPPs). These collaborations were formalised into legally binding contracts for the provision of services and concessionaire agreements. Over 40 business organisations were enlisted by

SBM to lend support to the initiatives undertaken by the government in the area of solid waste management. Similar participation could be encouraged under the NCAP by introducing Public Private Partnership models for plying of e-buses, introducing Intelligent Transport Management Systems, or carrying out Information, Education, and Communication activities through Corporate Social Responsibility funds. These are all examples of ways in which similar participation could be encouraged.

Third, efforts must be scaled up to transform NCAP into a “Jan Andolan”. The success of SBM also has much to do with the way in which it turned into a people’s movement. Air pollution is an anthropogenic phenomenon, and the awareness, or jankari, among the masses with respect to how their actions contribute to the degradation of air quality would enhance the bhagidari on their behalf. SBM conceptualised volunteer cadres like Swachhagrahis and Nigrani Samitis that helped ensure the sustained use of toilets instead of open defecation along with spreading awareness regarding sanitation practices. Such Nigrani Committees or volunteers could be conceived under the aegis of NCAP, who could sensitise people about the dangers of air pollution, while also exhorting people to adopt practices that lead to a reduction in air pollution like not burning waste in the open and opting for cleaner transport and cooking fuel.

In conclusion, the importance of working together to accomplish a goal in combating air pollution cannot be overstated. Although NCAP is only applicable to the 131 non-attainment cities (NACs), the problem of excessive air pollution extends well beyond administrative lines. It is more likely that city-level programmes will be successful if there is room for regional participation and collaboration among cities as well as adjacent rural communities, all of which are located in the same area (also referred to as an “airshed”). This is because a significant contribution from cross-border sources will increase the likelihood of success. Villages and smaller cities, which are subject to the same levels of air pollution as major cities, need to be included in the fight against air pollution in the same manner as SBM broadened its focus to include both rural and urban India. It is imperative that the model used by the Commission for Air Quality Management (CAQM) to battle air pollution be copied in other regions of the country since it serves as a great example of regional collaboration to combat air pollution.

To successfully improve India’s air quality, a comprehensive strategy is required. This strategy should contain actionable targets, innovation and entrepreneurship, citizen participation, and coordination between urban and rural areas. Let us hope that eight years after the successful introduction of SBM, we will recognise 2022-23 as the year when our quest for Swachh Vayu developed into a national mission embraced by each and every individual in the country (Priyanka Singh and Aishwarya Tiwari, 2022).

## Conclusion

After taking office, one of the most important and fruitful actions that Prime Minister Narendra Modi has made is to launch the Swachh Bharat Abhiyan. This effort has the potential to significantly benefit India's rural areas, in particular. Some of the obstacles that lie in the road of the Swachh Bharat Abhiyan include a lack of infrastructure in rural regions, a vast population, a lack of knowledge, public resistance, and the availability of water. These issues can be resolved by increasing public knowledge, improving infrastructure, ensuring that public complaints are promptly addressed by the government, and expanding access to adequate sanitary services.

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**ISBN: 978-81-960940-3-4**

# **To Study the Practices, Tips & Tricks of Organic Pest Control Used by the Household People in Chennai**

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## **Abstract**

Organic pest control is the method or technique which is used in pest management. Now the question arises “what is pest? Why we need to manage it? Pest is known to be a destructive insect or other animal that attacks area, corners of room, kitchen, and bathroom of our house, it includes crops, livestock, and food. In other words, it is basically a biological control technique of controlling pest such as mites, rodent, insect, weeds, arthropods, molluscs, vertebrates, and other microbial organism like fungi & bacteria.

In every household they look for cheap & effective way of controlling methods while keeping their house for living, security, safety and maintain its self-life of the property. That is why people opt different tips & tricks & practices for controlling pest. Not only the house hold but in every area where cleaning sanitation takes place.

Organic pest control is known and arguably to be the cheap, best & effective practices when it comes to handling the pest in order to maintain the self-life of any product or things. There are so many organic pests control technique is available but people are not much aware about it. To highlight these practices and techniques, an increase awareness should be there in between people and community which helps in development of eco-friendly method of controlling pests that is not that harmful for environment and the health of any individuals.



**Keywords:**

- **Mites:** This includes insects like cockroaches, termites, beetles & flees.
- **Rodent:** This includes rats and mice which are potentially hazardous.
- **Arthropods:** eight legs insect like organism such as mites, ticks & spider.
- **Molluscs:** it is type of species that include shellfishes and snails.
- **Vertebrates:** it includes the species like frog & lizard.

## Introduction

Organic pest control is a method or process which are used from the era of early man's time. It is also known as the story of shelter and protection. when early people are discovering their capabilities in terms of communication, food & using their body in such a way that they can utilise them optimum. It is said that they are few invention in human evolution that are consider to be remarkable inventions and discovery which helps them to become more brilliant, intelligent & different from other organisms, animals & species these include learning how to use their leg for walking which allow them to use their hand efficiently, another is they learn to communicate through sign language & by drawing pictures it also include formulating their voice to create a word for a particular thing, people, place any other thing other things which they feel, observe & touch in order to express them their views & thought, Another discovery they found that how to create fire by creating friction between two stones by rubbing them together which helps them in various aspects like cooking, protection from other hunters like carnivorous animal. There is more discovery like creating wheel for carrying load and clothing for their protection from outside environment. But the major objective of doing all those discoveries is to create a shelter for them. Shelter along with food & clothing is man's three most important necessities it helps them to protect them from the weather, shields them against wild animals & insects & provides a place to rest.

In stone age the early prehistoric era, before early man does not know how to create shelter, they usually use to live in trees & caves which protect them from heavy heat from sun & heavy rain fall and above all from the outside trespasser which are very dangerous for their survival.

As ancient civilisation started building flat topped roof house with stones and rocks along with doors & window for the entrance & ventilation then later modern architecture take place as we evolve. but through this evolution there is still need of some method & trick to protect those place & area from pest because what ever we create, collect & save

any tangible thing there will be a certain time when all these tangible things are affected by some chemical reaction or the trespasser from the external environment. For protection of this area & livestock we perform pest control in order to maintain hygiene, sanitation & its self-life.

Every spring, pests and insects start to appear in homes and gardens around the nation. It can be a constant battle to keep pests out and stop them from harming your plants, even if the kinds of pests may vary based on where you have home or what you are planting in your garden. There are numerous strategies to try and keep them at bay, but many of them involve the use of chemicals that might be damaging to the environment. The ideal solution might be provided by natural pest control techniques. Looking for justifications to switch to organic pest control:

- ***It is more environmentally friendly***

The main advantage of organic pest management is this. Organic pest control products are often considerably safer and better for the environment than chemical sprays, which while sometimes effective, frequently have negative impacts on the environment (including animals, soil, and water when it becomes runoff). Many organic sprays use plant- or food-based oils as their active ingredients, providing you with a natural means of warding off pests without endangering the environment.

- ***Long-term outcomes will be healthier as a result***

Chemical sprays usually lose their potential faster than organic insecticides. No doubt you have apply chemical pesticides before, following the same routine, apply once, and repeat in 30 days.

- ***Pests cannot withstand it***

Pesticides and chemical sprays have a history of losing their potency over time. It all boils down to nature and the transmission of advantageous traits: if a species of insects is not wiped out by pesticides, only those with traits that make them immune to it survive. Over time, most people could develop a resistance to that specific chemical. Pests are less likely to develop a resistance to organic treatments because they are organically based rather than being manufactured artificially.

- Most organic insecticides use both safer, environmentally friendly chemicals and biological controls (smells, tastes, natural oils, etc.) to keep pests away. Understanding the scientific makeup of the pests and pesticides is necessary because the components are

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sourced from natural substances. Businesses must be completely knowledgeable about pests and the organic substances that can fend them off. Their techniques are based on research and strategy rather than a chemical “spray and pray it works” approach.

Organic pest control practices are followed everywhere since prehistoric times it's not only cheap & affordable but also its effectiveness are observed and consider to be reliable in different aspects of lifestyle. An increase awareness, knowledge & involvement must need to highlight its value & benefits which helps the next generation & current population to utilize these practices to make sustainable environment which does not have any harmful effects.

### **Objective**

- To find out number of people aware about organic pest control.
- To study organic pest control common practice, technique, tips & tricks use by house hold people in Chennai.
- To find out its effectiveness & other different method which can be used in organic pest control

### **Purpose**

- There are so many organic sanitation practices especially related to Pest control are present in our surrounding in order to highlight them & spread awareness.
- Number of organic resources & product is available in our reachable sight but still we are unable to use them because of lack of knowledge.
- Pest are considered as trespasser which needs to be prohibited for adequate hygiene & cleaning of the surrounding, that is why there is need for finding different ways which are natural & environment friendly in nature.

### **Methodology**

- 1) In this research the primary data is gathered by questionnaire which is given to several number of house hold people in Chennai who are keeping their house for maintaining hygiene, cleanliness & sanitation. And secondary data is collected from various articles, journals and sources like internet, books, and newspaper.

## Review of Literature

- As mentioned by **Mr. Venkata kanaka srivani mandala June 2019 (sage journals page 141-152)** that to protect our environment green pest management methods & practice were adopted by the world. Instead of pesticide we can use other alternative like plant-based pesticides can also be used.
  - ▶ Leaves like neem, tansy equisetum, nettles have shown remarkable results. It also suggests that plant based essential oil are like rosemary, garden thyme, mint, eucalyptus consist of pest control properties.
  - ▶ Citronella oil mixed with water aids in the management of interior pests in homes and plays a significant part in pest control in the production of organic food globally. Sesquiterpenes in vetiver (*Vetiver zizanioides*) root oil have undergone oxygenation. Vetiver oil exhibits antiparasitic properties that render insects inert.
  - ▶ Oils from some plants, including *Artemisia vulgaris*, *Melaleuca leucadendra*, *Pelargonium roseum*, *Lavandula angustifolia*, *Mentha piperita*, and *Juniperus virginiana*, are also effective against a variety of insects and fungi.
  - ▶ The use of botanical pesticides is a long-standing practise in China. For instance, burning dried leaves of *Artemisia* species can keep mosquitoes and fleas away.<sup>50</sup> Many plant species produce secondary metabolites that are essential for biological pest control, and products from about 344 species can kill mosquitoes.
  - ▶ Solar heating, green roof deconstruction, and plantation utilising alternative energy sources are the greatest ways to reduce pests for sustainable buildings.
  - ▶ The correct storage of food and maintaining a clean kitchen are additional methods. Some pests can be controlled with non-toxic remedies like borax. Dr. Bronner claims that adding a tea spoon of peppermint soap to a gallon of water will keep all insects and spiders away.
  - ▶ Boric acid and sugar can be combined to kill Carpenter and Pharaoh ants.<sup>54</sup> Diatomaceous earth, a natural insecticide, can get rid of fleas. Rats are managed with sealed compost bins. Bora care has a lower toxicity. With addition to preventing algae growth and wood degradation, it aids in termite control.
  - ▶ 55 Beetles can be killed by heating to 120 F for many hours. Tomato juice, borax, and lemon applications can help you stay away from stink bugs. To kill aphids, we can easily and effectively use alkaloids from tomato plant leaves mixed with water and garlic.

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- 56 Thermal heat remediation treatments are the most efficient way to get rid of bed bugs without harming the carpet, furniture, linens, or bedding. The most successful bed bug removal methods are thermal heat remediation procedures because they do not harm carpeting, furniture, linens, or bedding.

S. no.	Name of the pest	Impacts	Control measures
1	Bedbugs	Saliva causes swelling and itching at the site of the bite	Bedbugs are sensitive to extreme temperature, so heat treatment is given to avoid bedbugs
2	Carpenter ants	Carpenter ants excavate wood creating galleries in which they live and carry germs when they crawl from one place to another. They destroy structures in and around	Wood piles should be placed away from the home. Pet droppings should be picked up to remove a potential food source for carpenter ants. Repairing water-damaged wood before they move in. Peppermint ( <i>Mentha piperita</i> ) repels ants
3	Cockroaches	Asthma, allergy, irritation	Condiment smell is intolerable to the cockroaches; oil of eucalyptus and boric acid help to kill cockroaches
4	Crickets	Destroy natural fibres and wooden building material and accelerate the decay and damage of fabric or other materials	Seal and caulk cracks and crevices around windows and doors and in the foundation. <sup>58</sup> Apply lime around the wood pile and enzyme cleaner with peppermint or baits
5	Deer mice	Damage to structures and property and they can transmit pathogens that cause diseases such as salmonellosis, a form of food poisoning. Rodents like deer and mice shed Hantavirus in their saliva, urine and droppings. It causes a dreadful pulmonary syndrome that affects lungs <sup>52</sup>	Sanitation, spray peppermint oil, mint
6	Fleas	Murine typhus and bubonic plague	<i>Mentha pulegium</i> wards off fleas, ants and mosquitoes <sup>60</sup>
7	Hornets	Stings of hornets are painful Pain, redness, minor swelling and itching are common symptoms of a wasp	Identification of nests and destruction
8	House mice	Asthma, allergy	Sanitation, spray peppermint oil, mint
9	Mosquito	Malaria, yellow fever, Lyme disease	Green pesticide, oil from <i>Mentha pulegium</i> wards off fleas, ants, mosquitoes, Catnip ( <i>Nepeta cataria</i> ) essential oil, citronella repels mosquitoes

10	Paper wasps	They sting the victim and inject venom which is painful and reddish at the site of sting	Kill the colony by blocking their access to the nests, spray nests with non-toxic wasp killer
11	Pavement ants	They won't bite but sting to defend themselves. The venom causes allergic reactions only to sensitive skins	Boil one gallon of water and then pour it directly into the mounds and spread thin layers of diatomaceous earth <sup>61</sup>
12	Silverfish	Damages paper wood and cardboard	Fresh dried rosemary and cucumber peels in our home help kill silverfish Boric acid can damage delicate exoskeleton of silverfish <sup>62</sup>
13	Norway rats	Norway rat transmits a number of diseases to humans, including murine typhus, leptospirosis, salmonellosis (food poisoning), rat-bite fever and plague. <sup>63</sup>	Biorodenticide can be used that causes septicaemia, typhoid and death <sup>64</sup>
14	Rodents	Causes plague, murine typhus, leptospirosis, fever, etc. <sup>64</sup>	Rub peppermint oil on beams and other areas where rodents travel. Use fresh or dried mint leaves, as both the oil and leaves repel rodents. Spread camphor balls in the attic or places frequented by rodents. The smell is intolerable to the mice and they will stop visiting the place <sup>65</sup>
15	Roof rats	Contaminates food, damage papers and feed on stored foods. Transmits number of diseases to humans, including Murine typhus, leptospirosis, salmonellosis (food poisoning), rat-bite fever and plague <sup>63</sup>	Peppermint oil, dried mint leaves and oil repel rodents <sup>63</sup>
16	Spiders	Spider species can cause painful bite leading to skin irritation <sup>66</sup>	We can eliminate spiders by adding salt water to bushes, flowers and needed parts of house. Use of lavender, citronella, cinnamon, citrus, and peppermint or tea tree oil. Only one drop of any of these useful herbs mixed with water will be effective for killing spiders
17	Stink bugs	Nuisance, not much harmful. But they may damage tomatoes, lima beans and green peppers <sup>67</sup>	Seal off entry points, replace and repair damaged ones, turn off lights, reduce moisture, use tomato juice on your hands and add borax or lemon
18	Termites	Termites damages paper, cardboard, wood, fibre, board furniture <sup>68</sup>	Nisus products help to control termites; it is a green control practice. Application of Bora-care product will not allow the termites to damage the wood <sup>55</sup>



These are some data which shown different pest name, its name & impact & control measures from **mandala June 2019 (table no.1) saga journals<sup>2</sup>**.

- As mentioned by The International Journal of Engineering and Science (IJES) (Volume2, Issue 7, Page 18-25,2013), (ISSN(e): 2319 – 1813 ISSN(p): 2319 – 1805).

Study on homemade Pesticides and Organic Pest Management in Organic Farming.

- ▶ The term “organic pest control” refers to a technique that makes use of natural resources to get rid of various pests, especially diverse insect species that harm plants. This also entails the management of various weeds that may obstruct the development of your plants. It is well recognised that it plays a big role in a programme called integrated pest management. On average, 83.33% of farmers mentioned organic pest management, which uses natural resources to manage pests, followed by pest control without chemicals and pest control by nature.
- ▶ It has been said that an insect turns into an economic pest when it results in a 5–10% yield loss. There are often only a few big pests that are the most significant in any local pest complex. It is necessary to regulate these because they are the main source of damage. The term “key pest” is frequently used to describe the primary pest that is the most dangerous. Stem borer was cited by 83.33% of farmers as a prevalent significant pest in the research area.
- ▶ Organic pest control frequently uses perching. It is a simple and extensively used approach for farming in rural areas. To do the perching, one must place a long stick in the middle of the agricultural field being targeted. Birds will then flock to the pole to perch, where they will consume dangerous bugs. It is an effective form of organic farming, according to 75% of farmers.
- ▶ Use of neem and vasaka leaves is one of the most popular methods of organic pest control. Farmers apply a paste made of neem and vasaka to the damaged crops in the field, or they dry the mixture and combine it with water. It is highly good in reducing beetles, according to 66.66% of responders, who were followed by aphids and stem borers.
- ▶ Use of cow dung and cow urine is the most common sort of organic pest management method in the research region. Farmer often applies water-mixed cow dung or urine to the field’s afflicted crops. According to the corresponding data, 66.66% of respondents stated that it is extremely helpful against all types of dangerous mites and Cheri caterpillars, followed by rice weevils.

- ▶ In order to prevent pests from entering the fields, farmers grow onions, garlic, and sunflower in the centre of the major crops. According to 66.66% of respondents, this method is highly successful in preventing all types of pests from invading crops.
- ▶ The primary component of an organic pest control strategy is organic farming's preventative practises. Use of pest resistant variety seeds and mixed cropping, followed by cover crops, appropriate soil management, and crop rotations, were cited by 66.66% of respondents as the most popular and efficient pest prevention methods.

The idea for conducting this research is to spread awareness of organic or green pest control in which this above author supported the argument related to the objective in which we can focus on house hold practices of organic pest control. As we all know that pest is something which we need to focus on them once in a month, so that is why we can identify that there is a need of pest control method implementation. These implementations should be eco-friendly & budgeted in nature. there are enormous methods & technique that suggest that organic pest control method should be consider not as irregular practices but with efforts & knowledge we can use these concept and skill in our day-to-day life.

## Scope

- a) Every house hold has different style of housekeeping, majority people do these practices with reachable resource & try to find and apply different tips & trick which helps them in reduction of time & money.
- b) Organic pest control can be portrait as the opportunity for many people to conduct effective way maintaining hygiene & sanitation.
- c) It is a need which needs to focus on the awareness & conduction of educational program which helps to conduct new practices by adoption of new tactics & refinement of current practice.
- d) It is very conventional practice the more we explore the more we get.
- e) It also helps in reducing things in pest control toolbox.
- f) Its gives the idea that which organic compound act effective against different type of pest. It's also gives us the knowledge that we can retain those organic practices instead of constantly uses of mechanical & chemical practices.
- g) It allow each individual to understand environment management such as light, atmosphere and humidity, to prevent pest reproduction.



## Limitation

- Due to current scenario, it is not possible to get interview directly, so the primary data collected through questionnaire by g-form.
- Because of certain time deadline it is conducted in specific area of Chennai city.
- Questions are made in open ended structure manner to get to know respondent honest opinion.
- The majority secondary data is collected by journals, article & report.

To reduce these factors the format of questionnaire is made in more direct form we can gather more primary data.

## Research Design

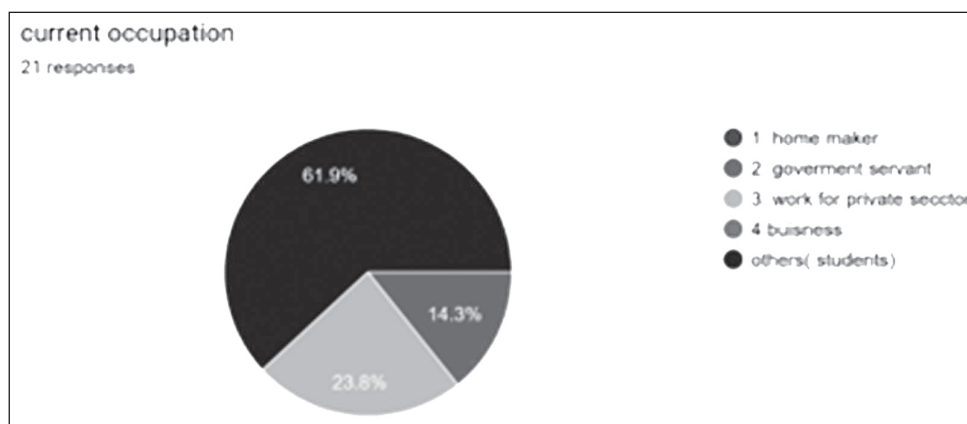
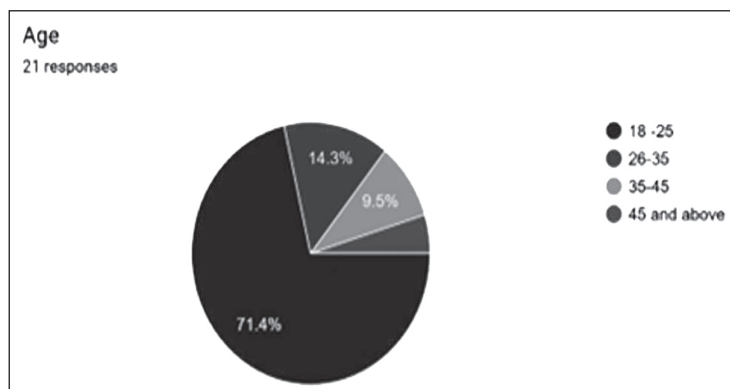
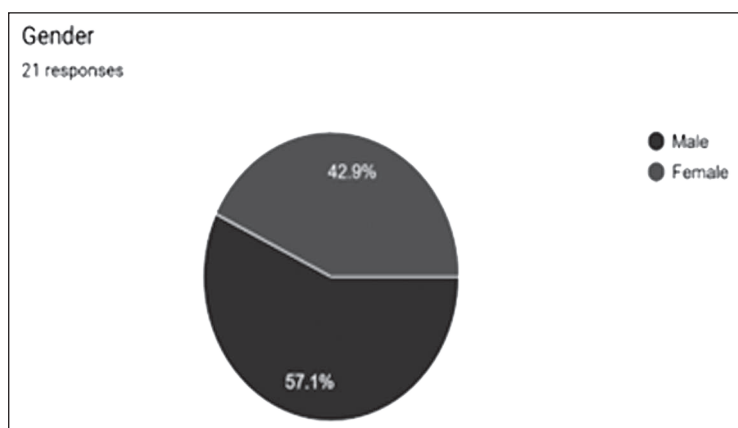
**Type of Research:** It is type of descriptive research where researcher is finding out the practices of organic pest control conducted by different house hold people in Chennai. And what are different remedies to control them. researcher also interested to known about some organic product which we can use in day-to-day life for make these practices regular basis. They want to know about respondent point of view about organic or green pest control. Questionnaire for interview its based on structured open-ended to base on current practices they are doing.

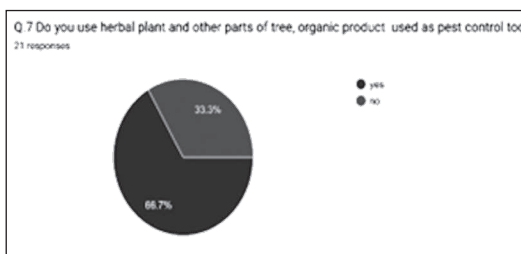
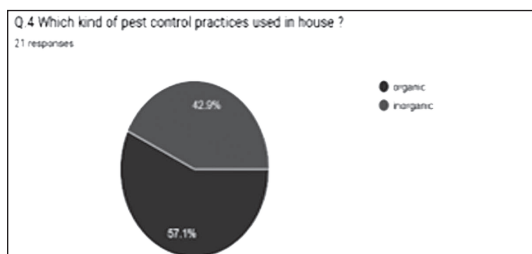
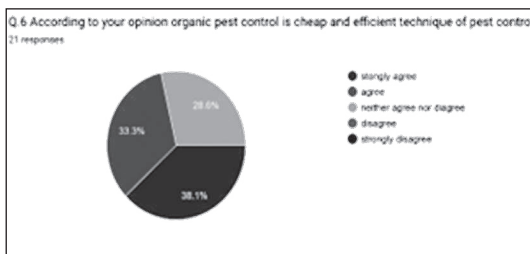
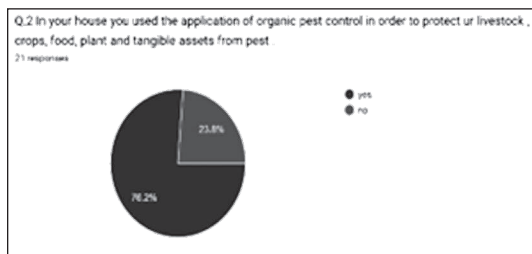
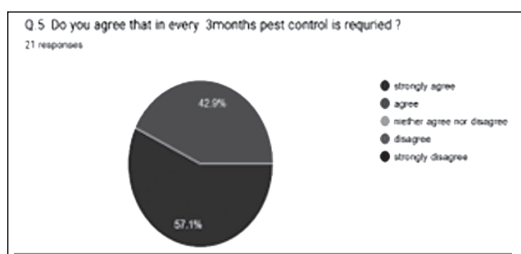
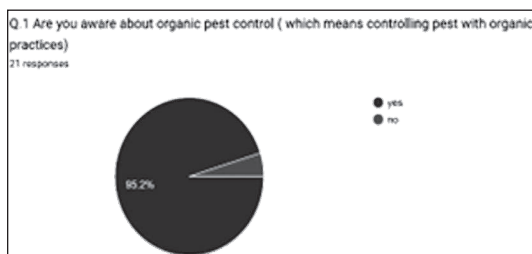
## Research Methodology

In this research primary data is collected trough interview based on structure open-ended questionnaire. there are two types of tools are used for the collection of data, first is Likert scale another is direct statement-based question in order to know the respondent's specific opinion. Sample are distributed to several house hold people in Chennai for the collection of primary data.

Secondary data is collected is collected by journals, article, books, magazine, & internet. Which is showcase in above literature review.

Below data represent the analysis of data which we got from sample.





## Findings

- 95% house hold people are aware about organic pest control. In current data the respondent is 43% are female & 57% are male in which majority age of respondent is in between 18-25 is 71.4% and rest 14.3% are in between 26-35 age, 9.5%are in between 35-45 age remaining 5.8 % is above 45 ages.
- 61.9% respondent's current occupation is student they are pursuing graduation degree, 14.3 % respondent are government servant & remaining work for private sector & own their business.
- 76.2 % house hold people are using organic pest control method in order to protect their livestock, crop, food & tangible asset from pest. The remaining goes commercial & chemical technique of pest control

- 28.6 % of respondent have seen pest like arthropods (six leg insect), 14.3% have seen weed in plants and in their garden, 52.4% have seen rodent that rats & mice & remaining have seen molluscs (snail).
- 57.1 % respondent inform that they use organic technique & method of pest control & remaining inorganic.
- 57.1% respondent are strongly agreeing that in every 3 months pest control is required & remaining 42.9% are only agree on this.
- 38.1 % respondent strongly agreeing that organic pest control is cheap & effective technique, 33.3 % respondent only agreeing & remaining are not sure.
- 66.7% of respondent uses herbal plant and other parts of tree, organic product used as pest control tool & remaining 33.3% are not using any organic product for pest control.
- Neem leaves dried, Turmeric, Dried red chillies, neem leaves, boric acid, cryolite, Handpicking the caterpillars, Swatting housefly & mosquitoes, Shaking the plants, Neem oil, Green Match, C-cider (specially used for weed Neem spray mineral kind of product Neem leaves), cow dung cake, turmeric, cinnamon, Egg shell, wasted veggie Lemon grass oil, pyrethrum (pyrethrum), rotenone or Rania (botanical insecticide, fermented curd etc. Lime, cloves, camphor, fenugreek are some of the organic product which we can use for organic pest control.

in this entire survey neem is found out to be more effective & suggest organic product for organic pest control.

**Neem is most effective organic pest control product, which is eco-friendly & does not have side effects.**

- It works to repel insects, prevent them from eating, and impede their development, metamorphosis, and reproduction. Although neem-based formulations seldom directly kill insects, they can significantly modify their behaviour to lessen pest damage to crops and decrease their reproductive capacity.
- Neem extracts have generally been tested on about 300 insect species, mostly belonging to the orders Orthoptera (grasshoppers, katydids, etc.), Homopteran (aphids, leafhoppers, etc.), Dictyoptera (cockroaches and mantids), Lepidoptera (moths and butterflies), Heteroptera (true bugs), Diptera (flies), Coleoptera (beetles and weevils (NRC, 1992; Randhawa and Parmar, 1993).

- Effects of neem on several common pests, In Africa and Asia, locusts—winged insects—pose a serious threat to trees and crops. In Africa, Asia, and Europe, field experiments, semi-field trials, and laboratory studies on the effects of neem tree components and seed kernels on locusts and grasshoppers were conducted. Neem oil has a highly potent phagorepellent impact on both the desert and red locusts. The striped grasshopper was subject to the same rules. The findings shown that several significant species of locusts and grasshoppers may be successfully controlled in farmer's fields using neem oil and other products (aqueous seed kernel extracts, neem seed powder).
- Azadirachtin-enriched neem oil stops locusts from growing into the migratory swarms that are so harmful to plants. The development of locust plagues can be stopped by dosages as little as 2.5 litres per acre. They grow lonely, lazy, and nearly immobile while still alive, making them very vulnerable to predators like birds.
- Neem has a similar effect on grasshopper nymphs. Some crops can be protected from locusts for a week to a month by utilising seeds soaked in neem oil or applying neem products to the soil.
- It has been demonstrated that cockroach species can develop more slowly when exposed to neem seed extract. The young cockroaches are killed, and the adults are prevented from producing eggs.
- Both neem oil and de-oiled neem cake, which is what is left over after the oil has been extracted from the seeds, are very effective against rice pests. Rice crops can be shielded against brown plant hoppers with five treatments of a 25% oil emulsion sprayed with an extremely low-volume sprayer. Green leaf hopper in rice is significantly less effective at transmitting the tungo virus when using neem products.
- One of the most destructive pests of food crops in the western hemisphere, armyworm, is effectively repelled by neem. Azadirachtin suppresses the pests at extremely low concentrations—just 10 mg per acre. Leaf miners are a major pest in regions of North America, and neem extract is effective against them. Neem seed extract is just as effective as synthetic insecticides that are sold commercially. The US Environmental Protection Agency has given it the go-ahead for use against leaf miners.
- Neem treatments have proven to be highly successful in combating the deadly European corn borer, which destroys large amounts of maize and other crops

- Controlling pests in stored goods has been one of the traditional applications of neem in Asia. Farmers typically combine neem leaves with grain before storing it for a while. Weevils, flour beetles, bean-seed beetles, and potato moths are just a few of the insects that are deterred by neem leaves, oil, or extracts. Neem oil or other compounds high in azadirachtin can be used to treat jute bags to stop pests like weevils and flour beetles from penetrating them. Neem oil kills bean-seed beetles (bruchids), a group of insects that primarily target legumes, right at the egg stage. Neem leaves, clay, and cow manure are combined to create a pest-resistant material that may be used to create grain storage bins.

## Conclusion

- Organic pest control practices are cheap & effective; it is vast range of study one can have different sets & dimension of the study which provide various scope.
- The study also suggest that people are aware about organic pest control and they do apply its application while keeping their house.
- It is affordable practice & very helpful in removal of pest.
- There is different type of tips & tricks which is very easy to apply and does not take much time and money.

## Suggestion & Recommendation

- Organic pest control consists of practices which needs promotion in order tom spread awareness in a population
- Practices which involve neem in forms should be priority first and one should always have neem plan or tree in their house.
- Camphor, turmeric, essential oil, vinegar, cow dunk should consider in monthly grocery list.
- social media also plays crucial role in order to spread knowledge of organic pest control. By making videos & post can also be very helpful.

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**ISBN: 978-81-960940-3-4**

# **An Appraisal of Housekeeping and Maintenance Practices adopted in Schools of Lucknow**

**(Case Study of Lucknow Public Schools and Colleges,  
Lucknow, Uttar Pradesh, India)**

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## **Abstract**

Attitude plays a crucial role in student development and learning. If the school is clean and people are happier in general, this positivity spreads. When it comes down to it, the importance of cleanliness in school is related to educational success. A clean school ensures a positive and healthy environment for everyone involved. Management of the school must ensure and feel pride with a clean facility that fosters productive learning and positivity. Work together as a team to ensure that everyone does their part to make your school a clean and safe place to learn.

Current study highlights the existing practices of housekeeping and maintenance services in the various branches of Lucknow Public School and develops the standard operating procedures based on area inventory list (AIL), frequency schedule, performance standard, productivity standard, time and motion study, pathway chart, process chart, operation chart, and job procedures with duty rota based on existing human resources.

**Keywords:** Hygiene, sanitation, housekeeping, maintenance, standards, tools, chemicals, awareness, conservation.



## **Introduction**

School plays a vital role not only in career building but also in learning and developing their social skills which always help a child in his/her life. A safe, clean, hygienic environment help students to learn more effectively and no one can neglect the importance of cleanliness and maintenance.

Clean schools promote positivity and have a real impact on the quality of the students' education. Housekeeping and maintenance staff are generally neglected or overshadowed with academicians and other office administrative staff of the schools. Housekeeping and maintenance is the backbone of institutions it facilitates the students, parents, administrative supportive staff in terms of their health, comfort, and academic activities therefore the purpose of the study to prepare standard operating procedure and maintenance guidelines for the management of Lucknow public schools.

**Lucknow Public School** was started in 1983 which has today transformed into a well-known chain of schools with 7 branches in Lucknow, 3 branches in other districts of Uttar Pradesh and 1 branch in New Delhi and total number of students including all branches are more than 26000. There is even a professional college preparing youth for a job-oriented future. Currently the group known as Lucknow Public Schools & Colleges, spearheaded by the crystal clear vision of Dr. Shiv Pal Singh has been achieving one milestone after another. But its biggest contribution lies in bringing affordable, and yet, top quality education to all strata of society. Digital classrooms and latest pedagogical methods are used to explain concepts to students and make learning easier. Branches in Madhoganj- Hardoi, Lakhimpur kheri and Sitapur were opened to ensure that the underprivileged kids or those unable to migrate to bigger cities get the best education in their home town. Teaching is done in both Hindi and English medium at some of the branches.

## **Research Objectives**

The main objectives of the study are as follows:

1. To do appraisal of housekeeping and maintenance practices adopted in Schools of Lucknow
2. To study the role of standardization of housekeeping and maintenance practices in ensuring safe and secure school environment for imparting education.
3. To perform analysis of existing housekeeping and maintenance practices adopted by the schools from housekeeping and maintenance perspective.

4. To suggest new ways of efficient and cost effective housekeeping and maintenance practices.
5. To create awareness about the benefits of standard practices of housekeeping and maintenance practices..

## **Research Methodology**

The present study used the quantitative as well as qualitative approaches which have been further analyzed for valuable information.

## **Research Design**

### **Sampling Design for Mapping and Survey**

A sampling design is a definite plan for obtaining a sample from a given population. It referred to procedure or technique the researcher is going to implement in selecting the items for the sample.

### **Mapping and Survey**

Mapping and survey of all seven schools inclusive of hostel facilities are done by a team of third semester students of M.Sc H.A. and data were gathered in terms of total floor area, total green area, total built up area, number of class rooms, laboratories, library, entertainment and recreational facilities, administrative and supporting offices, indoor and outdoor games, swimming pool, inventory of furniture, fixtures, and equipment, types of finishes inclusive of ceilings, walls and windows, floors, sanitary fittings, chemicals, detergents, fire fighting features, first aid kits, housekeeping cleaning agents, tools and utensils used in .

## **Findings**

1. All the branches of LPS have sufficient built up area to accommodate students for academic as well as semi academic activities(sports, entertainment, recreational activities)
2. All the classrooms of all the branches of LPS are fully equipped with most modern technology, safety and security features and comfortable environment

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3. Ratio of academic staff with the students found as per the norms of affiliated boards.
4. The ratio of housekeeping and maintenance staff was found very poor in comparison to international schools.
5. Few branches of LPS were not carrying sufficient housekeeping and maintenance equipment and utensils.
6. Staff engaged in housekeeping and maintenance was not found qualified and trained.
7. Housekeeping and maintenance staff members were not familiar with the chemicals and detergents to be used on various floor surfaces, windows panels and wall treatments.
8. There was no provision for in house training for the housekeeping and maintenance staff.
9. Housekeeping and maintenance staff members were not satisfied with the quality of meals and frequency of inspection of various building systems
10. Mostly staff members and students were not satisfied with current housekeeping and maintenance practices.
11. There is need to have separate housekeeping and maintenance department in all branches of LPS.

### **Limitation**

Limitation of the current study was paucity of time as researchers were not able to dedicate much time for the study as they have to manage two things simultaneously that is their college work as well as research work.

## Description of Universe

All seven schools of LPS operating in Lucknow were selected by researchers for the study:

**Table 1: Survey and Mapping Schedule**

Name of Institution	Location	Survey Schedule	Mapping & Survey conducted by
Lucknow Public School	Sahara States	1st August -6th August 2022	All surveys and mapping were conducted by students of M.Sc Third Semester as their field research work.
Lucknow Public School	B-Block, Rajaji Puram	7th August -13th August 2022	
Lucknow Public School	A-Block, Rajaji Puram	16th August -22nd August 2022	
Lucknow Public School	Aamrapali Yojna	3rd September- 8th September 2022	
Lucknow Public School	Vrindavan Yojna	12th September- 16th September 2022	
Lucknow Public College of Professional Studies	Gomti Nagar	18th d September- 29th September 2022	
Lucknow Public School	Anand Nagar	3rd October- 8th October 2022	

**Source:** Developed for Research

## Target Population

According to Hair et al., (2006) target population is said to be specified group of people or object for which questions can be asked or observed. The target population for this study includes respondents who are the students, supporting staff inclusive of housekeeping and maintenance staff of all seven branches of LPS.

## Population Size

Table 2 depicts the population size of all schools which is dependent on number of students, faculty members, administrative and supporting staff inclusive of housekeeping and maintenance staff. Total strength of students in all branches of LPS in Lucknow: 20,410, total academicians: 432, total administrative staff: 177 and supporting staff inclusive of housekeeping and maintenance: 123.

**Table 2: Population Size**

Name of Institution with location	Total No. of Students	Faculty members/administrative/ supporting staff inclusive of housekeeping and maintenance staff
LPS Sahara States	3500	80/30/22= 132
LPS B-Block, Rajaji Puram	2700	55/22/12=89
LPS, A-Block, Rajaji Puram	1950	36/18/14=68
LPS, Aamrapali Yojna	3210	74/27/19= 120
LPS, Vrindavan Yojna	2600	53/22/12=89
LPCPS, Gomti Nagar	4300	94/36/28= 158
LPS, Anand Nagar	2150	40/22/16=78
Total	20,410	Faculty : 432 Administrative & Supporting Staff: 177 Housekeeping and Maintenance Staff: 123 Total Staff: 732

**Source:** Developed for Research

### **Sampling Units: 07 Schools**

**Table 3** shows sample size of respondents and frequency of surveys required to conduct from all seven schools:

**Sample Size:** Out of 432 academic staff of all branches of LPS, approximate 80% (355 ) respondents were responded and considered and (41%) 123 responses were considered from supporting, housekeeping and maintenance staff out of total 300.

**Table 3: Sample Sizes of Respondents**

Name of Institution with location	Total No. of Academicians	Total no .of Respondents (Sample Size)	Total Supporting , Housekeeping and Maintenance staff	Total no. of Respondents
LPS Sahara States	80	61	60	22
LPS B-Block, Rajaji Puram	55	47	34	12
LPS, A-Block, Rajaji Puram	36	34	32	14
LPS, Aamrapali Yojna	74	56	46	19
LPS, Vrindavan Yojna	53	45	34	12
LPCPS, Gomti Nagar	94	75	64	28

Name of Institution with location	Total No. of Academicians	Total no .of Respondents (Sample Size)	Total Supporting , Housekeeping and Maintenance staff	Total no. of Respondents
LPS, Anand Nagar	40	37	38	16
Total	432	355	300	123
% of Responses	80%		41%	

**Source:** Developed for Research

## Research Instrument

Questionnaires were used as a tool for gathering data in this study. As pointed out by Sekaran (2003), questionnaire can be an efficient mechanism for collecting data when the researcher knows how to measure the variables under investigation. According to Leary (1995) the guidelines for designing a useful and effective questionnaire are as follows:

- Using accurate technologies while phrasing questions.
- Questions should be as simple as possible, avoiding difficult words and unnecessary terminology.
- Avoid making unnecessary assumptions about the respondents.
- Choosing an appropriate format.
- Pre-testing the questionnaire using a pilot test.

Two different questionnaires were developed by using literature review, mapping and physical survey of the each schools and organized on the basis of background information of the respondents (students and housekeeping and maintenance staff) and the research objectives. This was to ensure relevance of research problem. Questionnaire was developed into three parts:

**Part A:** Part A comprises of six questions and the purpose of this part was to explore demographic profile of the students housekeeping and maintenance staff.

**Part B:** Part B of questionnaire was carrying five statements and purpose to analyse existing housekeeping and maintenance practices adopted by the schools measure from strongly disagreed to strongly agreed) of existing Housekeeping and Maintenance Practices adopted by the schools.

**Part C (1)** of the questionnaire designed for academic : Academicians were asked to rank features, facilities and services specially classrooms, laboratories, and library, mannerism of housekeeping and maintenance staff, accommodation and catering services provided on board during their stay in the school/ hostel from highly satisfied to dissatisfied.

**Part C (2)** of the questionnaire designed for supporting, housekeeping and maintenance staff : staff members were asked to rank of working conditions, working hours, weekly offs, compensation, existing stage of maintenance of features, facilities and services specially in classrooms, laboratories, awareness level of finishes of floors, roofs, windows, water and drainage system, electrical network systems, Heating and ventilation systems, safety and security, first aid provisions, detergents and chemicals, tools and equipment, training , standard operating procedures of housekeeping and maintenance services and catering services provided by school management during their stay in the school/ hostel from highly satisfied to dissatisfied.

### **Pilot Study and Instrument Validation**

Pilot study was conducted by using a structured questionnaire with a sample size of 25 students and 10 supporting, housekeeping and maintenance staff of these schools. After getting the feedback, opinions, comments and suggestions from the respondents, researcher modified and final questionnaire was drafted.

### **Data Collection Methods**

Data is considered as the information gathered from the respondents or through any other source that is useful and relevant to the research topic. Data collection is an important aspect of any research study. Inaccurate data collection can lead to incorrect results of a study and eventually lead to invalid results. In the present research, both primary and secondary data were used.

#### ***Primary Data***

Most of the study is based on primary data collected from various respondents in the chosen reference frame. For collecting primary data, researchers have administered two questionnaires to the students and housekeeping and maintenance staff of these schools.

#### ***Secondary Data***

Secondary data was collected from text books on Housekeeping and Maintenance, SOPs adopted in International and domestic schools, research journals and publications, articles and research papers of other researchers in the relevant field of study.

### ***Data Processing Tools***

Data processing is an intermediary stage between collection of data and their analysis and interpretation. Researchers included editing, coding, classification and tabulation of the data collected so that they were amenable to analysis during data processing and resulted meaningful conclusions.

### ***Tools used***

MS Excel is used for descriptive statistics and percentage analysis and analyzes the results as per the study objectives.

## **Review of Literature**

A literature review is **a piece of academic writing demonstrating knowledge and understanding of the academic literature on a specific topic placed in context**. Researchers reviewed couple of following research papers and find-out key points and issues address by the eminent research scholars.

### **Role of Standardization**

Standardization always reflects with its couple of S namely: Sort, Systematize, Sweep, Safely, Self-discipline Set, Shine, Standardize and Sustain in housekeeping and maintenance department. These entire S become very essential during and Post Covid 19 and housekeeping and maintenance becomes focus area in all social, commercial and welfare establishments.

## **Review of Literature**

- 1) **Name of author** - Richard Shaughnessy , Mark Hernandez and Ulla Haverinen-Shaughnessy

**Study** - Effects of classroom cleaning on student health: a longitudinal study.

**Key points** - Found that enhanced cleaning protocol, including bi-weekly cleaning of classroom desks, as well as training of custodians and teachers, monitoring of effectiveness, and feedback.

- 2) **Name of author** - P. J. Marks, I. B. Vipond , F. M. Regan , K. Wedgwood , R. E. Fey and E. O. Caul

**Study** - A school outbreak of Norwalk-like virus: evidence for airborne transmission



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**Key points** - Pupils were significantly more likely to become ill following an episode of vomiting within their classroom. The times from exposure to illness were consistent with direct infection from aerosolized viral particles where exposure to vomiting was high.

### 3) **Name of author** - Uduak Imo EKPOH

**Study** - School Plant Maintenance Culture and Utilization

**Key points** - School plants at all levels of education are poorly maintained.

Attitude of school personnel to maintenance culture is generally very negative. Repairs only take place when a problem arises due to break down and maintenance work at school is “unsystematic, uncoordinated and not holistic”. building walls collapsing and killing both staff and pupils in some parts of Nigeria

### 4) **Name of author** - Franciele Maria Costa Ferreira , HenorArtur de Souza

**Study** - Management for maintenance of public education

**Key points** - Lack of financial resources, disqualified and insufficient workforce, lack of investment in the Information Technology sector specific for this purpose, absence of a plan or program for maintenance, absence of specific actions in maintaining structured steel constructions, lack of technical staff for the preparation of inspections, reports and memorial.

### 5) **Name of author** - Peter Fsadni, Frank Bezzina, and Stephen Montefort

**Study** - Impact of School Air Quality on Children's Respiratory Health

**Key points** - Indoor formaldehyde, particulate matter (PM 2.5 and PM 10), CO, outdoor particulate matter (PM 2.5, PM 10), and ozone exceeding recommended international thresholds

Old buildings, south facing windows, and cleaning/maintenance schedules were found to have an increased risk of exposure to limonene, CO, and outdoor pollutants (NO<sub>2</sub> and ozone).

### 6) **Name of author** - Justice Agyei Ampofo

**Study** - Implications of poor waste disposal Management practices on senior high schools within the wa municipality of Ghana

**Key points** - The study found out that student's teachers and school management in Senior High Schools within the Wa Municipality are not comfortable living with the waste disposal in their schools. Furthermore, it emerged from the study that there is poor waste disposal management problems in Senior High Schools within the Wa Municipality. The study further found out that poor waste disposal in Senior High Schools within the Wa Municipality have some negative effects on students/teachers/school management and this

constitute disaster for Students, teachers and school management. Moreover, the study found out that poor waste disposal in Senior High Schools within the Wa Municipality causes air pollution which is very serious to the health of students, teachers and school management in the Wa Municipality.

## Research Gaps

From the previous research papers we got to know that they noticed the issues like less attendance due to illness, lack of maintenance fund in schools, and impacts of poor maintenance but no one discussed about the importance of setting standard operating procedures of housekeeping and maintenance practices in schools and satisfaction level of the supportive staff.

Our study is not only focusing on importance of setting SOPs of housekeeping and maintenance practices in schools, satisfaction of supportive staff but also creating awareness related of hygiene and cleanliness among students, teachers and supportive staff.

## Data and Data Analysis/Discussion

### Demographic Profile of Respondents

Table 4 depicts total number of academicians working in all seven branches of LPS and ratio of male is higher than female students in all branches. Maximum age of academicians was 29 years.

*Table 4: Demographic Profiles of Respondents*

Name of Institution with Location	No. of Respondents	Male: Female Ratio	Maximum Age
Sahara States	61	55:45	28
B-Block, Rajaji Puram	47	52:48	32
A-Block, Rajaji Puram	34	61:39	29
Aamrapali Yojna	56	70:30	28
Vrindavan Yojna	45	65:35	28
LPCPS, Gomti Nagar	75	54:46	29
Anand Nagar	37	60:40	27
Total/Average	355		29

**Source:** Developed for Research

## Demographic Profile of Housekeeping Staff

Researchers found that more than 85% of workforce was female staff out of total 123, staff working in LPS found experienced but not well qualified as just 18% of total human resource working in housekeeping and maintenance department were 10<sup>th</sup> or 12<sup>th</sup> standard. No maintenance staff was carrying any technical qualifications and there was no professional housekeeper in any branch of LPS.

**Table 5: Demographic Profiles of Supporting, Housekeeping & Maintenance Staff**

Name of Institution	Total No. of staff	Work experience (in years)			Male/ female ratio	Qualification Area of work			Area of work	
		5-10	11-15	16-20		5th -7th	8th -9th	10th -12th	House-keeping	Maintenance
Sahara States	22	7	10	5	15:85	17	2	3	17	5
B-Block, ajaji Puram	12	6	4	2	12:88	11	1	0	8	4
A-Block, Rajaji Puram	14	5	4	5	14:86	10	3	1	10	4
Aamrapali Yojna	19	10	4	5	16:84	16	2	1	16	3
Vrindavan Yojna	12	4	4	4	20:80	9	1	2	8	4
Gomti Nagar	28	13	12	3	15:85	23	3	2	19	9
Anand Nagar	16	9	5	2	12:88	13	2	1	13	3
Total / Mean	123	7.71	6.14	3.71		14.14	2	1.42	13	4.75

**Source:** Developed for Research

**Ratio of Supporting, Housekeeping and Maintenance staff between Students and Built up area:** Table Researchers found that average ratio of housekeeping and maintenance staff is very low (165 students:1 staff) as compare to International standards for schools are **80:1**. Ratio of housekeeping and maintenance staff with total area/ built up area also varied from total school to school and it was observed that LPS Gomti Nagar Branch had minimum ratio of 1: 161.00 square meter while maximum ratio is 1: 1000 square meter in Vrindavan Yojna Branch (**Table 6**).

**Table 6: Descriptive Statistics and Percentage Analysis of Supporting, Housekeeping and Maintenance Student / Staff and Built up Area/ Staff**

Name of Institution with location	Total No. of Students	Total No. of Housekeeping & Maintenance staff	Ratio of HK/ Maintenance students: staff	Total area of the school (in sq.mts)	Built Up area
LPS Sahara States	3500	22	159:1	9448.64	2835.0
LPS B-Block, Rajaji Puram	2700	12	225:1	9448.64	2835.0
LPS, A-Block, Rajaji Puram	1950	14	139:1	9448.64	2835.0
LPS, Aamrapali Yojna	3210	19	168:1	8481.0	2124.0
LPS, Vrindavan Yojna	2600	12	217:1	9449.0	12,000.0
LPCPS, Gomti Nagar	4300	28	154:1	15015.0	4500.0
LPS, Anand Nagar	2150	16	134:1	9448.64	2835.0
Total	20,410	123	166:1		

**Source:** Developed for Research

**Part B: Analysis:** Researchers framed six statements to perform descriptive statistics and percentage analysis of existing housekeeping and maintenance practices adopted by the schools and below Table 7 depicts the rating done by the academicians of their own branch. More than 90% respondents were agreed and appreciated the idea of setting of green house club and assigning them for a special task that they should complete at the end of every learning day, whether it's putting pencils and pens back in their cups or wiping down the desks, it's a good way to encourage productive teamwork.

**Table 7: Descriptive Statistics and Percentage analysis of Existing Housekeeping and Maintenance Practices**

Statement	Strongly disagreed	Disagreed	Neither disagreed or agreed	Agreed	Strongly agreed
Every part of the school is thoroughly clean, and surfaces are wiped down and sanitized on a regular basis?	10%	10%	40%	28%	12%
Do you think that housekeeping and maintenance staff take pride in their work and cares about your place of learning?	14%	14%	16%	32%	24%

Quality of cleaning materials and tools used by housekeeping staff?	24%	18%	16%	22%	20%
A Clean Environment Means People Care. Idea of Setting of a Green House Club (Get the Students Involved)	5%	10%	5%	25%	60%
Assigning students a special task that they should complete at the end of every learning day. Whether it's putting pencils and pens back in their cups or wiping down the desks, it's a good way to encourage productive teamwork.	5%	5%	5%	25%	65%

**Source:** Developed for Research

## Ranking of Facilities and Services

From the ranking it was disclosed that 50% academicians were not satisfied with cleanliness of classrooms, labs & libraries, mannerism of staff, staff uniforms and maintenance services while most of the students are very satisfied with general upkeep of hostel facilities (Table 8).

**Table 8: Descriptive Statistics and Percentage Analysis of Facilities and Services**

Maintenance and Upkeep	Highly Satisfied	Very Satisfied	Moderately Satisfied	Satisfied	Dissatisfied
Cleanliness of Classrooms, Laboratories and library	5%	15%	30%	40%	10%
Mannerism of Housekeeping staff	25%	25%	10%	30%	10%
Maintenance of dining room, canteen	5%	15%	30%	20%	30%
Uniform of housekeeping and maintenance staff	15%	15%	30%	20%	20%
General upkeep of hostel and rooms	25%	55%	10%	5%	5%
Preventive maintenance of Furniture, fitting and equipment	15%	15%	30%	20%	20%

**Source:** Developed for Research

**Part C Level of Satisfaction:** Most of the employees were satisfied with working environment, duty hours, salary, week-offs but they were found unsatisfied with existing stage of maintenance of features, facilities & services of classrooms, laboratories and library. Staff was not familiar with cleaning procedures, finishes of floors, roofs, windows. They were not satisfied with provision of meal, first aid, quality of detergents, chemicals, tools, utensils. Researchers found irregularities in frequency of inspection of electrical, plumbing, ventilation, safety and security systems and there was no provision of in house training for the staff (Table 9)

**Table 9: Descriptive Statistics and Percentage analysis of Level of Satisfaction**

Statement	Highly satisfied	Very satisfied	Moderately satisfied	Satisfied	Dissatisfied
Working hours	5%	10%	20%	35%	30%
Weekly offs	5%	15%	30%	50%	10%
Compensation	5%	5%	20%	40%	30%
Existing stage of maintenance of features, facilities & services of Classrooms, Laboratories and Library	5%	5%	20%	20%	50%
Awareness level of cleaning procedures of finishes of floors, roofs, windows,	0%	05%	05%	10%	80%
Meal facilities	25%	25%	10%	30%	10%
Provision of first aid during accidents	5%	5%	40%	30%	20%
Availability and quality of detergents, chemicals, tools, utensils	10%	10%	15%	10%	55%
In House Training	0%	0%	0%	0%	100%
Frequency of inspection of electrical, plumbing, ventilation , safety and security systems	10%	10%	10%	10%	60%

**Source:** Developed for Research

## **Result/Findings**

1. All the branches of LPS have sufficient built up area to accommodate students for academic as well as semi academic activities(sports, entertainment, recreational activities)
2. All the classrooms of all the branches of LPS are fully equipped with most modern technology, safety and security features and comfortable environment
3. Ratio of academic staff with the students found as per the norms of affiliated boards.
4. The ratio of housekeeping and maintenance staff was found very poor in comparison to international schools.
5. Few branches of LPS were not carrying sufficient housekeeping and maintenance equipment and utensils.
6. Staff engaged in housekeeping and maintenance was not found qualified and trained.
7. Housekeeping and maintenance staff members were not familiar with the chemicals and detergents to be used on various floor surfaces, windows panels and wall treatments.
8. There was no provision for in house training for the housekeeping and maintenance staff.
9. Housekeeping and maintenance staff members were not satisfied with the quality of meals and frequency of inspection of various building systems
10. Mostly staff members and students were not satisfied with current housekeeping and maintenance practices.
11. There is need to have separate housekeeping and maintenance department in all branches of LPS.

## **Avenues for Future Research**

In the current study, we are studying about the importance of housekeeping and maintenance practices in the schools which would definitely help schools in future as it will help them in designing a better atmosphere of the school for the students as in the the current time no school is focusing much on housekeeping and maintenance practices due to which students, teachers and supportive staff is facing much problems.

## Conclusion

A clean environment means people care. When it comes down to it, the importance of cleanliness in school is related to educational success. A clean school ensures a positive and healthy environment for everyone involved.

Show your school pride with a clean facility that fosters productive learning and positivity. Work together as a team to ensure that everyone does their part to make your school a clean and safe place to learn.

The vision of the Housekeeping Department at the LPS should be a pillar service provider assisting LPS as a whole in reaching its goals. The mission of the housekeeping department at LPS to achieve total quality performance by providing superior quality housekeeping and maintenance services that consistently meet and exceed the expectations of students, parents, visitors & teaching and non teaching staff. Standardization of housekeeping and maintenance services will improve the quality of daily life of students and staff and staff alike by ensuring a clean, safe and healthy environment within all academic, semi academic, non academic and public areas.

Researchers recommend the following suggestions to improve housekeeping and maintenance services to achieve the mission of the LPS:

1. To create awareness about the fundamentals of housekeeping and maintenance equipment, gadgets, and utensils.
2. To develop Standard Operating procedures based on area inventory list (AIL).
3. To design frequency schedule based on performance standard, time and motion study.
4. To organize regular training sessions for the staff of housekeeping and maintenance.
5. To involve students in day to day cleaning practices and formulate green house club for improve their efficiency and effectiveness.



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**ISBN: 978-81-960940-3-4**

# **Importance Given to Hygiene by Customers: A Study in Fine Dining Restaurants of Chennai in the Year 2022**

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## **Abstract**

CLEANLINESS, TIDINESS, NEATNESS, SANITATION and so on ultimately refers to the word HYGIENE. Hygiene and cleanliness is the most important and influencing factor from a customer's perspective. It established seven sanitation-related variables, which were evaluated based on consumers' positive and negative feelings about sanitation.

When cleanliness is rated as the second most important factor by the customer to book a room after the price, it becomes an injunction to the hotel's management. The hygiene of a place can push the business to two extremes in this competitive world. The higher the guest expectations the more hotel becomes responsible to deliver it.

Luxury hotel management must recognise the value of "Professional Competency" and "Understanding" when offering cleaning services and educate their employees on how to do it efficiently, courteously, and in time.

This study attempts to assess how the COVID-19 pandemic has affected consumer views of sanitation in five-star hotels. Additionally, it's noted the most important aspects of sanitation and how they affected the relevant feelings felt by hotel guests.

**Keywords:** : Aspects of Sanitation, Hygiene, Injunction,

## **Introduction**

Making the guest happy is the most important factor in the company's ability to market. All the departments in the hotel come together to make the guest happy and satisfy them as per their expectations and majority succeed in that too. Even after all this the major part a customer is looking is at the cleanliness and hygiene of the place and its surroundings.

It is everyone's responsibility when it comes to keeping an environment clean. Especially the managers and supervisors always make sure the surroundings are spotless to make sure there is no difference between the guest expectations and guest perceptions.

The key to successful hospitality, luxury hospitality in particular, is identifying client expectations and exceeding them. It should not come as a surprise that clean surroundings is a key client demand, particularly in metropolis cities. Customers clearly measure their happiness differently with each and every element since the degree of satisfaction varies with each characteristic. Hotel guests, notably foreign visitors and NRI visitors, are particularly concerned about the consistently terrible air they must breathe while in India since the air pollution in most of the country's major cities reaches appalling levels.

A recent incident in Thiruvananthapuram, Kerala took place in which a 14-year-old boy breathed his last and over a dozen people felt sick who were then shifted to hospitals immediately after eating a shawarma. This incident led to a drastic downfall of the sales of shawarma in the state and also few parts of the country. This shows a major hygiene and safety concern of the place.

To reduce and manage food safety risks during manufacturing, storage, processing, distribution, and human consumption, hotels should use a HACCP (Hazard Analysis Critical Control Point) food safety management system. In order to decrease the incidence of what is known as an avoidable illness, the hospitality industry should recognise, implement, and apply best practises for food safety. Staff members need to be educated and instructed to pay more attention to their personal hygiene, as well as the hygienic conditions of the areas where food and beverages are prepared and the design of hygienic equipment.

## **Objectives**

- To understand the importance given to hygiene and sanitation by the fine dining restaurants.
- To understand the importance given to hygiene and sanitation by the customer before going to the place.

- To know whether the outlets are reaching the customer's expectations in the hygiene and sanitation aspect.

## Methodology

In this research work, the primary information is collected from one-to-one conversations with the hotel managers. The secondary data is collected through books and journals.

## Review of Literature

**ASK SARAH HUSSAIN ET AL (2015)** The hotel business in India has developed into a key driver of the country's services sector and overall economic growth. The way a hotel treats its visitors has a big impact on how successful it is. Making sure and keeping happy guests is one of a hotel's most challenging and demanding tasks. A company needs to be able to provide outstanding service and satisfy customers' requirements in order to forge lasting relationships with them. The purpose of this study was to identify the elements that lead to customer satisfaction by analyzing hotel employees' impressions of the 5 Star Deluxe Hotel Category in New Delhi.

**B. JESSZON CANO (2019)** The efficacy of hotel room attendants is supported by traditional housekeeping methods. This study's main objective was to determine how satisfied guests were with the room attendants' level of cleanliness. Fifty visitors participated in this research. The instruments are made up of three parts. Part 1 of the report focuses on the respondents' demographics, Part 2 on the guests' level of enjoyment, and Part 3 on the most frequent problems encountered by tourists. The data were analyzed using a number of statistical methods, including weighted averages, frequency analysis, basic percentage calculations, and Spearman's rho correlation. The majority of the attendees expressed satisfaction with the event's service. However, visitors to the resort have voiced some complaints. The information on gaps in service quality may be used by resort management to pinpoint the areas for improvement. Businesses require a stable staff if service standards are to be internalized.

**PAZIR, DIL, et al (2019)** The key to a business' success in today's cutthroat economy is its ability to keep consumers satisfied. Service providers must comprehend their customers in order to enhance their offerings in a way that maximizes customer happiness. The goal of this study is to determine how well hotel guests are treated in Kashmir Valley. The findings of the study will be applied to provide consumers with advice on how to raise the calibre and efficiency of their services. In order to collect primary data from survey respondents, questionnaires are utilized. The study's sample size is 150 people. In statistical research, sample size is decided using sample variance and confidence methodologies. Using a straightforward random sampling method, the researcher obtained the data.

**MAZUMDER, SUMAN, ET. AL (2014)** As the number of international tourists visiting Bangladesh continues to rise, it is becoming more and more important to thoroughly investigate the service quality claims made by Bangladeshi hotels. The main objective of this study is to find out whether or not local and international hotel clients in Bangladesh have different expectations and opinions of service quality. In order to construct the concept of service in this essay, a thorough literature review is employed as a starting point. To compare hotel guests from the United States with those from other nations, we employed a modified version of the SERVQUAL model in this study. According to the poll, hotel guests' perceptions of the sector's service quality were below their expectations. Bangladeshi travelers to hotels have the lowest standards and perceptions of the establishments there. The general customer satisfaction scores between local hotel customers and hotel visitors from foreign countries were determined to be poor. Before you can conceptualize and apply service quality successfully as a hotel, you still have a long way to go. Such a piece will help forward the debate on crucial reforms in these fields.

**Whereas, Mustafa et al** recognised a number of advantages and potential growth drivers for the Jordanian tourist industry, including its favourable reputation, its wide variety of natural and cultural resources, and its high degree of security and safety in comparison to its neighbours. They made the point that safety and security follow political stability, and that tourists prioritise safety and security when deciding where to travel or spend their holidays.

As the second-largest sector and top earner of foreign money, tourism is crucial to Jordan. In 2013, there were 46,667 people employed directly in the travel and hospitality sector. **Alafi** conducted research on Jordan's tourism infrastructure and earnings in 2014. He stressed Jordan's stability:

*"Jordan stands out strategically in the core of the region as a safe, secure destination with a stable, almost democratised Hashemite Kingdom ruled by King Abdallah II since 1999; economically Jordan would like to increase tourism investment, because of its political stability, religious toleration, a higher quality of life, better healthcare and education compared with surrounding areas, cosmopolitanism, exquisite cuisine, friendly and welcoming people, together with a reasonably liberal social and economic environment".*

Jordan is abundant in natural resources as well as man-made ones. The capital, Amman, was constructed over the ruins of the ancient city "Philadelphia," Jerash is one of the largest Decapolis cities in the Middle East, the Baptism site is near the Dead Sea, the Golden Triangle is made up of Petra, Wadi Rum, and Aqaba, and there are hundreds of other historic sites spread throughout the country. As a result, Jordan's hotel industry has generally grown over the past five years. In addition to numerous unclassified hotels and flats, Jordan has 245 categorised hotels.

## Hygiene and Sanitation

Customers are served by hotels for a reason. Families, vacationers, and business travellers are just a few examples of the several categories that clients might fall under. Although not every client need assistance while they are there, the staff should constantly keep in mind that “every encounter the staff make with the customer within the hotel is a chance for the employees to make their mark.” Effectively managing those moments requires dedication and a sense of long-term affiliation with the organization. Effective visitor management and attention to their comfort can occasionally lead to the acquisition of long-term repeat business.

As much as the guest interactions matter in retaining the guests, the cleanliness and hygiene also plays a major role in the same. According to Bharwani et al., hoteliers regard cleanliness to be the primary risk in the hospitality sector. They said that the hotel sector is frequently negatively impacted by a pandemic disease's impact, such as swine flu or corona virus.

They also stressed the hotel's dedication to maintaining high levels of sanitation in food production and the physical security of its visitors as they use the sauna, gym, swimming pool, spa, and other facilities. Food safety at hotels is critically dependent on the kitchen personnel. Hotels should implement a HACCP (Hazard Analysis Critical Regulate Point) food safety management system to limit and control food risks throughout manufacturing, storage, processing, distributing, and human consumption, according to Al Yousuf et al.

When it comes to hotel hygiene and the perception of how sanitary each room and item is, five-star hotels are even more under the microscope and are required to follow the strictest standards. The reputation of the hotel may be on the line; thus, the health and wellness of the workers and visitors comes first.

### **Some essential food safety and hygiene practices which must be kept in mind:**

- Employee attire that is appropriate for their jobs must always be worn.
- Impermeable gloves are a requirement that must be maintained clean and sanitized at all times to avoid the transmission of bacteria, and they should be worn by any hotel staff members that handle food preparation.
- Any organization that produces food is expected to adhere to the guideline of wearing appropriate footwear.
- All food production businesses adhere to the rule of dressing appropriately.

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- As another fundamental hygiene practice that must be observed at all times, make sure you always have hair and facial hair protection on when cooking and prepping food.
- In order to minimise contamination and the spread of illness, all hotels should post signs directing guests and staff to wash their hands properly with soap and warm water. This is especially important for those who work in the food business.
- Another practice which must be kept in mind is ensuring that the tools and equipment used within food processing in hotels are clean and sanitised.

### Effects of not practicing proper food safety and hygiene in hotels:

- Food contamination
- E. coli
- Listeria Monocytogenes
- Campylobacter

## Data Analysis

- While the majority of the respondents were running business or business chains from various parts of the country, there were many private employees also just started their careers and wanted to experience the fine dining experience. There were few students also who were there along with their families among the respondents.

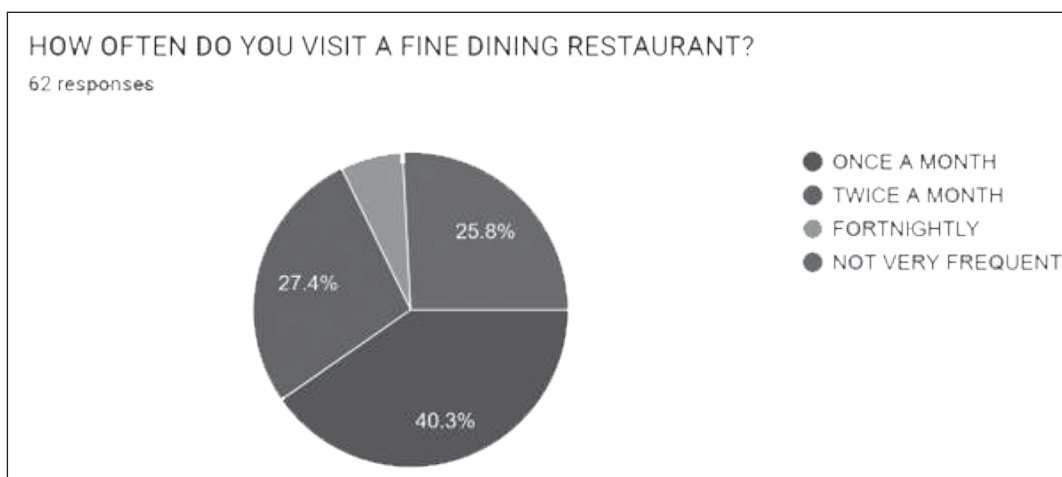


Figure 1

Pradyumn & Shubham Singh

- As per the study conducted, 40% of respondents visit a fine dining restaurant once a month while close to 28% people do it twice a month.
- The remaining 25% of people are not very frequent with their visits to a fine dining restaurant.
- Some respondents who visit restaurants have a business background and often held meetings or team building activities in a restaurant.
- The other set of people go out to spend time with their families on weekends or for any special occasion.

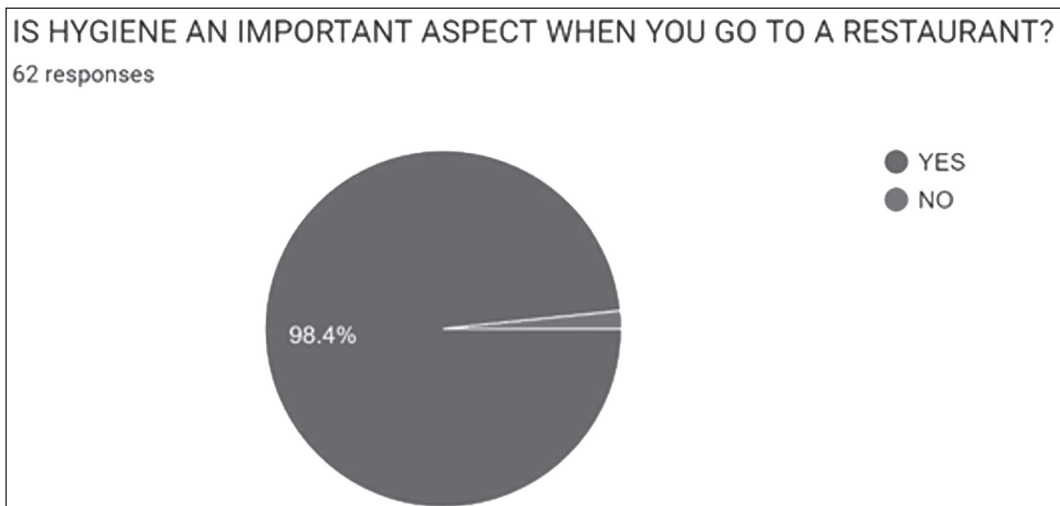


Figure 2

- The importance given to hygiene by the responders going to fine dining restaurants is very high and the people to whom it is not an important aspect is very negligible.



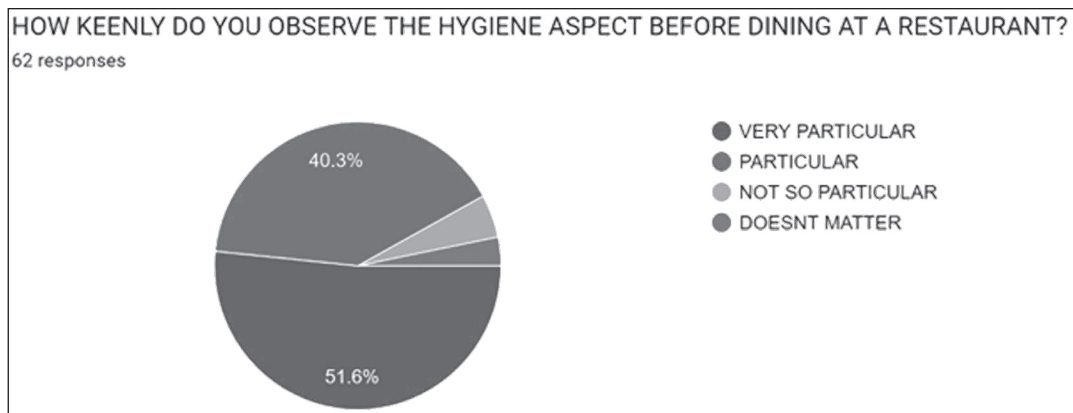


Figure 3

- Majority of the customers said that they look at the hygiene aspect before even dining at the restaurant. They go online and check for the reviews given on that restaurant by others who have already been to that place.
- As per the survey, 50% customers make sure the place is hygienic and they give the uttermost importance to hygiene aspect.
- While around 40% of the restaurant visitors do give importance to hygiene aspect but not very particular about it.

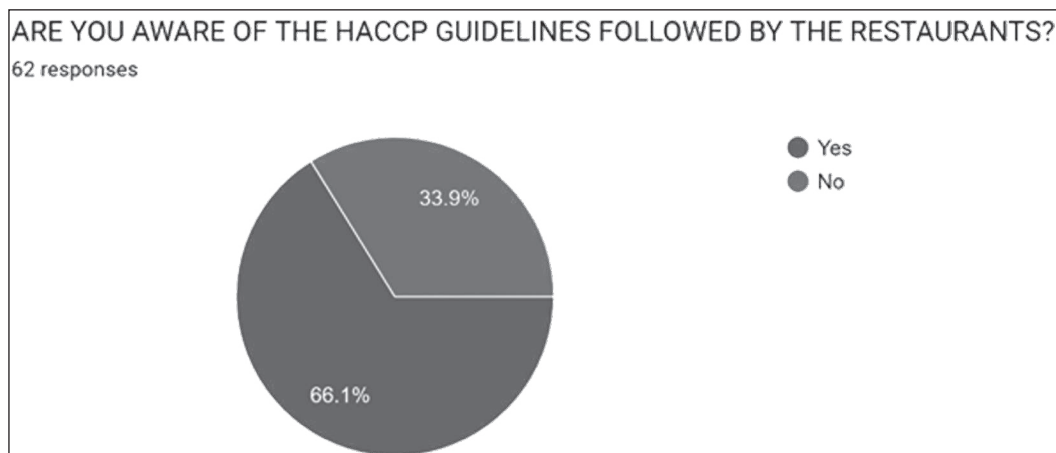


Figure 4

- A majority of 66.1% customers are aware about the HACCP and the rules and guidelines that are being followed in the hospitality industry.

- While the other 33.9% of the customers aren't aware of the HACCP guidelines that are supposed to be followed by the restaurants and hotels.
- At the same time the people who weren't aware of the HACCP were showing interest to know what the HACCP is all about and the guidelines they set for restaurants and hotels.

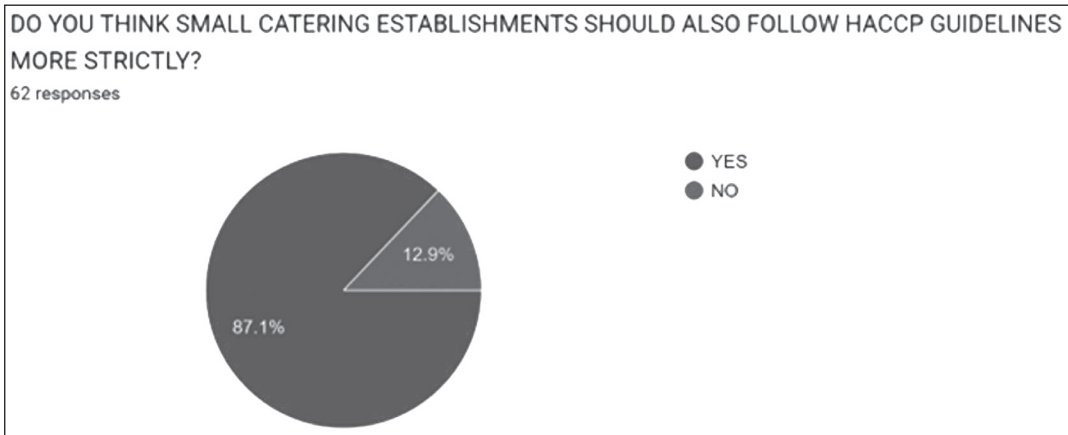


Figure 5

- When asked about whether the small restaurant businesses should also follow the HACCP guidelines strictly a majority of 87.1% of people agreed to that and said it would be a great step for the small business owner to increase their business and reduce complaints if any.
- While the 12.9% customers thought that making the small establishments follow guidelines would make their business better but felt that it would be an expensive affair to the business which directly reflects on the cost of the products.
- ◆ When asked about the one major thing that makes the perception of the place for the customer majority of the customers answered it's the cleanliness and hygiene followed by the restaurant as well as the staff. The answers followed to them are the taste of food and the behaviour of the staff.
- ◆ Few respondents also told us that they make sure they read the online reviews on that place before going there.
- ◆ When the respondents were asked to suggest what are the things the outlets have to follow, majority of them suggested that the outlets have to follow the guidelines set by the HACCP.

- ◆ Some respondents suggested that the restaurants have to be regular with the cleaning schedules and follow proper SOP's set by the organisation.
- ◆ The important point to be observed is there were mixed responses regarding the outlets reaching the guests expectations. While few are happy with the level of hygiene whereas few respondents wanted the outlets to improve the standards of the organisation

## **Limitation of the Study**

- The limitation of the study is that the sample is taken only from tourists visiting Chennai city, the results obtained cannot be generalized to all the hotels and cities of India.
- The genuineness of the respondents is not totally known.

## **Conclusion**

Behaviour or practices that can improves cleanliness and leading to good health and avoiding the spread of diseases is called hygiene. In the kitchen, bathroom, and toilet rooms, routine cleansing of hands, food, sites, and surfaces prevents the transmission of infections. Although some splashes and aerosol creation might happen when flushing, especially when someone has diarrhoea, the danger of infection from flush toilets is low, providing they are properly maintained. After washing and bathing, pathogens can persist in the scum or scale that is left on bathtubs, showers, and washbasins.

The spread of fungi diseases can be stopped by thorough cleaning. Molds can survive on shower curtains, floor tiles, and wall tiles. Mold is capable of causing infections, allergic reactions, surface degradation or damage, and foul odours. Carpets and soft furnishings are common places for fungal development on inanimate surfaces. The majority of the time, wet environments, inadequate ventilation, or closed air systems are linked to airborne fungus.

Through this study we can confidently say that the customers are not only looking for good food they are also looking for good ambience and better service. All of these tops with the most important aspect, hygiene. There were circumstances where the respondents were talking about the personal hygiene of the hotel staff and not just the cleanliness of the surroundings.

This study also tells us that the consumers want even the small establishments to follow strict rules and guidelines set by HACCP. We can understand through the survey that the place's perception is made by looking at its environmental hygiene and the personal hygiene of the employees.

The focus is no longer entirely on the food or anything else but it has shifted onto hygiene specially after the pandemic in the year 2020. The use of technology can also be used to keep the premises clean at restaurants and hotels. While still having mixed feelings about the expected hygiene levels reached by restaurants, majority of the customers want the HACCP guidelines and the SOP's to be followed and maintain the premises safe, clean, hygienic and sanitised all the time.

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**ISBN: 978-81-960940-3-4**

## **Attention towards Single-Use Plastic: A Study on Sani-Waste**

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### **Abstract**

Sanitary waste involves all the used sanitary napkins, baby and adult diapers, tampons, incontinence pads etc. One category of bio medical waste is sanitary waste. It is a broad term that covers any liquid or solid waste produced by people or human activity that isn't known to be contagious. Sanitary waste typically refers to used menstrual hygiene items. Sanitary trash is abundant and contagious, and plastic is a key component in the production of disposable sanitary items, which makes us consider them as a single-use plastic, which emphasizes the need for sanitary waste management in India, it is expected to increase as the market for sanitary pads grows. Sanitary napkins are one of the most preferred menstrual hygiene products, but they are also among the most polluting and harmful to the environment. So, the rising amount of waste produced should be reduced with proper disposal and treatment of menstrual waste. If environmentally viable methods of disposal are not found and brought into practice, the future is likely to stagnate and there will probably be a negative long-term effect on the health and hygiene of humans. And a negative indirect effect on the environment and society. Incineration is a technique that enables us to get rid of these dangerous plastics. It's crucial to understand that wearing a sanitary napkin and properly disposing of sanitary waste go hand in hand.

## Introduction

Sanitary napkin disposal has become an increasing problem in India as the plastic used in disposable aseptic towels isn't biodegradable and leads to health and environmental hazards. The impact is more pronounced because of the unorganized methods of external solid waste operations and the poor community collection, disposal, and transportation networks in the metropolises and townlets. Further, one major issue with sanitary napkins has always been their categorization, i.e., whether they are biomedical or plastic waste. Soiled towels, diapers, condoms, tampons, and blood-soaked cotton, which are managed waste according to the 2016 Solid Waste Management (SWM) Rules, are being isolated into biodegradable and non-biodegradable factors. Still, the Biomedical Waste Management Rules (2016) indicate that particulars defiled with blood and body fluids, including cotton, dressings, soiled cataplastm casts, lines, and coverlets, are bio-medical waste and should be incinerated, autoclaved, or microwaved to destroy pathogens. The lack of concern for sanitary napkin operations in our country is reflected in the fact that there are no dependable statistics on the subject. Due to the lack of isolation of waste, there's hardly any attestation in this area, so thorough instructions for handling and operating sanitary napkins are essential. As per the study conducted in 2011, "Sanitary Protection: Every Woman's Health Right," it was estimated that only 12 of the 335 million menstruating women have access to disposable aseptic towels. Environment portal Down to Earth estimates that 432 million pads are inclined every month.

## The Problem of Decomposition

Conventional disposable aseptic towels are 90% plastic. Indeed, the upper sub caste generally referred to as the "fabric" sub caste, is a plastic woven distance. Still, similar to packaging and plastic bodies, if we consider the fresh accoutrements. It's estimated that each aseptic hankie or diaper takes between 500 and 800 times to putrefy and that on average, a woman could use up to 1,000 aseptic pads from menarche to menopause (Verma & Sambyal, 2018). According to a 2017 report by DASRA, over one billion non-compostable aseptic pads make their way into the sewage system and contaminate land and water bodies in rural and urban India every month. Still, most disposable pads, especially those containing SAP, don't putrefy; rather, they break down into small pieces of plastic—also referred to as microplastics—and pollute the soil, water, and air, eventually entering the food chain in some form. The plastic element of an aseptic pad that contains blood and other mortal fluids cannot be used again. Not only is it medically unsafe to exercise, but the cost of treating and recovering would also render it economically unviable. According to UNEP (2018), single-use plastics (also referred to as "disposable plastics") include materials that are intended to be used only once. The question also is, why are aseptic pads and diapers not designated as single-use plastics?

In metropolises, aseptic towels are discarded along with external waste. This is because of a policy lacuna that categorizes aseptic waste as domestic dangerous waste rather than biomedical waste. The Solid Waste Management Rules 2016 (SWM, 2016) require manufacturers to give a disposal poke to grease the disposal of soiled disposable Sanitary Napkins (SDSN). Still, for numerous brands, the so-called “poke” that’s handed is too flimsy and small to hold an SDSN and has no glue to seal the poke. There may also be no markings or identification marks on this “poke” to enable waste selectors to identify similar particulars. Eventually, the aseptic waste is either incinerated or dumped in a landfill. Occasionally, it’s tattered before being ditched in a tip, which results in the creation and release of microplastics, which end up polluting common pool reservoirs similar to air, water, and soil and make their way into the food chain. In pastoral areas, since there’s veritably little, if any, systematized effort towards the effective waste collection and necessary disposal mechanisms, aseptic waste is frequently discarded by either burying or burning.

## **Objectives**

- To know the negative impacts of Sani-waste on environment.
- To recognize the problem of decomposition of Sani-waste.
- To study the rules and guidelines given by the government regarding Sani-Waste Management in India.
- To get aware of proper disposing methods of Sanitary wastes.
- To understand the importance of incinerators.
- To precise the importance of correct Sani-waste disposal.

## **Methodology**

This research paper is qualitative analysis. The data is gathered from secondary source from Sanitary Waste Guidelines India 2020. Incineration is a waste disposal method in which waste is burned at a very high temperature and converted to ash. In the environment of menstrual waste, incineration has gained important traction as a favoured system of destruction of dangerous pathogens in aseptic waste; this kind of waste, as bandied about above, takes a veritably long time to putrefy and is thus dangerous to the terrain. The addition of incineration as a mode of disposal and treatment of menstrual waste has been catalysed in India by its reference in the SWM Rules, the Biomedical Waste Management Rules, 2016.



First, we will review the national policies and regulations provided by the government on the management and disposal of sanitary waste. Knowing the legal framework aids in our understanding of the present regulations that must be followed as well as any errors or areas where we are falling behind. Additionally, we should educate ourselves on the sanitary disposal procedures used in other nations as well as the present societal sanitary waste disposal practises. Estimating the annual use of sanitary napkins in India is done as part of data collecting. Then, comparing the expanding use of sanitary napkins throughout Indian states enables us to understand the daily production of solid waste. We sum up the detrimental consequences on the environment and long-term health by mentioning the government-promoted policies on sanitary management and menstruation hygiene management. Further discussion is given on an investigation into incinerators, their types, uses, and the significance of establishing them.

## **Review of Literature**

### **Sanitary Waste Disposal: Legal Framework**

There are two major legal frameworks for sanitary napkin operations: the Solid Waste Management (SWM) Rules of 2016 and the Central Pollution Control Board (CPCB) Guidelines for Management of Sanitary Waste issued in 2018. The CPCB guidelines cover a wide range of sanitation napkins disposal options, including the types of waste that each option can handle, where they can be espoused and enforced, and the specialized specifications or pollution control norms that may apply to their manufacturing process and operation. The SWM Rules, 2016 also acknowledge the role of stakeholders in the process. Piecemeal from the SWM Rules (2016), other government enterprises addressed sanitary napkin treatment and disposal styles.

### **Solid Waste Management Rules, 2016**

According to the 2016 Solid Waste Management Rules, “sanitary napkins” include used aseptic towels, diapers, condoms, tampons, incontinence wastes, and other analogous waste. Aseptic towels and diapers are also included in the description of dry waste in the SWM Rules, 2016.

- Every waste creator must collect and insulate all waste into three categories: biodegradable, non-biodegradable, and domestically dangerous waste. In the case of sanitary napkins, the waste creator must wrap the used product in the manufacturer’s sacks or any other suitable wrapping material as directed by the original authorities and collect it with other non-biodegradable waste.

- Sanitary napkin manufacturers must consider using recyclable accoutrements or provide covers, wrappers, or bags for disposal after use. They must also raise public awareness about adequately collecting and disposing of sanitary napkins.
- The original authorities must use information, education, and communication enterprises to raise awareness under the SWM Rules, including the collection and disposal of sanitary napkins.

### **Menstrual Hygiene Management: National Guidelines**

The Menstrual Hygiene Management (MHM) Guidelines were published in 2015 by the Ministry of Drinking Water and Sanitation in collaboration with UNICEF India. The Guidelines are an essential aspect of the Swachh Bharat Mission (SBM). As per the guidelines, all popular MHM conditions can be met from the SBM budget. Any Information, Education, and Communication (IEC) programs on MHM can be funded from the SBM's IEC juggernaut budget. Incinerators can also be bought for academy use.

- The guidelines are divided into three sections. The first order of guidelines focuses on the MHM frame and covers how adolescent girls and women can be offered MHM options, the MHM structure in seminaries, and safe menstrual waste disposal styles. The alternate order details the roles and responsibilities of government associations and other applicable stakeholders. The third order addresses the specialized details of disposal styles.
- To collect aseptic waste, separate lockers should be used, with a designated schedule for disposing of and duly transporting similar waste.
- The available budget, quantity, and type of material are the significant factors when determining the applicable disposal result for menstrual waste. In addition, sociocultural stations may also determine the system's selection and perpetration.
- The disposal and treatment result chosen must ensure minimum mortalities and no adverse environmental impact. If a sanatorium with a dangerous waste treatment installation is located far away, the disposal option can be incorporated into the procedure.

## **Disposal of Menstrual Waste under the Guidelines for Swachh Bharat Mission (SBM)-Urban and (SBM)-Gramin**

Disposal of menstrual waste, emphasizing the isolation and collection of aseptic waste. Aseptic towels and diapers must be separated, especially pronounced, and transferred to a biomedical waste container for incineration.

- One of the essential specifications for constructing community toilets is installing small-scale incinerators in toilets with more than ten seats. Ladies' toilets shall have a dealing machine for aseptic towels.
- SBM- Gramin guidelines for pastoral regions outline the deployment of acceptable installations for icing MHM and recommend the safe disposal of menstrual waste through incinerators.

Further, each of these programs has a different approach to treating and disposing of aseptic waste, which can beget problems with perpetration. Further, the categorization of aseptic waste, whether biomedical or plastic waste, has been a significant issue. Aseptic towels, diapers, and condoms are classified as ménage wastes and should be disposed of with dry waste as per CPCBG guidelines and SWM rules, 2016. Still, waste defiled with blood or other fleshly fluids is classified as biomedical waste under Order 6 and Schedule I of the Bio-Medical Waste Management Rules 2016. Under the same schedule,

Order 2, biomedical waste includes organs, body corridors, aprons, and bleeding corridors of creatures. This addresses why aseptic waste, especially period waste, is not classified as biomedical waste. According to the Bio-Medical Rules 2016, similar biomedical wastes should be microwaved or autoclaved to kill pathogens rather than burying them in tips, as potent contagions like hepatitis B and C can indeed survive in a drop of blood or any other fluid, posing trouble to the terrain and humankind. Also, aseptic particulars include dangerous origins that can beget conditions in those who work in tips and harm the terrain by eroding lands, soil, and water bodies. These guidelines and programs exist only on paper and haven't been translated into action on the ground.

**Household users:** The menstrual waste in homes is most frequently not insulated from another ménage waste, except for many metropolises and cosmopolises similar to Panaji and Pune where isolation mechanisms have been enforced. Also, the disposal mechanisms vary across the pastoral and urban surrounds. In pastoral areas, where waste collection isn't as popular, women may collect and bury their menstrual waste near their houses or practice open burning as a way of getting rid of the waste. Contrary to that, civic areas have waste collection systems that can collect household waste and place it in a tipi (burial) or, if insulated, incinerate the waste using centralized incinerators.

***Seminaries and office spaces:*** In most metropolises, waste from seminaries and office spaces also finds its way to Tip. Recently, given the increased traction for MHM in India, there’s a small but growing number of seminaries and services that have installed decentralized incinerators in their structures where menstrual waste can be disposed of on-site. At least 19 countries, including Tamil Nadu, 29 Maharashtra, 30 Goa, 31 Karnataka, 32, and Telangana, 33, have reported institutionalized programs for the installation of incinerators. Given that seminaries and services frequently have private waste collection and isolation staff, the system for menstrual waste disposal can be improved to dispose of the waste in a sustainable manner, which may not always be the case in practice.

***Community druggies’ public toilets:*** In the case of community druggies and public washrooms, depending on the operation, the menstrual waste may be segregated. However, the waste can be incinerated, segregated following solid waste operation rules, or buried in a tip.

***Hospitals Drugstores:*** All body fluids and blood-related waste are insulated and put into unheroic encrypted bags for disposal. The unheroic bags are transported to a biomedical waste incineration installation and disposed of according to the Biomedical Waste Management Guidelines.

## **Mental Waste Management Practices (Other Countries)**

Studies from African countries such as Ghana, Nigeria, and Egypt indicate that girls in secondary schools substantially use aseptic pads. Schoolgirls from Malawi and Ethiopia primarily calculate on cloth or manual pads, whereas Asian countries showed less use of cloth or clothes during the period. Some studies also show that tampons are the sponge of choice for many drug addicts in India, Uganda, South Africa, and Nigeria, along with Airman studies that point to the use of menstrual cups in Zimbabwe and South Africa, which received positive feedback. These, still, are neither a common practice nor a scalable result due to the social and artistic morals girding insertable products and beliefs around purity in these regions. To understand the disposal mechanisms of menstrual waste, it’s important to gauge the environment of sanitation systems, paying specific attention to the commerce points across the sanitation value chain, from the restroom, waste collection, vehicle, and treatment and disposal of aseptic waste. For illustration, in low-income regions of Bangladesh, some women disposed of their habituated cloth in rainspouts and dikes, but others who were uncomfortable with disposing of menstrual cloth in the open inclined them in toilets due to the perception that it was a separate disposal option. Also, the use of sites varies across regions in LMICs. Numerous women do not prefer using pads because they think it’ll bring shame to them, as waste collectors will think less of them if they see the

used ones. A study in Durban (South Africa) reports that none of the studied collaborative ablution blocks had lockers within the toilets for disposal. Also, in South Africa, women reported that they do not throw used pads in the external stalls, as they stressed that tykes will dig out the used pads and someone will see them. Thus, they prefer to bury the waste under an old drum box or a heavy gravestone. The perception of shame associated with monthly visits frequently forces girls to stay out of school during their periods. Seminaries frequently warrant proper water and sanitation installations and hence do not allow women to dispose of their aseptic waste properly and discreetly.

While incinerators are considered accessible and allow for grease disposal onsite, there are also reports of unworkable, broken academy incinerators, problems with bank and smell from simple incinerators in seminaries, and concerns raised about emigrations released from incinerators.

## **Using Incinerators**

Incineration is a waste disposal method in which waste is burned at a very high temperature and converted to ash. In the environment of menstrual waste, incineration has gained important traction as a favoured system of destruction of dangerous pathogens in aseptic waste; this kind of waste, as banded about above, takes a veritably long time to putrefy and is thus dangerous to the terrain. The addition of incineration as a mode of disposal and treatment of menstrual waste has been catalysed in India by its reference in the SWM Rules, the Biomedical Waste Management Rules, 2016, the CPCB Guidelines on Sanitary Waste, and the MHM Guidelines. Taking direction from these rules, flagship schemes similar to the Sarva Shiksha Abhiyaan [49] and indeed the ODF and ODF protocols [50] under the Swachh Bharat Mission have been laboriously promoting the use of incinerators. While biomedical waste treatment installations have routinely relied on incineration for the disposal of certain kinds of waste, including waste that has blood or other body fluids, the use of small and medium-scale incinerators placed at the source has also seen an increase in their uptake lately, with as many as 19 countries in India having reported schemes for the installation and use of similar small- or medium scale incinerators.

We've categorized incinerators into two broad groups: decentralized incinerators and centralized incinerators, and decentralized incinerators are further categorized into small-scale and medium-scale incinerators. A small-scale incinerator has a capacity of over approximately 200 or 300 pads a day, and a medium-scale incinerator has a capacity of over approximately 800 or 900 pads a day. Both are decentralized options. A large-scale incinerator is one that has a capacity of more than 1400 pads per day and would include incinerators placed at bio-medical waste treatment installations, waste-to-energy shops, etc.

## Centralized Incinerators

In India, large-scale incineration technology has been introduced numerous times and has seen mixed responses. Its presence was challenged in the Supreme Court of India through a public interest action, which concluded with the apex court permitting the use of bio-medical incinerators in hospitals. Still, large-scale incinerators are largely present in urban and peri-urban areas and used for the treatment of bio-medical waste or a combination of bio-medical waste and other solid waste that's incinerable. Given their continued use, norms have been specified under the Bio-Medical Waste Management Rules, 2016, and the regulations and guidelines framed under them.

One of the most important prerequisites for the use of any central incinerator is the need for well-developed structures and processes around the isolation of waste. The focus on isolation in the case of any centrally located igniter has been reiterated by multiple stakeholders working with ULBs in different corridors of India. Isolation as a process has also been proposed under the SWM Rules, which give a period of two years from the date of announcement of the rules (in 2016) for the perpetration of this provision. Large-scale isolation sweat are underway in numerous metropolises around India, with metropolises like Indore (as per Swachh Sarvekshan 2019) doing well on this front. Other similar metropolises, such as Pune and Panaji, have also tried to address the issue of isolation at the ULB position in the past decade, through the sweat of the external original body (in the case of Panaji) and civil society enterprise (in the case of Pune). Still, most metropolises segregate waste into dry and wet waste. Aseptic waste isn't linked independently and finds its way to dumping sites.



Source: CSE, 2022

**Figure 1: Centralized Incinerator at a Common Biomedical Waste Treatment Facility (CBWTF) in Agra**

## Decentralized Incineration

In India for the disposal of menstrual waste arose from the need for isolation at the source in cases of centralized incineration technologies. It was observed that there was a need for a disposal system that could be immaculately placed at the source, would not bear important mortal commerce, and could be used directly by the waste creator. The decentralized incineration approach thus fits the bill in this regard. If burned correctly, this incinerator presumably disposes of pads with limited bank and ash residue. Eventually, in addition to being a separate solution to the menstrual waste disposal problem, these incinerators have also come to be seen as part of a complete MHM package, whereby aseptic hankie manufacturers provide an incinerator machine to be installed with their dealing machine.

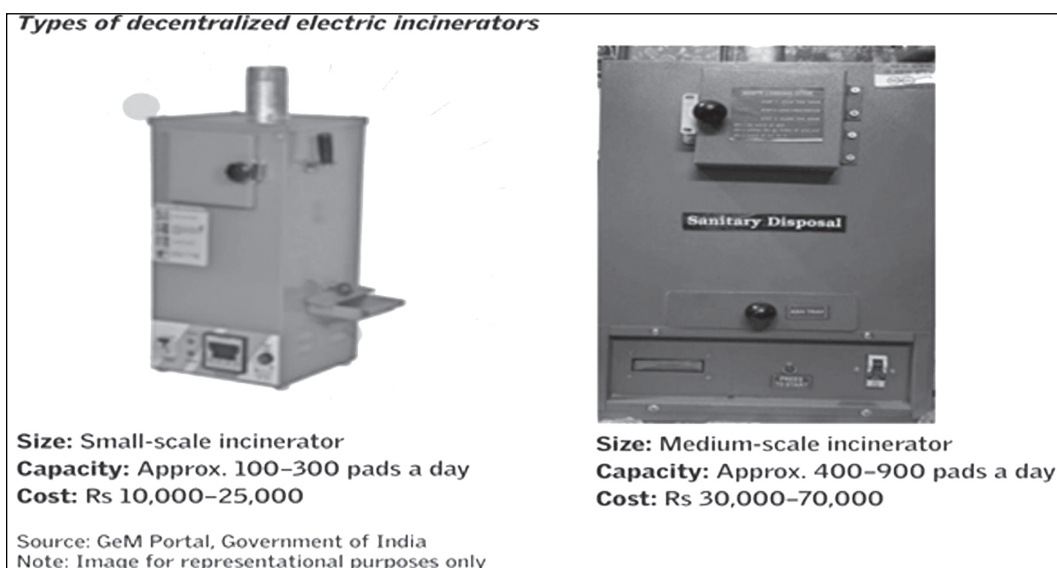


Figure 2: Types of Decentralized Electric Incinerators

## Environmentally Friendly Alternatives to Sanitary Napkins

1. **Biodegradable pads** - There are products on the market with the same functionality but manufactured with natural ingredients and without the use of chemicals, making them better for the environment and the consumer.
2. **Cloth pads** - The very traditional way of period comfort used by our ancestors was cloth. But as time went on, we discovered that these were difficult to use because they needed to be changed frequently and may spread various infections if not



maintained hygienically. that could refer to cleaning the fabric, using the same cuff for numerous launderings, etc. Cotton pads are now available with the idea of being environmentally friendly because they are produced from 100% cotton.

3. **Green Menstrual cups-** Cups can be washed and reused for 5-7 years and can be changed once every 12 hours. Thus, these generate less trash than sanitary napkins. Additionally, the green menstrual cups are constructed of 100% natural, biodegradable rubber, which is safe for the environment and readily breaks down in our garden compost.
4. **Menstrual Sponges-** Period sponges and sea sponge tampons are other names for these sponges. These represent a sustainable choice. They are manufactured from chemical-free, naturally occurring sea sponges that may be recycled and reused. You can use one of them for six months.
5. **Menstrual discs and period panties-** In these two techniques, there are some biodegradable possibilities. and these fall into the category where less waste is generated than when using sanitary napkins.
6. **Some eco-conscious brands :** *Saathi, Carmesi (pads made of corn starch, bamboo fibre and compostable bio-plastic), Heyday, Everteen, Purganics, Vivanion, Anandi, etc.*

## Data and Data Analysis

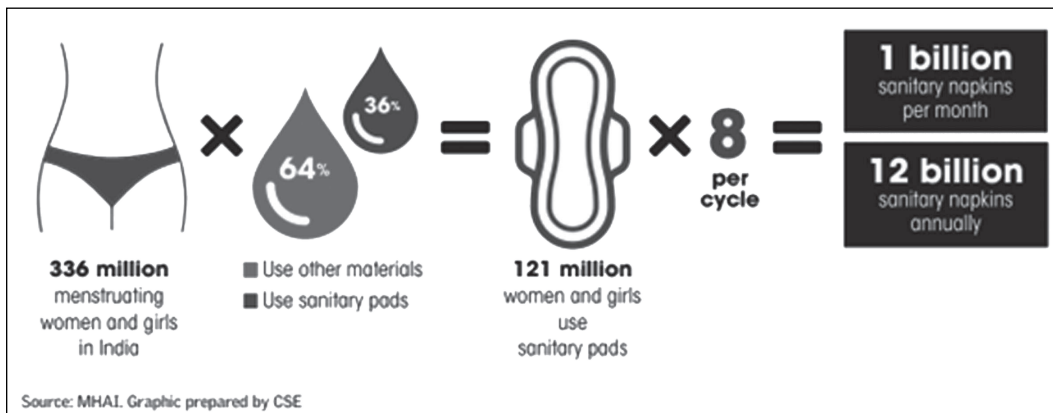
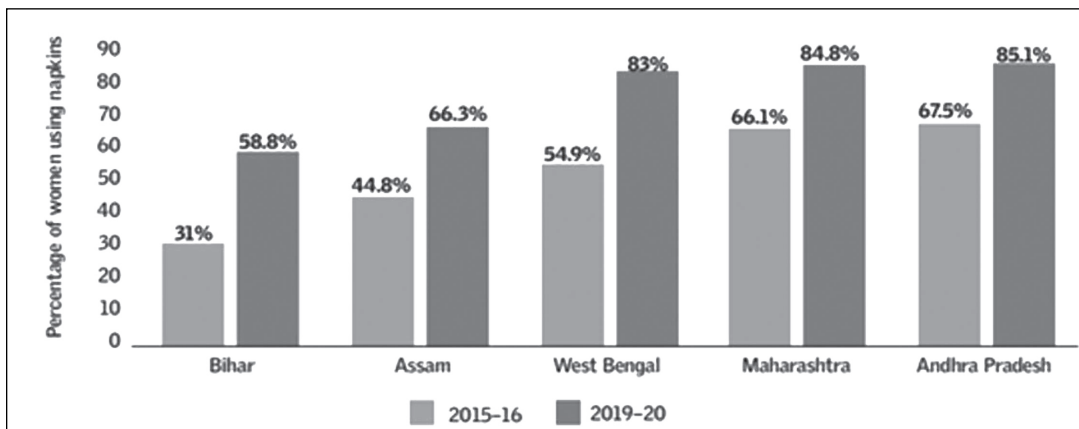


Figure 3: Estimated usage of Sanitary Napkins in India



Menstrual Hygiene Alliance India (MHAI), a proponent group, In India, 336 million menstruation women and girls use around 1 billion sanitary napkins per month, or 12.3 billion sanitary napkins yearly, if 36% of women or girls consistently use disposable sanitary napkins at an average rate of eight per month. 33 million disposable sanitary towels are used in this way every day. India produces about 137,483 tons of used sanitary napkins yearly, or 377 tons every day, assuming that the average weight of a dirty napkin is 11.3 g, the average daily loss of blood and other fluids during menstruation is 8 ml, and a sanitary napkin weighs 10.5 g on average.

**Graph 1: Growing usage of SanitaryNapkins in India**



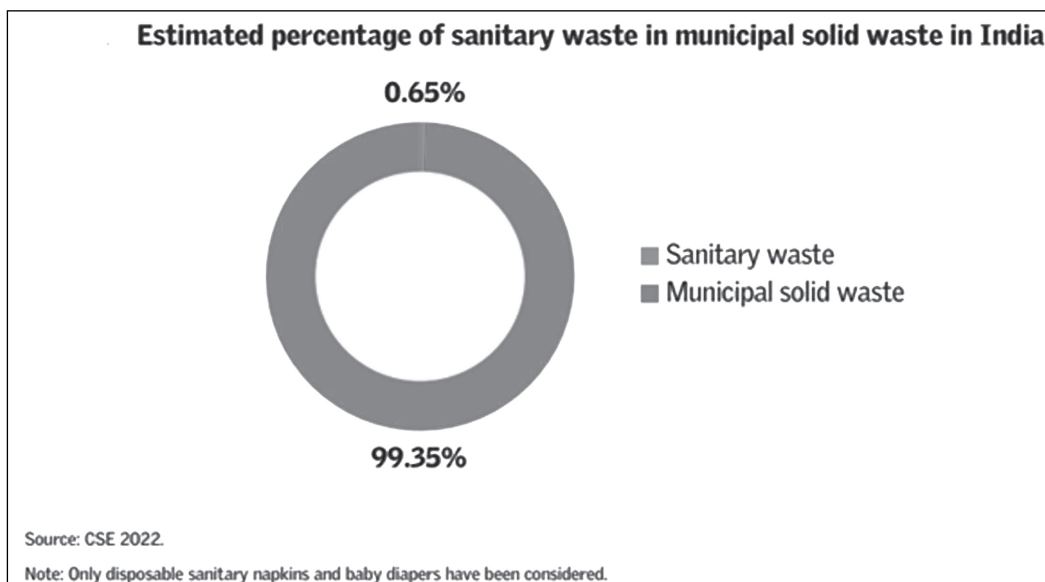
**Source:** National Family Health Survey, 2020

Around 41.8 percent of women in the age range of 15 to 24 use disposable sanitary napkins, while 16.4 percent use napkins made locally, according to the National Family Health Survey (NHFS-4), a nationwide survey conducted by the Ministry of Health and Family Welfare, Government of India, with the International Institute for Population Sciences serving as the nodal agency<sup>4</sup>. Recent government statistics show that women between the ages of 15 and 24 are increasingly using disposable sanitary pads. For instance, in Bihar, 58.8% of women and girls in this age range utilized such items, an increase of nearly 90% in just four years, from 2016 to 2019. In Andhra Pradesh, their use climbed to 85.1% in 2019–20 from 67.5% in 2015–16. Most of the Indian states have a similar trend.

India produces about 141,000 tone of solid trash every day, according to figures from the Ministry of Housing and Urban Affairs (MoHUA). CSE predicts that, the combined daily generation of sanitary napkins and infant diaper garbage in India is around 925 tons, or 0.65% of the country's total solid waste (adult diapers, tampons, condoms, incontinence sheets, and similar waste are excluded). The total percentage of feminine trash in municipal solid

waste could reach as high as 3–4% given the rising volume of sanitary waste, which includes sanitary napkins, diapers, tampons, condoms, incontinence sheets, and similar products. The need for sanitary waste management in India is highlighted by the fact that although the percentage may not seem like much, sanitary waste is large-scale and contagious by nature. Plastic is also a major material used in the production of disposable sanitary items. 10 Most sanitary waste ends up in landfills combined with solid waste or thrown in the open because of disorganized sanitary waste management in towns and villages, poor source segregation, and inadequate collection, transportation, and disposal networks, creating serious health and environmental risks.

Many government agencies in India have promoted policies on sanitary waste management and menstruation hygiene management over the past few years, including the Central Pollution Control Board (CPCB), Ministry of Health and Family Welfare (MoHFW), Ministry of Jal Shakti, Department of Drinking Water and Sanitation (DDWS), and others (MHM). The government’s actions are mostly focused on sanitary napkin disposal. There are scarcely any documented policies in place in the nation for the collection and disposal of additional sanitary waste, including tampons, condoms, incontinence pads, and other similar garbage. On the handling of sanitary waste, there are no detailed statistics available for India. Sanitary waste is expected to have negative effects on the environment and long-term health unless a scientific solution is developed.



## Findings

After examining the survey data, it is evident that the nation is dealing with a significant issue with sanitary waste management. Our future will be in grave danger if this issue is not treated seriously by the general population as an individual duty and by the government as a component of preserving the environment and ensuring the welfare of all people.

## Conclusion

Product a woman chooses to use should be entirely her choice, so assessing draconian measures like banning disposable aseptic towels isn't a practical option. Many practical suggestions are:

- 1) By encouraging manufacturers to reduce the composition of all forms of plastic in the final product (within the pad, as well as in the individual quilting, and within the larger packet in which all the pad accessories are eventually packed) by furnishing incentives as well as levying forfeitures;
- 2) Strictly enforcing SWM 2016 by making manufacturers pay for the collection of the waste created by their products and holding them responsible. Technologies arising that are similar to the distributed tally system can potentially be used for this purpose.
- 3) Recognizing the donations of stakeholders and their enterprises that promote source position isolation and disposal
- 4) More application of commercial social responsibility (CSR) budget spending
- 5) Advanced support to start-ups for developing alternate socio-eco-friendly products
- 6) Conditions spread by mortal waste kill more people worldwide every time than any other single cause of death.
- 7) The government should take the initiative to have incinerators installed in all public restrooms and should make it a requirement that all establishments, including hospitals, colleges, schools, workplaces, etc., have incinerators in the women's restrooms and in the baby care areas.
- 8) Public education regarding the correct disposal of medical waste is not just the government's job; it is also the people. Today, we see a lot of people taking the effort to raise awareness about the necessity of using sanitary napkins for women.

They should also raise knowledge about how to properly dispose of them as part of environmental protection. Each girl kid who begins menstruating should be taught about the proper disposal of sanitary napkins as well as their importance and the consequences of doing so incorrectly. This is how internal change in people can begin.

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**ISBN: 978-81-960940-3-4**

# **Cleanliness at Beaches in India, Blue Flag Beaches the Way Forward**

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## **Abstract**

India has a coastline of 7516.6 Kilometres, which means there is ample opportunity to promote tourism. Most of the coastline is accessible to the local communities as they depend on the coast for their livelihoods, but then for purposes of tourism the access will be in a limited number of beaches.

A good number of beaches in the Indian coast line have become accessed by visitors as they meander around for tourism related activities. The beaches of Goa, Kerala, Odisha, Tamil Nadu, Karnataka, Maharashtra some in Andhra Pradesh and Gujarat and in the Union Territories of Daman, Diu and Pondicherry, Lakshadweep and Andaman and Nicobar have provided ample opportunities for beach tourism.

Come cyclones or any other natural event and true, human interventions and wrong waste management interventions, the beaches do get polluted. Based on the FEEE and FEE, Denmark norms, a program of Blue Flag Beaches in India was managed by the Government of India, Ministry of Environment, Forests and Climate Change (MoEFCC) which has further launched a special purpose vehicle, a “Eco-Label” BEAMS: (Beach Environment and Aesthetics Management Services) under the Integrated Coastal Zone Management (ICZM) was initiated. The paper makes an effort to study and understand the impact of the interventions on cleanliness at beaches and their qualitative management.

**Keywords:** Coastline, Blue Flag Beaches, Eco-label, Coastal Management, Cleanliness.

***Shaheed Khan & Freeda Maria Swarna***

## Introduction

As per an answer to a Starred question in the Lok Sabha (Lower House of Parliament) dated 30th April 2013 (MHA, 2013); the 12 states (Provinces) and Centrally Administered Union Territories (UT) in India; India has a coastline of 7516.6 Kilometres, which means there is ample opportunity to promote tourism and yes, ensure cleanliness of the beaches as well. To understand further, the Coastline in India borders the Arabian Sea and the Indian Ocean in the west, and the Bay of Bengal in the east creating a total coastal area of 3,287,263 km sq., (Balaji, 2022). It clearly means that there is an opportunity to ensure cleanliness in the beaches of India with qualitative global certifications and local interventions which will help over a period of time a good number of beaches to be maintained as a standard that would be appreciated internationally. Table (1) clearly puts forward the facet of the beaches in India and the opportunities that we have to ensure.

**Table 1: Indian States and the Coastline in Each State (MHA, 2013)**

	State/Union Territory	Coastline (in Km)
1	Gujarat	1214.7
2	Andhra Pradesh	973.7
3	Tamil Nadu	906.9
4	Maharashtra	652.6
5	Kerala	569.7
6	Odisha	476.4
7	Karnataka	280
8	West Bengal	157.5
9	Goa	101
10	Andaman and Nicobar Islands	1962
11	Lakshadweep	132
12	Puducherry (Pondicherry)	47.6
13	Daman and Diu	42.5
	<b>Total</b>	<b>7516.60</b>

## Objectives of the Study

- i) To estimate the opportunities, we have in India to manage the beaches,
- ii) The early impact of Blue Flag beaches in India,

- iii) To consider global eco-labels and benchmark with local postulates which will help augment clean and well-maintained beaches,
- iv) To get a *vox-populi* of the local stakeholders in regards to beach management in India through the Blue Flag and how other beaches can adopt the best practices.

## Methodology

The Researchers over a period of three-years have been moving around the Blue Flag beaches and the ones that do not fall under the category across India to get a *vox-populi* understanding of the Blue Flag beaches and how the stakeholders can create opportunities for clean and well-maintained beaches. The Researchers have travelled through eight of the nine states that have a coastal line and interacted with the stakeholders and the tourists which has supported in the research.

## Review of Literature

As at present not much literature is available in the academic form. The various orders of Government of India which emanate from the Ministry of Environment, Forests and Climate Change (MoEFCC), Ministry of Tourism (MoT) and various inputs provided by the global stakeholders of Blue Flag beaches and social media ‘influencers’ who have provided information of various hues, have been the fulcrum of the research. Another facet, the researchers would like to mention is that, the current paper is making an effort to augment base-line data and information that will help in future studies on the subject of beaches in India, and its management through various interventions and programmes.

## Discussion

### Geomorphology of the Coastal Region of India

Spread over sixty-six districts (Malakar, 2019) of India the following is the Geomorphology of the Coastal Region of India (Balaji, 2022) which becomes important for each one of us to understand the way we can tackle the issues of the Indian coast. In fact, this is one of the best ways to ensure that we zero down on the issue that is to be tackled as not every beach/coast line need to be considered for management from the perspective of cleanliness and for providing tourism opportunities.



**Table 2: Geomorphology of Coastal Region of India (Balaji, 2022)**

Sandy Beach	43%
Muddy Flats	36%
Rocky Coast	11%
Marshy Coast	10%

When one observes the geomorphology of the Coast line in India, it is clear that 57% of the beach line is either left alone for the local community who will be part of the coastal environment and the State and Federal Government machinery to manage and intervene as required. It is the 43% of Sandy Beach line that one needs to consider for management from the perspective of Tourism and the yes, cleanliness considering the beaches will have access to the people, not only the local community, but visitors alike. One needs to know that, there have important milestones in the Coastal Regulatory Zone (CRZ) mandates as well which have helped in adding value to the management of the coastline of India.

### **Coastal Regulatory Zone (CRZ)**

1991, 2011 and 2019 have to be considered as the watershed years for the CRZ Plan (CRZP) interventions.

*The Notification of 1991 focused on the following (Parthasarathy & Gahlot, 2020)*

**Table 3: Coastal Regulatory Zone (Notification 1991) (Parthasarathy & Gahlot, 2020)**

<b>1</b>	<b>CRZ I</b>	Areas that are ecologically sensitive and important such as national parks, marine parks, sanctuaries and other important biologically sensitive areas and of heritage or of historical significance and also included the area between the Low Tide Line (LTL) and High Tide Line (HTL). It also laid down prohibition on any construction within the 500 meters of the High Tide Line and allowed (Clause 2 (xii) of the Coastal Regulation Zone Notification, 1991) for constructions for carrying treated effluents and waste water discharges into sea, facilities for carrying sea water for cooling purposes, oil, gas and similar pipelines and facilities for essential activities.
<b>2</b>	<b>CRZ II</b>	Developed Areas (areas within the municipal limits or in other legally designated urban areas which is substantially built up and has been provided with drainage and approach roads and other infrastructural facilities such as water supply and sewerage mains.) which are developed up to or close to shore line are classified under the second category. CRZ-II however allowed for construction and reconstruction of buildings, subject to respective laws and mandated that the said buildings shall be consistent with surrounding landscape and local architectural style.

3	<b>CRZ III</b>	Areas not falling within CRZ-I and CRZ-II are classified under CRZ-III, which are in the rural areas and also those areas which are not substantially built up. Introduced the ‘No Development Zone’ up to 200 meters from HTL. It permitted activities like agriculture, horticulture, gardening, pasturing, parks, playfields, forestry and salt manufacture. However, no new construction was allowed and only repairs of existing structures were allowed. Between 200 meters and 500 meters of HTL allowed for hotels and resorts for tourists as provided under Annexure – II to the Notification, construction and reconstruction of dwelling units with specified measurements, along with alteration of existing authorised building.
4	<b>CRZ IV</b>	Covered the islands of Andaman and Nicobar, Lakshadweep and other small islands except those under CRZ-I, CRZ-II and CRZ-III. Restrictions on construction within the 200 meters of HTL imposed and prohibited the use of corals and sand from beaches and coastal waters, dredging and under water blasting in and around coral formations.

The CRZ norms and interventions were clear guidelines to ensure management of the coastal areas of India. The evolution however, did not stop here.

### *The notification of 2011*

The notification of 2011 filled in the gaps that were found wanting in the notification of 1991 and ushered in three main objectives which laid focus on the:

- i) Protection of livelihood of traditional fisherfolk communities,
- ii) Preservation of coastal ecology and
- iii) Promotion of economic activity.

Special provisions were made for several areas like Sunderban Mangroves (West Bengal), Chilka Lake (Odisha), Gulf of Kutch (Gujrath), Kundapur and Karwar (Karnataka) among other places. It laid down the mandate for establishing the Coastal Zone Management Authority (Clause 4(b) of the Coastal Regulation Zone Notification 2011) in the State Government and Union Territories, with specific powers and functions.

***Shailesh Nayak Committee Report (2014) (CPR, 2018)***

The Shailesh Nayak Committee report made the following recommendations:

1. Concrete proposal must be formulated by the Ministry, as loss of fragile ecosystem causes irreparable damage to ecosystem impacting the local communities. Naturally created barriers like mangroves, coral reefs, sea grass protect from cyclones.
2. Promotion of Eco-tourism based on the model of International Union for Conservation of Nature (IUCN).
3. Ecologically Sensitive Areas under CRZ-I should be identified on scientific assessment and to draw up measures to protect and conserve.
4. Ministry of Culture to undertake identification of historical, archaeological and heritage value structures and areas for protection and conservation.
5. Protection and regulation of activities detrimental to integrity of water bodies and their beds.
6. Address the issue of disposal of sewage, effluents and solid waste.
7. Regulations in CRZ-II and III have impacted the State Town and Country Planning laws and the States should address those issues. Issues of overlapping also found as Notification overrides Town and Country Planning Regulations of the States or Union Territories.
8. Housing with basic infrastructure to be provided to the communities living in the coastal areas.
9. Existence of ambiguity and difficulty in interpretation of the Notification of 2011 including demarcation of HTL/LTL, boundaries of CRZ-I, II, III and IV.
10. Economic and social development has to happen of coastal communities.
11. Shoreline changes have been acknowledged and to identify the reasons for shoreline change.
12. New initiatives to be explored by the Ministry to protect and conserve the coastal ecosystem.

### ***Coastal Regulation Zone Notification of 2019***

The Government of India based on the recommendations of the Shailesh Nayak recommendations and the observations by the public, notified the Coastal Regulation Zone, 2019 on 18<sup>th</sup> January, 2019.

The 2019 CRZ regulations have laid more emphasis on the development of coastal areas. The Notification has made efforts to address several issues regarding the land use. Creation of infrastructure for the development of coastal area has been the focus of the Notification. While provision for the conservation efforts specifically mentioned, opening the coastal areas may threaten the fragile ecosystem for unabated commercial activities jeopardising the ecosystem itself and ultimately leading to its destruction. The Government in its wisdom has been very clear with the interventions that it has sought to ensure quality management of the coastal areas. However, all of it cannot be left to the Government machinery, there should efforts on the.

### **The Blue Flag Initiative**

The concept of Blue Flag was established in France in 1985, by the Office of the Foundation of Environmental Education, where French Coastal municipalities were awarded, the Blue Flag based on the criteria covering sewage treatment and bathing water quality. Eleven French Municipalities received the certification in 1985, and from then on, what was a one country-oriented classification scheme, moved to the European Union (EU) in 1987 under the umbrella of The Foundation for Environmental Education in Europe (FEEE) (Freeda, 2021).

By 2001 the FEEE norms were changed to incorporate other non-EU geographies and the Foundation for Environment Education (FEE, Denmark) ([www.fee-international.org](http://www.fee-international.org)) was found. With many other countries joining the beach certification schemata, regional variations were added to the criterion as well. It was in 2001, that the European Blue Flag became the International Blue Flag. South Africa with a vast beach network, became the first country outside of EU to accept the Blue Flag norm. Thence, by 2006 an international criterion with regional variations came into existence. By 2016 the Blue Flag accreditation was extended to Boat-based tourism activities with nature watching (whale watching, bird watching, cage diving to mention a few), recreational fishing, diving, and crewed charter tours (Freeda, 2021).

***Blue Flag beaches, the nuances, the eco-label***

What then are the pertinent aspects of Blue Flag beaches that ensures the finer aspects of clean beaches, well maintained and managed beaches that one can speak of. The thirty-three stringent facets are:

- i) Environmental education and information,
- ii) Safety and services in the beach areas,
- iii) Environmental Management and Conservation and
- iv) Bathing water quality

that must be met and maintained by a beach, marina or sustainable boating tourism operator that one must focus on that has created a buzz for qualitative interventions in the beach/coast administration (Manish, 2022). It is very clear that Eco-labels and global certification will help in ensuring the cleanliness of beaches year-round and also support in community involvement and employment generation, besides providing for quality tourism for the visitors.

***Blue Flag beaches, the certification, the eco-label initiative***

We also need to realize that the certification, the eco-label comes based on the recommendations of an International Jury that includes the United Nations Environment Programme (UNEP), United Nations World Tourism Organization (UNWTO), International Union of Conservation of Nature (IUCN) and Foundation for Environmental Education (FEE); which clearly means that the beaches on getting the eco-label will have to focus on the management of the ecosystem and ensure the quality of the beach on a daily basis.

***Blue Flag beaches, the India initiative:***

The programme of Blue Flag Beaches (Freeda, 2021) in India was managed by the Government of India, Ministry of Environment, Forests and Climate Change (MoEFCC) which has further launched a special purpose vehicle, a “Eco-Label” BEAMS: (Beach Environment and Aesthetics Management Services) under the Integrated Coastal Zone Management (ICZM) which will further augment a position of power of the Indian beaches that are being developed by the Society for Integrated Coastal Management (SICOM) (Hindustan Times, 2018), a body working under the MoEFCC. SICOM is the making the best of efforts to ensure that India will have a network of 100 Blue Flag beaches by 2023. It may be a difficult ask, but by attempting to ensure, and the efforts that all stakeholders will put, even if we in India were to reach 50 beaches by end of 2023, it will be a significant achievement considering the beach/coast line of India.

**Table 4: Blue Flag Beaches in India (Krishnan, 2022)**

1	Chandrabhaga beach (Golden Beach) (close to Konark Sun Temple)	Odisha
2	Shivrajpur beach (12 Km from Dwaraka)	Gujarat
3	Ghoghla beach (Diu)	Diu
4	Kasarkod (Dhareshwar) beach (3 km from Honavar)	Karnataka
5	Padubidri beach (26 km from Udupi)	Karnataka
6	Kappad beach (1498 Vasco da Gama landed at Kappad)	Kerala
7	Rushikonda beach (8 km from Vishakapatnam)	Andhra Pradesh
8	Radhanagar beach (Havelock Islands, commonly known as Beach number 7)	Andaman and Nicobar Islands
9	Kovalam beach (40 km from Chennai City)	Tamil Nadu
10	Eden beach (located towards the south of Pondicherry, Chinna Veerampatinam)	Puducherry (Pondicherry)
11	Minicoy Thundi beach (second largest island in the Union Territory)	Lakshadweep
12	Kadmat beach (part of the Amindivi group of Islands)	Lakshadweep

### **The *vox-populi* about the Blue Flag beaches and the opportunities for other beaches**

What do the visitors say about the Blue Flags that they have visited and how does it augur well for the administrators to ensure the other beaches too get to follow the norms of Blue Flags even they do not get certified by FEE, Denmark. The idea is to ensure that the best practices are shared with each and every beach area; which will help in supporting the idea of having clean beaches, where the visitors and local community play a dynamic role in ensuring the beaches remain clean for the use of all stakeholders.

The researchers spoke to a total of 356 respondents on which 320 responded whilst at the Blue Flag beaches and provided their views/responses on various aspects of the Blue Flag beaches on a Likert Scale; which has helped us to ensure an understanding of how the Blue Flag beaches have assuaged the benefits of it being certified and how the other beaches that of now do not come under the concept of Blue Flag can benefit.

**Table 5: Responses from the Visitors to the Blue Flag Beaches**

The responses were provided for the subject lines of Security, Cleanliness, Safety, Information, Presence of Life Guards, Access of beach, Parking facilities, Maintenance, Signage, Toilet facilities, Bathing facilities and Eateries. The responses as can be seen in Table (5); which give very high scores to all parameters that were enquired into. One can actually see the same happening in the Blue Flag beaches across the country. The Researcher also got to feel a few beaches in Spain during a visit and felt that in Europe the Blue Flag beach management had become part of the routine and it had become a rule, a law, that all have to follow. Thereby ensuring qualitative management. Considering that the newness of the Blue Flag beach in India, there is a feeling of the administrators of something new being done. But then it is normal; once the Blue Flag system becomes part of the beach ecosystem, it is bound to create ample opportunities to maintain the beaches in a manner that is desirable, i.e., clean and safe for use by the visitors, with all facilities being provided.

Mithun, former President of the Mangalore Surf Club (MSC) (<http://www.surfmangalore.com>) who has been making the best efforts to introduce Surfing in the Tannerbhavi Beach area to the north of Mangalore has been working with the District Administration to usher in the Blue Flag beach certification at Tannerbhavi Beach. Mithun (Mithun, 2022) mentions, “even without the Blue Flag beach certification, we have adopted the norms and kept the beach clean and safe for use of not only the surfers, but also the visitors who come on a daily basis. The District Administration too has been supportive of MSC and other stakeholder

to engage the local community in ensuring healthy practices in the beach area.” If one were to take the arguments of Mithun further it is clear that if the local community adopts the facet of beach management without even getting the Blue Flag certification, then it augurs well for the area and the tourism product. Subramaniam, a regular visitor at Eden Blue Flag beach in Pondicherry, maintains that, “the greatest thing to happen will be with or without Blue Flag certification, the beaches should be maintained, and the responsibility is not only on the local administration, but on the tour operators, the local community members, the visitors themselves who throng beaches in large numbers during holidays, weekends and on other days.....cleanliness should become a norm, not something that is being told to us (Subramaniam, 2021).”

## **Conclusion**

A Manager at a Blue Flag beach, who wanted to remain anonymous spoke to the researchers and mentioned that; “the norms of Blue Flag beaches are no doubt stringent; but once adopted and implemented, the way the team at the Blue Flag beach makes efforts to maintain, is something that will support in the long run.” The Manager also mentioned that, he has been educating the nearby beach/coastal area community members about the importance of health and hygiene at the beach sites; keeping in mind the learning of the Blue Flag beaches. The community no doubt wants to ensure cleanliness at the beach site, but at times the administration should support them which will go a long way in ensuring cleanliness.

Whilst administering the questionnaire at Eden Blue Flag beach in Pondicherry, the researchers chanced upon a Ward Member, who did not want to officially record any statement, but mentioned that, “the local self-Government (LSG) has not been directly consulted in regards to the Blue Flag Beach at Eden (Chinna Veerampattinam, Pondicherry); but what they have done is very good job. We studied the way the Eden Blue Flag has been developed and the number of visitors whom on a daily basis; we at the LSG are planning the same without any Blue Flag certification, as this will ensure a clean beach, a beach that will attract more visitors and the finally the community too will benefit from the same.” This statement from a LSG member clearly proves the fact that even if a beach does not get the Blue Flag status, if the local community, the district administration, the Gram Panchayats or the Urban Bodies that get juxtaposed with the beach in the area work in tandem and provide the necessary amenities at the beach, the facet of cleanliness will be ensured.



The researchers spoke with one of the maintainers of the beach in Kasarkod (Karnataka) who mentioned, that earlier, the local community members used the beach as a toilet; but today, they have realized the way the Kasarkod beach has proved to be successful on account of the Blue Flag status; now they are ensuring the same for the other nearby beaches. It is a clear indication that, if one were to follow the best practices of Blue Flag even without getting the certification, they will be successful and will be in a position to ensure for the betterment of other beaches in the area.



**(Representative pictures of Indian Beaches, Courtesy Dharthi NGO,  
ngodharthi@gmail.com)**

The researchers though got to speak to four Gram Panchayat members; who simply mentioned, that they are happy with the Blue Flag beach in their respective areas, but would like to adopt similar measures in other beaches in the vicinity. Hence, they will be ensuring that the Gram Panchayat Development Plan (GPD) which is a mandatory document that every Gram Panchayat will have to file with the Ministry of Gram Panchayat and Rural Development, Government of India; they will incorporate the best practices of Blue Flag beaches that are to be adopted in other beaches as well; not necessarily to get the Certification of Blue Flag, but to ensure clean and hygienic beaches which will attract one and all. This is a clear indication that if the Gram Panchayats get involved the Line Departments will ensure the best for the community and usher in change. In the case of beaches, what the Gram Panchayats are requesting will be to ensure cleanliness in the first phase and ensuring the visitors get to benefit, besides the local community.

The researchers also got to meet with Anudeep and his wife Minusha, a resident of Byndoor in Coastal Karnataka, whose work was appreciated by Prime Minister Shri Narendra Modi in his *Maan ki Baat*, for the simple reason, after their marriage in November 2020, the couple got together with other friends and cleaned (Kulkarni & Naina, 2020) up a beach in Someshwara and shifted 500 kilograms of waste that had accumulated, thereby educating the local community and the visitors not to throw waste on the beach. Anudeep mentions, “the local community should be sensitized about the pollution and cleanliness of the beaches that provides for them and they will surely stop throwing garbage on the beaches. However, by educating the visitors to stop throwing plastic and other waste on the beach and rather throw it into the waste bins, it will usher in a lot of benefit to the beaches. We have started the movement in our areas; other youngsters and the local Gram Panchayats have followed suit and we are confident that our humble efforts will bring in dividends on the long run.” (Anudeep, 2021)

Blue Flag beaches, are a beacon of hope for clean and hygiene beaches, even if India has about 50 Blue Flag beaches by the end of 2023; it should be an inspiration for the other beaches to catch the go clean mantra and ensure the beaches are kept clean, the Government is willing to support any initiative and the Gram Panchayats of the 66 districts where the beaches are located would happily come forward to ensure the same; after all clean beaches will attract more visitors and also provide the local community with employment.

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**ISBN: 978-81-960940-3-4**

# **Pandora of Women in Swachh Bharat: A Paragon for Posterity**

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## **Abstract**

Swachh Bharat, also known as Swachh Bharat Abhiyan (Campaign Clean India), is an initiative by the Government of India to clean the country's streets, roads, and infrastructure. The campaign is being carried out on a national level and covers 4041 statutory towns. Swachh Bharat Mission, is a nationwide initiative that was launched by the government of India in 2014 with the goals of putting an end to the practice of open defecation and enhancing the management of solid waste. 2017 saw the appointment of Bollywood actress Shilpa Shetty as the new Brand Ambassador for the Swachh Bharat Mission. Since that time, other Indian women from rural areas, small towns, and major cities have begun making significant contributions toward the success of this effort. Through the use of a variety of primary and secondary sources, this article makes an effort to determine the extent to which Indian women participated in the Clean India Campaign.

**Keywords:** Women, Contribution, Clean India Campaign, Solid Waste Management.

## **Foray into the Foreground**

When discussing the Swachh Bharat Abhiyan, it is necessary to discuss numbers in order to highlight significant landmarks or accomplishments that have been reached thus far. Over 5 crore (5.17 crore) toilets have been built, 2.5 lakh villages have been declared free of open defecation (ODF), and the sanitation coverage of the country has increased to 70 percent today, up from just 38 percent in 2014. But aside from the fact that the numbers have been crunched, the success of the Abhiyan is in the stories, some of which are motivating, and some of which are unfathomable for the efforts that they have made, all for a fundamental need that they have been deprived of for decades – a toilet. A growing number of women in India are adopting novel approaches in order to put an end to the centuries-old practise of

*Eugene*

public disavowal. In many of these accounts, the protagonists are fearless female warriors who have stepped up to play an active role in the movement to make India cleaner. Women of all ages and stages are taking the initiative to clean up their communities in India, with some as young as 12 years old and as old as 106 years old.

## Research Objectives

Discovering answers to the research problem requires conducting exploration that is guided by clearly defined research objectives. This study, too, has outlined a number of attainable goals, which serve as the impetus for the entire research project. These objectives are as follows:

- To *picturize* the contributions of women in Swachh Bharat
- To *promulgate* the efforts of individual woman in inspiring people towards Swachh Bharat
- To *personify* the future measures to protect and support the women in this National movement

## Research Methodology

The research methodology is the driving force behind any study. In spite of the fact that there are a few different ways to carry out the research, this study concludes that the qualitative research method is the most useful approach to take in order to achieve the outcomes that are desired from the research. “Content analyses” are a method that can be very beneficial when conducting qualitative research. Newspapers, brochures, media publications, and other sources that are very similar are analysed and interpreted in great detail. The entire study includes both critical analysis and self-reflection in the form of constructive criticism.

## Hypothesis

In this study, an attempt is made to assess the breadth of significant occurrences to which women have made a monumental contribution in the context of Swachh Bharat. Each individual contribution is one of a kind, uplifting, helpful, deserving of praise, and commendable. As a result, the research delves deeply into the topic of confronting the reality that the participation of women in the Swachh Bharat initiative has had a significant and favourable effect on the Indian society. The entirety of the investigation is centred on this single point.

## Inspiring Illustrations

After selling her goats, the only source of income she had, in order to build two toilets in her home, Kunwar Bai, a 106-year-old woman from Chhattisgarh, became the face of the open defecation movement in the state. Later on, she began advising residents of her village in Kotabharri, which is located in Kotabharri, on the significance of installing toilets in their homes. She was even honoured by the Prime Minister of India, Narendra Modi, for her contributions to the Swachh movement. Today, both her village and the district of Dhamtari can boast having a sanitation rate of one hundred percent (Anisha Bhatia, 2017).



**Figure 1: Kunwar Bai being felicitated by Prime Minister of India**

Sushila Yadav, daughter of Kunwar Bai, adds that because her mother was old, she used to fall down every night and every day whenever she went out in the open to defecate. This happened because my mother was old. After that, one day, in accordance with the Swachh Bharat Abhiyan mission, we were provided with a time frame of fifteen days to build a toilet at home. Because of the tight schedule, this did not come as a surprise to my mother, but rather, it served as a source of motivation for her. She found the idea of having a toilet in her own home to be absolutely fascinating. That marked the beginning of this revolution in sanitation practises. The first thing that she did was make the decision to sell our goats in

order to purchase a toilet, and after that, she started inviting other villagers to come by and check out the toilet. She would also educate them on the advantages of having a toilet in the house and encourage them to construct one of their own.

Another uplifting story from the same state is the one about Kajal Roy, who was the first woman to hold the position of sarpanch. She is originally from Sana village in the Jashpur district of Chhattisgarh, which is one of the state's 8,000 villages that does not allow people to defecate in the open (Sonia, 2017). The state of Chhattisgarh has designated 8,582 villages as being free of open defecation (ODF). Sana is one of these types of villages. But the woman who serves as Sana's Sarpanch, Kajal Roy, is the key ingredient in the town's recipe for success. Although it is said that a woman's jewellery is her best friend, Kajal did not hesitate to put hers up as collateral in order to fund the construction of one hundred bathrooms. After all, she maintains that one must treat one's bathroom facilities with the utmost respect.

According to Kajal, "toilet" is synonymous with "self-respect" for women. After having this realisation, Kajal made the decision to help other women in her state achieve the same goal as she has, which is to own their own toilet. Given that her village was located in a remote part of Chhattisgarh with very limited access to facilities or supplies from urban centres, the challenge was figuring out how to get things started in light of the fact that this presented a significant obstacle. In an interview with NDTV, the Chief Executive Officer of Zila Panchayat, Mr. Deepak, explained that after learning about Kajal Roy's goals, the Zila Panchayat considered providing her with training through the National Rural Livelihood Mission. Kajal received instruction in the fundamentals of brickmaking. That established the groundwork upon which Kajal could build. She began teaching other women how to make bricks so that they could construct their own latrines without relying on anyone else to supply the essential building materials. Her goal was to free the women from dependence on outside sources for the provision of these materials. In just a few short months, she instructed more than one hundred different women.

She put up her jewellery, which was worth Rs. 87,000, as collateral for her business venture, and together with other women, they built more than one hundred toilets in the local village of Sana. This monumental effort has resulted in the village being recognised as being free of open defecation as of today, which has also had a positive impact on the overall performance of the district. By the end of March of this year, the district of Jashpur should no longer permit public defecation.





**Figure 2: Mayor of Indore in Madhya Pradesh Distributing Portable Bins for Car**

From Chhattisgarh to Jharkhand, a 12-year-old girl named Monidrita Chatterjee has sparked a mini toilet revolution in the state. Hailing from Jamshedpur, Monidrita has had two dreams since she was a child: the first was to fight open defecation in the country and give other girls the most fundamental right – a toilet; the second was to improve the management of plastic waste. She set aside every last dime she could, including the cash that she could have splurged with during celebrations, just so that she could construct latrines for young women. This little swachh warrior worked hard in 2016 to save money and construct two toilets for use by the children living in the Kendradhi village. Then, she constructed two toilets in the village of Haldubani, but with a twist: She built these toilets with waste products such as plastic bottles and fly ash in an effort to encourage people to recycle plastic bottles.

Sharanamma Bakar is the Swachh Bharat Fan “No. 1” and she lives in the village of Danapur in the state of Karnataka. As a vendor of vegetables, she gives away one kilogram’s worth of tomatoes for free to any household that has installed a toilet. Her goal is to encourage others to build their own toilets at home using this method. After learning that approximately 1,300 families in her village do not have access to toilets, she had the brilliant idea to create this novel solution. Not only that, but in an additional step forward, Sharanamma went



around to different homes that had toilets in order to inquire as to whether or not their residents actually used them. A little more than half of the homes in her district, Koppal, have access to toilets, and they are working toward eliminating open defecation as quickly as possible. The Gulaab Gang, a group of fiery women activists who are widely known for their aggressive methods to end evil practises against women, has been resurrected in the districts of Koppal and Belagavi in the state of Karnataka. Only this time, they will collaborate with workers who are Accredited Social Health Activists in order to combat the harmful age-old custom of defecating in public. These members of the pink movement are using the 'fear' factor to sensitise people by doing everything from going door-to-door to conducting workshops on lessons on hygiene and sanitation.

Latha Devi Diwakar from Vidhnu village in Kanpur sold her "mangalsutra" for 17,000 rupees in order to purchase a toilet for herself. In the Buxar district of Bihar, adolescents stopped wearing gold jewellery until their parents agreed to build toilets for the family. In Kanpur, Latha Devi Diwakar from Vidhnu village sold her "mangalsutra" for 17,000 rupees.

The movement for India to become cleaner and safer is undoubtedly gaining momentum and spreading like wildfire! There are also inspiring stories from Uttar Pradesh's Baghpat district and the Haryana sarpanch, who are following a policy of 'No Toilet, No Bride.' This policy states that daughters from these respective areas will not get married in homes that do not have a toilet. In addition to the individual success stories, there are also inspirational stories from Uttar Pradesh's Baghpat district and the Haryana sarpanch. According to the data collected by the government, there have been approximately 13 lakh toilets built or are in the process of being built across the country specifically for women. However, without the active participation of the women themselves, the construction of these buildings would not have been possible.

Swachhata Hi Seva is a new initiative that was recently launched by the centre in the run-up to Gandhi Jayanti. The goal of this initiative is to give a boost to the ongoing efforts of the Swachh Bharat Abhiyan. According to the statistics regarding the impact, approximately 10 lakh women stepped forward and worked tirelessly to raise public awareness regarding the importance of hygiene and sanitation. It would appear that not only a successful man, but also a successful woman is the driving force behind every successful swachh effort.

## **Swachh Shakti 2019: Rural Women Champions for Swachh Bharat**

On February 12, 2019, the Prime Minister, Shri Narendra Modi, travelled to the city of Kurukshetra in the state of Haryana. He took part in Swachh Shakti 2019, which is a gathering of Women Sarpanches, and gave out the awards for Swachh Shakti-2019. The Prime Minister gave a speech at a public gathering after visiting the Swachh Sunder Shauchalay exhibition in Kurukshetra. In addition, the Prime Minister launched a number of different development projects in Haryana and lay the foundation stone for some of them.

Swachh Shakti-2019 is a nationwide event that has been organised with the purpose of highlighting the leadership role that rural women have played in the Swachh Bharat Mission. The event will be attended by women serving in the position of Sarpanch and Panch from all over the country. It is anticipated that approximately 15,000 women will take part in this year’s Swachh Shakti event, which is geared toward empowering the women. The event known as Swachh Shakti-2019 is being coordinated by the Ministry of Drinking Water and Sanitation in collaboration with the Government of Haryana. They will share the most effective practises for Swachh Bharat that have been implemented at the grassroots level or in rural areas. At this event, the accomplishments of Swachh Bharat and the recently finished Swachh Sunder Shauchalay campaign (which translates to “neat and clean toilet”) will be highlighted. This campaign is the first of its kind anywhere in the world.

Swachh Shakti was initially introduced in the year 2017 in the city of Gandhinagar in the state of Gujarat by the current Prime Minister of India, Narendra Modi. On the occasion of International Women’s Day and under the banner of Swachh Shakti 2017, there was a gathering of 6000 women sarpanches from all over the country in the state of Gujarat. PM spoke to them and honoured them in some way.

Lucknow, which is located in Uttar Pradesh, played host to the second Swachh Shakti event, which was referred to as Swachh Shakti-2018. During the event, a total of 8000 women sarpanches, 3000 women Swachhagrahis, and other women champions from various walks of life from different parts of the country were honoured for their exceptional contributions toward the creation of a Swachh Bharat.

The programme known as Swachh Shakti is a good illustration of how rural women champions are working at the grass roots level to act as a change agent to mobilise the community and lead from the front women taking initiatives for a cleaner India. This movement is a part of ongoing activities that are being carried out under the aegis of the Swachh Bharat Mission, which was initiated on October 2nd, 2014, by the Prime Minister of India, Narendra Modi, with the goal of achieving a Clean and Open Defecation Free (ODF) India by October 2nd, 2019 (Press information Bureau, 2019).

## Swachh Bharat Pledge by Women

Recent events in Vindhyachal, Uttar Pradesh, featured a one-of-a-kind celebration of the divine feminine and a focus on the significant contribution that women have made to the Swachh Bharat Mission. During the Shakti Sammelan, which was centred on uplifting and empowering women, tens of thousands of women from the surrounding village areas came together with a great deal of excitement and enthusiasm. According to HH Pujya Swami Chidanand Saraswatiji,

***“Women must take the initiative today to lead the change toward cleaner and healthier communities.”***

There are approximately 1600 children who pass away every single day due to a lack of access to clean water, adequate sanitation, and good hygiene practises (abbreviated as WASH). My opinion is that granting our mothers and sisters the right to their fundamental needs as well as adequate sanitation facilities is the second most difficult challenge. Without these rights, they are forced to defecate in public and are at risk of being raped or assaulted. This is the second biggest challenge. We have a responsibility to see to it that every woman has access to a toilet, and if some of them do not, we have a shared obligation to see that they do (Divine Sakthi Foundation, 2022).

An enormous pledge was made under the direction of Pujya Swamiji, who stated that

***“Now is the time for all of us to become Swachhta Krantikaris (Clean Revolutionaries), to be the solution to the pollution in our communities and our country, so that, together, we can realise a vision for a cleaner, greener, and healthier Mother India and Mother Ganga.”***

It's interesting to note that as part of the Swachh Bharat Mission, a group of women in Madhya Pradesh have been making manure out of garbage collected from daily households. For the past seven years, they have been collecting garbage from their homes and the homes in the surrounding area, then mixing it with cow dung. The Central Government showed its gratitude to their group by presenting them with a gift of one lakh rupees (ANI, 2022).

## Suggestions and Recommendations

Having access to clean water, adequate sanitation, and good hygiene practises are the most fundamental building blocks in the process of becoming an ODF and empowering women. If we work on the following, improved sanitation will be a crucial factor in elevating the status of women as well as their wellbeing and opportunities (Mahreen, 2020).

### ***1. Inclusion of women in decision-making processes***

At this time, owning a toilet offers a choice but not a solution to the problem. Women need to have a voice in the decision-making process and the governance of the WASH activities for it to be possible for toilets to become part of the solution. Research conducted in coastal Odisha on the factors that determine whether or not a rural household has a toilet found that the decision-making authority typically lies with the male head of the household, particularly when it comes to the question of whether or not to purchase a toilet. On the other hand, women were in charge of maintaining the toilets, ensuring that the system continued to operate properly, gathering water for flushing the toilets, and other similar tasks. There is evidence to suggest that giving women the authority to make decisions regarding sanitation could improve performance outcomes for households as well as the community as a whole. During the process of determining the solutions to issues relating to sanitation, women are required to participate and engage in decision-making processes within their households and communities. The methodology that will be implemented in the construction of toilets, Taking into account concerns regarding the location of the restroom in terms of safety, Maintenance responsibilities of toilet facilities, Menstrual hygiene management requirements, Elderly women’s needs, Pregnant women’s needs etc. should be kept in mind.

In India, there are some encouraging examples of women participating in the decision-making processes, including the following: Women were encouraged to make decisions regarding the placement of household toilets as part of a drinking water supply and sanitation project in the Indian state of Rajasthan. In the villages in Odisha where the Total Sanitation Campaign (TSC) was carried out, adolescent girls’ committees were established in each village with the objective of promoting usage of toilets among households following the completion of toilet construction.

## ***2. Improve the effectiveness of self-help groups (SHGs) in the water and sanitation industry***

SHGs are financial intermediate committees that typically consist of 10-20 members and are primarily made up of women who come from the same socio-economic background. They engage with formal financial institutions to assist unbanked households in gaining access to financial services, and they are present in the countries of South Asia and South East Asia. SHGs typically work towards empowering women, developing leadership abilities among the poor, increasing school enrolment rates, improving nutrition, and increasing the use of birth control among their members. Working through SHGs makes it easier to mobilise members of the community and communicate with them. This is because SHGs hold regular weekly meetings at which trained female community mobilizers deliver a standardised set of messages that are then repeated throughout the community.

## ***3. Sanitation that is inclusive of both sexes***

It is essential to keep in mind that a WASH programme may inadvertently run the risk of increasing the burdens for women if men are not involved in the process of facilitating opportunities for women's decision-making in WASH processes. This is an important point to keep in mind. Emerging in this field is the concept of facilitating men's partnership in order to support women in WASH processes. In addition, there shouldn't be an exclusive emphasis on women's dignity in promotional efforts made through the media. Messages should be written for both men and women, and they shouldn't reinforce stereotypes of a patriarchal society.

## ***4. Alterations in both one's behaviour and one's mind-set***

It is of the utmost importance to make certain that sanitation is regarded as more than a building, but rather as a variety of practises and requirements that sanitation programmes may overlook. In addition, sanitation programmes ought to bring attention to the obstacles to sanitation that women face as a result of the patriarchal mentality that exists in society. Women are expected to put their own needs for sanitation second to the responsibilities of the home (such as keeping the house clean and tidy, ensuring the health of the family), as well as the requirements of other members of the family (especially sick and elderly). On the other hand, we shouldn't lose sight of the fact that the status of women is something that can shift subtly and gradually over time because it has such deep cultural roots.

## Conclusion

This study is unique in that, it focuses mainly on the contributions of select women in Swachh Bharat. It is high time that women be considered not only as the beneficiaries of solutions, but also as the architects of solutions, in order to construct a stronger, better, and more long-lasting response to the sanitation problems. We have an obligation to acknowledge that there is a significant opportunity to advance women’s rights, gender equality, and sanitation programming by encouraging active citizenship among women and giving them a voice in community decision-making.

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**ISBN: 978-81-960940-3-4**

# **Mid-Day Meal Programme in Chennai Schools: Food Safety and Hygiene Perspective**

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## **Abstract**

India is implementing the Mid-Day Meal (MDM) programme, which is the largest supplemental school meal programme in the world for students in primary and upper elementary schools. Personal hygiene of food handlers and recipients should be adequately maintained in order to sustain a healthy programme. The purpose of this study is to evaluate the MDM Food safety and hygiene practices in Chennai Schools. Students, teachers, and midday meal coordinators from Chennai, Tamil Nadu's primary and elementary government schools make up the population of the current study. The programme gives students an adequate amount of nourishment, but there is room for improvement in the following areas: food safety, food diversity, timing of distribution, the program's obligations to teachers, and authority accountability.

**Keywords:** Mid-Day Meal programme, Food Safety, Hygiene.



## Introduction

The Mid Day Meal Programme (MDMP), which serves approximately 10.03 crore children in more than 11.50 lakh schools nationwide, is currently the largest school feeding programme in the world. Its goals are to improve students' nutritional wellbeing and support the universalization of elementary education. In order to implement MDMP in the capital Chennai. The only Indian state that has formally started working towards becoming a "malnutrition free state" is Tamil Nadu, which has a long history of direct nutrition interventions. Tamil Nadu's feeding programme has a strong political commitment (ANBARASAN & AHUJA, 2011). The Greater Chennai Corporation, formerly known as the Corporation of Madras and Corporation of Chennai, known as The Puratchi Thalaivar MGR Nutritious Meal Programme. This was begun in 1982 by the Tamil Nadu government, although its precursor was started by the Madras Presidency Government, which was then governed by the Justice Party, way back in 1920. The Justice Party, noted for its extreme social reforms, was possibly the first political party anywhere in the world to believe that feeding kids could increase reading rates. They carried out the plan rather than just leaving it as a notion.

The mid-day meal programme was introduced in 1920 by A Subbarayalu Reddiar, the first Chief Minister of the Madras Presidency, at a Corporation school in the Thousand Lights neighbourhood, on the initiative of P Theagaraya Chetty, the Justice Party's then-president. Theagaraya Chetty has been referred to be the father of the mid-day meal programme by author R Kannan in his book Anna: The Life and Times of C N Annadurai.

The government first agreed that the overall cost of the meal should not be more than one "anna," or Rs 0.06, and only breakfast was offered. The plan was successful. The British government ended the programme as more pupils enrolled in schools. However, the plan was reinstituted in 1925.

K. Kamaraj, a former chief minister, established the noon meal programme. The plan worked really well. The state's overall literacy rate was only 20.8% in 1951. When compared to 1951, it had increased more than twice as much by 1971, when it had reached 45%. In the same time frame, the female literacy rate tripled from 10.10 to 30.92%, showing that more females were enrolling in school.

In 1982, MGR made changes to the plan. The goal was changed from only raising enrolment to feeding pupils nutritious meals in order to preserve their health.

## Review of Literature

Dreze & Kingdon (2001) : Employing household data from the PROBE survey, researchers in Rajasthan, Bihar, Himachal Pradesh, Uttar Pradesh, and Madhya Pradesh concluded that the provision of midday meals in nearby schools had a beneficial impact on the number of girls who chose not to attend school, which had decreased by 50%. In the schools that supplied midday meals, female attendance was a healthy 15 percentage points higher. Mid-day meals also had a favourable impact on girls' class performance in addition to their attendance at school.

Dreze & Goyal (2003) : stands out in the literature as the first comprehensive study to examine the impact of MDMP and emphasise its successes and concerns, conducted in three sample states: Chhattisgarh, Karnataka, and Rajasthan. The study found that midday meals provided youngsters in the poorest communities—where some were not guaranteed even two meagre meals—with protection from famine. It was also the main cause of the surge in enrollment in schools (up 14.5% overall and 19% for girls) and the higher-than-normal interest levels of children in their studies. It also attributed the rise in girls' school attendance to midday meals.

Afridi (2005): the financial and institutional setup in Karnataka, where the MDMP was managed and monitored at the base level by the School Development and Monitoring Committees, and the funds were managed so effectively that they did not forage into the existing resources of the panchayats or force them to make unwanted compromises in quality of meals

Thorat & Lee (2005) : deserves special recognition in the literature for pointing out egregious instances of caste-based exclusion and all other forms of discrimination against dalits during the implementation of MDMP, as well as for advocating for dalit empowerment by including dalits in the management and oversight of MDMP in order to eliminate the teething problems of exclusion and make the right to food a free and equal entitlement for dalits, just as it is for upper caste and communities.

Singh (2008): Based on longitudinal data collected by the Young Lives Project from Andhra Pradesh in 2002 and 2006, an econometric analysis of the impact of the MDMP on the health and learning outcomes of children was conducted, and it was discovered that the programme had significantly improved both nutrition and learning levels. The study is significant because it highlights how crucial it is to examine the precise effects of government-sponsored nutrition programmes on vulnerable populations and to assess how well they address the consequences of environmental shocks on vulnerable children.

CAG (2016) : In its performance audit of the Mid Day Meal Scheme in Maharashtra for the period 2010–15, among other things, highlighted a number of flaws, including inadequate coverage of schools in notified drought-affected districts; excessive delays in releasing funds to the districts, blocks, and schools; irregular supply of cooked meals in 66% of the schools; exorbitant cooking costs paid to ISKCON; shortfalls in lifting of rice by 289 food service providers in Mumbai; and 97% of the mid day meal participants

## **Objectives**

- To study Mid-Day Meal programme in Chennai schools
- To identify the Food safety measures followed by Chennai schools for Mid-Day Meal Programme
- To assess hygiene standards maintain in Mid-Day Meal programme

## **Food Safety at Mid-Day Meal Programs**

A single meal is given to primary kids enrolled in government-run schools as part of the mid-day meal programme, which is run by the government. For this programme, the Indian government has published thorough recommendations on food safety. When dangerous chemicals and microbes cause illness through their presence in food, this is referred to as food contamination. These are outlined here in their key points.

The “AGMARK quality symbol” should only be seen on packaged dals, salt, spices, condiments, and oil. Midday meals should only be prepared with “double enriched salt.” Fresh produce should be purchased whenever possible, and longer-term storage of perishable food items should be avoided. Purchases of raw materials should be made in proportion to available space for storage and preservation. Physical inspection and thorough cleaning should be performed on all raw materials. Raw materials that are packaged must be examined for “expiry dates.” Food grains like wheat and rice should not be kept in storage for longer than three months and must be kept in airtight containers or piled neatly in gunny bags in a place free of insects and rodents. There are now enhanced food safety precautions for the kitchen when cooking. These include regulating the temperature, employing a refrigerator, separating vegetarian and non-vegetarian food, and requiring food handlers to wear an apron, gloves, and a cap. It is required that a teacher taste the food right before serving it and keep a record of it.

Every day, both before and after the food is made, the kitchen floor and the slabs should be cleaned. Additionally, it is important to make sure that all tools, equipment, and other items are cleaned. Items such as tables, benches, crates, cupboards, and glass cases must be clean. Cooks and helpers are expected to keep themselves exceptionally clean and hygienic. Following items should be kept in airtight containers: salt, condiments, oils, soy beans, lentils, etc.

The usual rule is that no pesticides or insecticides should be used in the cooking area, despite the possibility of other pest control measures. There will be enough time and space provided for washing the hands of both cooks and kids. Facilities, drainage, and garbage disposal should all be adequate.

Kitchen-cum-store hygiene must be upheld, as explained in a previous chapter section. Water that is fit for drinking should be available continuously on the property. Making adequate storage arrangements for water used for cooking or washing should be done in the event of intermittent water supply. Testing for chemical and microbiological pollution of water is necessary. The Public Health Engineering Department can perform water testing.

## Kitchen Hygiene and Sanitation

Having impeccable kitchen hygiene is just as important as having impeccable personal hygiene.

**Kitchen:** The entire kitchen area should always be open, well-lit, fly- and rat-proof, breezy, and immaculately clean. A separate cooking area (the real kitchen), a storeroom for fresh food, a preparation room, a scullery, and a space for the cooks’ wardrobe should all be included in the kitchen complex.

**Walls, Ceiling and Floors:** Walls and floors must be moisture-resistant, easy to clean, and have non-slip surfaces. There must be space for chimney and exhaust vents.

**Light:** Both natural and artificial lighting must be adequate, especially above work and preparation areas, sinks, and kitchen appliances. Shadows should not be used.

**Ventilation:** To stop temperature, smoke, and humidity increases, natural and mechanical ventilation are both required.

**Kitchen Appliances:** When choosing all surfaces, appliances, and utensils, ease of cleaning is a crucial consideration. Keep utensils, tools, and surfaces spotless and in working order. Can openers and slicing/mincing equipment need to be simple to disassemble and reassemble since they must be cleaned thoroughly and frequently.

## **Research Methodology**

Based on extensive fieldwork research conducted over the school year 2021-22, the study is descriptive in nature.

## **Results and Discussion**

Since the MDMP is administered through the schools, it is the responsibility of the school administration to educate MDM recipients on the benefits and rights under the MDMP. To the extent that school teachers are aware of their roles and responsibilities under the MDMP (they must make sure that children are served wholesome, high-quality food; that mealtimes are conducted in a cooperative, friendly atmosphere without compromising on hygiene and discipline; that meals are tasted before being served on a rotating basis and signed on the taste register)

School Health Programme in Chennai Schools: In accordance with SHP, medical professionals from the neighbourhood Public Health Clinic travel to schools and offer services like as health examinations (at least once a year), urgent free treatment for mild illnesses, and referral services for serious illnesses. All children have school health cards and medical records are kept on file.

All children have school health cards and medical records are kept on file. The assessment rating is “never” because weekly iron and folic acid supplementation (WIFS) together with vitamin A has not been given throughout the past year. Because deworming dosages have only ever been given once a year, the assessment was given a “occasionally” rating. It is required of teachers to keep track of students’ weight and height every three months. Each school now has a recorder for height and weight. The issue of hidden hunger among the underprivileged schoolchildren attending Chennai’s civic schools continues neglected in the absence of routine nutritional supplementation and deworming treatments.

According to the MDMP Guidelines from 2006, instructors are responsible for making sure that kids are fed healthful, high-quality food and that eating is done in a friendly, cooperative environment. On a rotating basis, they must test the cooked food before serving it and sign the school’s taste record.

Robust safety and exquisite hygiene standards were to be given high importance in order to ensure the success of MDMP, with implementation being a critical concern at the school level. Half an hour before break, midday meals are delivered in secure steel containers and set outside the school headmaster’s cabin under the watchful observation of a peon. Before the FSP-appointed volunteer arrives and begins serving the food, no one is permitted to touch or open the containers.

Quantity and Quality of MDMs Served in Chennai Schools on his or her midday meal tray. Instead than only satisfying empty bellies, MDMP’s core mission is to provide healthful, delectable, appetising, and nutritionally dense cooked meals. Midday meals are “rarely” delivered in accordance with established entitlements or norms in all of the study’s sample schools, according to analysis of quantitative characteristics related to MDMs (quantity of meals is served by approximation, more often on the lower side).

## **Conclusion**

Conceptually, it is best to assume that schools will play a facilitative rather than a proactive role in the implementation of midday meals because their performance can be evaluated solely on the basis of execution rather than externalities, formulation, innovation, vigilance, and course correction as necessary. And yet, in the researcher’s opinion, the reasoning might be deemed fallacious if one tries to objectively analyse the ground realities and, consequently, the role of schools in the implementation process, since the study’s one conclusive failure is the crucial part that school authorities play in the MDMP’s ultimate success or failure.

From educating school students and their parents about the benefits of MDMP and giving them the voice to demand their legal entitlements under MDMP with dignity to instilling proper nutrition and eating habits, hygiene, and sanitary practises in children through MDMP, school authorities can play a crucial and defining role in the entire process. Furthermore, it is insufficient to blame the Food Service Providers and/or Chennai officials for deficiencies and variations in the quantity and quality of the meals or the monotony of the food served, knowing that these parties have the authority to reject subpar meals, step in when food is not served in the proper quantities, or suggest a wholesome and nutrient-rich menu.

Food safety must be maintained if an MDM programme is to run smoothly and continuously. Many contagious illnesses, including diarrhoea, can be avoided by practising good cleanliness. Therefore, maintaining good hygiene should be a responsibility of the school administration. A training programme must be set up for CCH to ensure good hygiene maintenance. They should be given gloves, aprons, and safety goggles, and they must use these while working. There should be a notice board within the building in the local language listing the dos and don’ts for the CCH. This report offers significant information on a flagship program’s current situation.

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**ISBN: 978-81-960940-3-4**

# **A Study on how Often College Students are Motivated toward Cleanliness**

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## **Abstract**

The Swachh Bharat Abhiyan, or Cleanliness Campaign, of India, was launched in 2014 to inspire residents to take action to make their country a clean one. As the nation's future, young people's perspectives are essential to the development of the nation. Because of this, the present survey was conducted among college students studying hotel management to find out how they felt about the country's continuous effort for cleanliness.

The Swachh Bharat Abhiyan (SBA) is the Government of India's largest initiative to promote cleanliness. Any nation's development is supported by its youth. The young cleaning drive needs to undergo a significant shift. This study intends to evaluate dentistry students in Chennai City's attitudes toward cleanliness and SBA.

**Keywords:** Cleanliness, Swachh Bharat, Waste management, hygiene, awareness.

## Introduction

“According to Mahatma Gandhi, sanitation is more important than independence”. He had visions of a clean India where he emphasized cleanliness and sanitation as essential components of daily living because he was aware of the miserable state of Indian rural people at the time.

India has a long history of civilization. It is regarded as a religious country, and its citizens are fervent believers. People of many different faiths, including Hindus, Muslims, Christians, Sikhs, Parsis, and Jains, live in India and are loyal to their respective religions. But the unfortunate reality in our nation is that cooking and religious activities are the only things that require cleanliness and modesty. Maintaining a sanitary and clean atmosphere is not in line with our conduct. Most of the time, we only clean our own homes; maintaining sidewalks, roads, parks, or other public areas is not one of our priorities.

Although Swachh Bharat may have begun on a positive note, cleaning up the nation is a significant undertaking. In addition to the investment, it necessitates skill, expertise, and scientific knowledge. SBA is an ambitious project that has been successful in improving infrastructure and services, but all of its objectives can only be met if the general public is aware of its mission and adopts a positive attitude toward basic sanitation and waste management. Because they are the primary level of providers and may assist people with counseling and motivation, primary healthcare physicians thus play a crucial role in attaining.

## Waste Management

### *Solid waste management*

Through lectures, noticeboard advertisements, and the placement of slogan boards throughout the campus, faculty, and students are made aware of proper waste management procedures to reduce waste at the institution. Daily collections of waste are made from various sources, and dry and moist waste is segregated. Different forms of waste are disposed of in colored trash cans. Green denotes liquids, and blue, solid waste.

Daily trash is gathered by housekeeping staff and given to Tiware Gram Panchayat-approved staff for further processing. All drain pipes from restrooms, toilets, and other fixtures are joined to municipal drainage mains. Plastic, paper, and other types of waste are collected and occasionally sold to scrap vendors. There have been initiatives to create compost manure from canteen solids.

### ***Liquid waste management***

The used chemical waste Recycled water is used to water trees or other non-potable purposes after being combined water from the lab is piped into a soak pit. By mixing with the bathroom and toilet liquid wastes in the common drainage, liquids are diluted.

### ***E-waste management***

The gathered electronic garbage is kept in a storage area and disposed of annually as necessary. For rotating drums used in pharmacology that are beyond repair, the buyback scheme is used. To ensure their safe recycling, used toners, cartridges, computers, and electronic devices are sold as scrap.

### **Management of Food Waste**

To speed up decomposition, the gathered food waste is originally combined with shreds of greenery. After that, the mixture is allowed to rot for 15 days. Food waste is placed in layers to create compost beds that reach a height of three meters, along with litter, shredded dry leaves, crop leftovers, and trimmed campus grass. Cow dung slurry is applied to each layer of trash that is 25 cm thick. This also applies to the topmost layer. After that, the bed is left for 45–60 days to allow for biodegradation. The heap is covered with sheeting to keep the heat and gas produced within and speed up the process. A thermometer is periodically inserted to measure the temperature of the partially degraded trash.

### ***Reduce***

As you would infer from the fact that the first of the three R’s is “reduce,” managing solid waste is best done through reduction. It’s fairly straightforward: the less you use, the less garbage you’ll create. Customers are most uneasy about this R because we tend to believe that we must make drastic cuts or we won’t be having an impact.

### ***Reuse***

Reuse is the second R. With the increase in upcycling and creative projects all over the web, this one is getting more and more well-liked. Reusing something rather than dumping it away prevents trash from ending up in landfills and produces something fresh.

### ***Recycle***

Recycling is the last R, and arguably the best recognized. Recycling is the process of remanufacturing a product to be marketed as new, as you are surely aware. Other products can be recycled that you might not even be aware of, in addition to the standard recyclables

like paper, plastic, glass, and cardboard. Also, keep in mind that recycling only functions if you finish the process by purchasing recycled items. Try one of the following today to start recycling:

- Ask your local rubbish collection service if they offer to recycle as well.
- To find out what materials local recycling facilities accept, inquire with them.

## **Waste Collection**

Regular waste collection is the first step in effective waste management. Dustbins being placed in strategic locations has made this process simpler. Dustbins, for instance, are positioned at canteens, along the sides of the highways, and in every building's hallway. Infectious vectors are kept from reproducing by using covered trash cans. The sources determine how frequently waste is collected. The frequency of waste collection will increase as waste production at a particular source increases. Many people congregate in mess halls, so a huge quantity of waste is produced there. This demands that it be cleared after every meal. Following each mealtime, the food waste from all nine mess halls is transported in a pick-up truck.

### ***Information on Pests in the institution and their Control***

Pests such as insects, rodents, fungi, and weeds can affect the school environment and the people who work and learn there. These pests can cause human health problems, structural damage, and plant damage.

### ***Pests of concern in the institution***

You will need to know what pests you are facing before deciding how to control them. These pest fact sheets will give you a brief overview of some pests that may be issued at your school, including their life cycle, health concerns, and information about the control.

Pests find homes in many places and around such as:

**Cafeterias** – Food and water in small spaces, as in cabinets and between appliances, attract pests.

**Classrooms** – Desks and closets are examples of messy spaces where pest populations grow.

**Lockers** – clutter and food can quickly collect in lockers throughout the school year, providing a safe harbor and breeding grounds for pests.

**Locker rooms** – These places may be heated and poorly ventilated, making them ideal places for bugs to breed.

**Dumpsters** – Waste bins and their surroundings are susceptible to insect issues, particularly if they are next to educational facilities.

**Exterior conduits** – Pests have simple entry points at all exterior apertures.

**Landscapes, school grounds, and athletic fields** – Neglected landscaping can draw many different pests, including those that damage school buildings.

**Buses** - provide particular pest management difficulties when schools implement initiatives like Breakfast on the Bus.

## Maintaining Cleanliness

Although the flu virus can survive on surfaces for up to 48 hours, thankfully standard disinfection and cleaning are all you need. Consider all the surfaces that are touched and used regularly, such as:

- Doorknobs
- Keyboards
- Desks
- Faucet handles
- Toys
- Drinking fountains

Maintain easy access for all of your workers to antibacterial wipes, tissues, trash cans, and EPA-registered disinfectants. A fantastic technique to estimate how much cleaning and disinfecting is required is to divide the school into parts according to the types of activities that are conducted there. For instance, regularly-used restrooms, classrooms, or break rooms will require a different daily cleaning schedule than places with less foot traffic. The amount of cleaning employees you require can be determined once you have a plan in place. Everyone will be more inclined to maintain a clean environment if they are informed about the need for personal responsibility in limiting the transmission of germs. The well-being of the pupils and the cleanliness of the school shouldn't just be the responsibility of the cleaning staff.

## **Dry and Wet Waste**

Wet Waste is all the kitchen waste that we produce. This can include fruit waste, old tea, leftovers, peels from vegetables, etc. These are essentially compostable biodegradable organic waste.

Paper, glass, plastic, cardboard, Styrofoam, rubber, metal, and food packaging materials are all examples of dry trash. Even milk packets and cartons are disposed of in a dry waste bin. However, before disposing of these, you must rinse and dry them. Whatever dry waste you dump, make sure it is indeed dry. There should be no soiled packaging waste in this bin. Milk and food residues can be rinsed out in a matter of seconds. Use a moist towel to clean and wipe off non-rinsable items, such as pizza boxes. If you don't, it will smell, draw flies, and be difficult to recycle.

## **Segregation of Dry Waste & Wet Waste**

The amount of rubbish that fills landfills and takes up space is decreased when it is separated. The amount of air and water pollution has significantly decreased, which makes it simpler to use various techniques like composting, recycling, and incineration on various waste types.

Starting at the domestic level, waste management is rather simple to implement. Even a few small adjustments make a big difference. First, make sure your home has two garbage disposals: one for dry trash and one for wet trash. Dry waste includes things like aluminium foils, tetra packs, glass, paper, plastics, and metals, whereas moist garbage includes things like stale meals, fruits, and vegetables from the kitchen.

## **Awareness of cleanliness**

### ***Cleanliness Awareness through Wall Paintings***

Wall Painting, a mode of art is a powerful tool of communication that is used in NCL to deliver the message of cleanliness. NCL fully understands the magnitude of impact that it creates in motivating people to adopt practices towards maintaining clean and hygienic surroundings.

### ***Cleanliness Awareness through Banner/ Message Display***

Display banners are one of the most powerful tools to communicate a message to the masses at a time. NCL has also adopted some innovative ideas in displaying the messages through different means such as placing banners at conspicuous locations, displaying messages through LED screens in Swatch Rath, etc.

### ***Cleanliness Awareness through Nukthu Natak***

Nukthu Natak is an art form in which drama is performed to create social awareness among the masses. Nukthu Natak has always been an integral part of social awareness tools in Indian society. NCL organizes Nukthu Natak in different areas/ units.

### ***Cleanliness Awareness through Seminars and Counselling***

NCL organizes seminars and counseling sessions to demonstrate the importance of maintaining personal hygiene illustrating the importance of comprehensive cleaning to maintain a hygienic workplace and residential accommodation.

### **Review of Literature**

Gregory R Maio, Ali Pakizeh, Wing-Yee Cheung, Kerry J Rees 97 (4), 699, 2009 According to circular models of values and goals, certain motivational objectives are orthogonal to one another, while others are in opposition to one another. By exploring how to value confrontation and priming strategies affect values and value-consistent behaviors across the full value system, the current research explored this hypothesis directly. According to Experiment 1, when one set of social values changes, motivationally compatible values become more important, while orthogonal values remain unchanged and motivationally incompatible values become less important. According to Experiment 2, priming stimulation values raised the better-than-average effect whereas priming security values decreased it. Similar results were seen in Experiments 3 and 4, where it was shown that priming security values raised cleanliness and decreased curiosity behaviors, but priming self-direction values lowered cleanliness and increased curiosity behaviors.

Thomas Klatetzki 30-62, 2016 Organizations will in some way or another other have to deal with the feeling of revulsion as long as there are human beings there. There are essentially three causes for this. First off, disgust is an embodied feeling with biological roots that is almost always brought on by stimulation of the senses of touch or scent as well as by mental imagery. Second, organizations must take into account institutions of cleanliness (of the body) and purity (of the mind), which are connected to the activation and control of disgusting sentiments. Thirdly, disgust is a strong feeling that drives avoidance, separation, and cleansing behaviors, which helps shape social interactions both inside and between organizations. Consequently.



Likdanawati, Hamdiah, Saiful Harif 1 (1), 63-80, 2021 the purpose of this study is to identify and examine the relationship between employee work performance at the Langsa City Office of Environmental Sanitation and leadership style, incentives, and motivation (BLHK). Officer in the Office was one of 45 respondents in the research sample (BLHK). Employee Job Performance is the utilized variable's dependent variable. While Leadership Style, Incentives, and Motivation are independent variables. Multiple linear regression analytic tools are used in this work. The factors of Leadership Style, Incentives, and Motivation combined have a significant impact on Employee Job Performance, according to hypothesis testing using the F test. The Leadership Style, Incentives, and Motivation variables have a positive and significant impact on Employee Job Performance.

## **Objectives**

- To identify various methods adopted by the students to promote cleanliness.
- To analyze the various cleaning activities at various places by students.
- To design the different parameters among the students to create awareness about cleanliness.

## **Methodology**

### ***Secondary data collection***

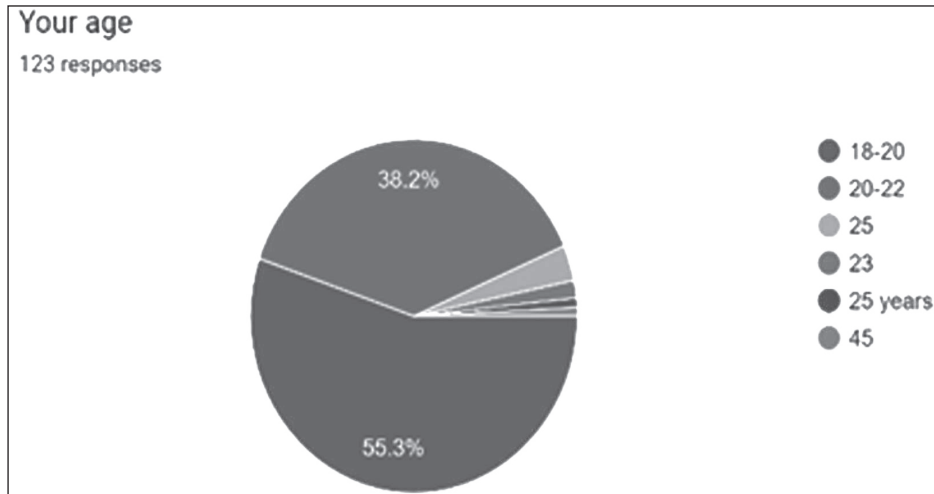
Our research paper is mostly based on secondary data sources. Secondary data were collected through various sources such as Website reports, journals, etc. We have collected All collected data was analyzed with the help of trend line analysis.

### ***Primary data collection***

The primary source is taken by a survey that consists of various questions from the institution's faculty and students. To understand the perception and to know various practices are followed in their institutions. The research is done by the quantitative method.

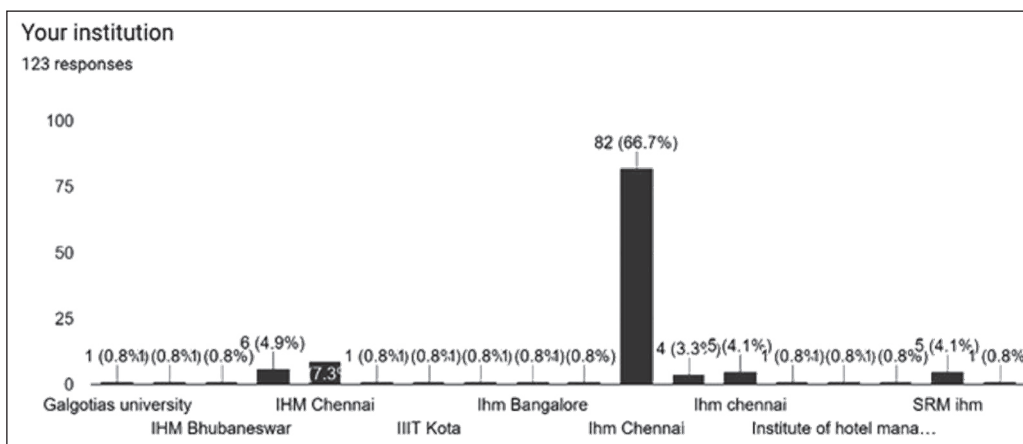
## Data Analysis

### 1. Your Age



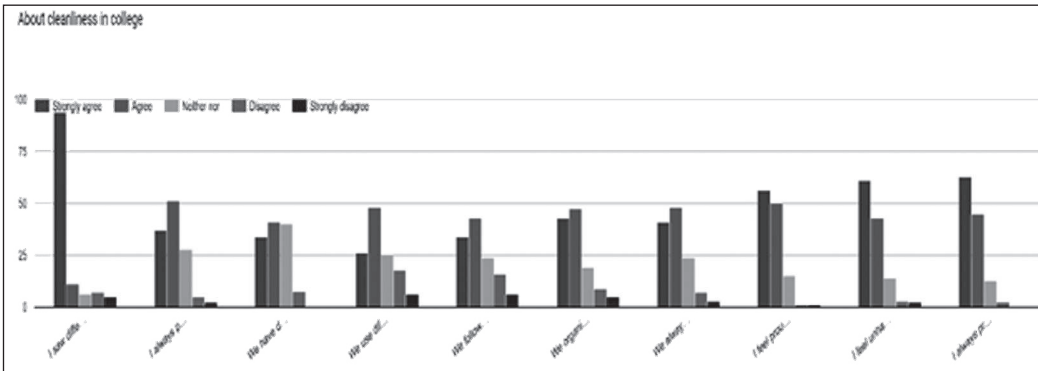
To understand the role of college students motivated towards cleanliness. A survey was conducted on the students from different colleges students. The response received between the age group of 18 to 20 is 55.3%. The response received between the age group of 20 to 22 was 38.2% .and hence we conclude that a large number of people are aware of the cleanliness of public places.

### 2. Your Institution



From the above table, it shows that 70% of them responded from the IIM Chennai institution.

### 3. About College Cleanliness



- I saw different types of garbage in my college surroundings.

**Result:** The majority strongly agree that, they are having different types of garbage in their college surrounding.

- I always participate in different types of cleaning drives & activities.

**Result:** The majority has agreed that they are participating in different types of cleaning drives & activities.

- We have dedicated staff for waste collection, segregation & disposal.

**Result:** The majority has agreed that they are having dedicated staff for waste collection, segregation, and disposal.

- We use different garbage dustbins for different types of garbage.

**Result:** The majority has agreed that they are having different types of garbage to use.

- We follow 3R {reuse, reduce, recycle} steps regularly in our collage.

**Result:** The majority has agreed that they are following the 3R steps in their college on regular bases.

- We organize a competition to make students & people motivated towards cleanliness.

**Result:** The majority has agreed that they will organize a competition for cleanliness among students.

- We always take initiative for pest control

**Result:** The majority has strongly agreed that they will always initiative for pest control in college.

- I feel proud & happy to see my surroundings clean& fresh

**Result:** The majority strongly agreed that they feel proud & happy to see my surroundings clean & fresh in college.

- I feel unhappy and exhausted when I saw dirty are which has insects going around

**Result:** The majority strongly agreed that they feel unhappy when the place is dirty and insects surround them.

- I always promote cleanliness so that aware other people can recognize & get aware of their surrounding environment.

**Result:** the majority strongly agreed that promoting cleanliness is to get more awareness for the people to surround us, and to keep surrounding cleanliness.

## Conclusion

Institutions are a significant source of infection because they are crowded settings where employees and students spend the majority of their waking hours.

Institutions become high-risk settings for students and employees because of the danger of person-to-person transmission, which is exacerbated when water, hygiene, and sanitation standards are subpar. To prevent infections from spreading within the institution and to safeguard students and employees, it is crucial to provide clean drinking water, hygiene, and sanitation services. Students can attend school in a safe and healthy setting in this way. However, it was seen that the institution in Antalya struggled to offer the essential supplies, equipment, services, and staff to maintain hygienic conditions, despite their best efforts to find short-term fixes. Providing institutions with supplies, equipment, and cleaning personnel is crucial to promote and assisting in successful WASH coverage and implementation.

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**ISBN: 978-81-960940-3-4**

# **Opportunities and Challenges Associated with Energy Conservation: A Study of Uttar Pradesh**

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## **Abstract**

It is a widely held belief that in order to lessen the issues brought on by rising levels of fossil energy use, one must adjust their behaviour. The most significant causes of the desired behaviour should be the focus of any behaviour change strategies. Research gap of the study: Over the past decade number of studies has been conducted on energy conservation, but no extensive study has been found worldwide collaborating opportunities and challenges associated with energy conservation. No specific study has been found related to energy conservation in Uttar Pradesh. Research focuses on the two aims and objectives. First is to study the opportunities helps in saving energy in day to day life. Second is to analyze the challenges faced to save energy. Research based on two methods. The primary sources of data collection was structured questionnaire by using Likert scale. Questionnaire was prepared distributed through the Google form and personal interview. Secondary sources of information were national and international journals, Government reports, published research articles, theses, books, websites, magazines, newspapers, etc. major findings of the results are as follows: paper first discussed the opportunities helped in saving energy in day to day life. Majority of the respondents agree that planting trees, using solar power devices, using automated devices, using double glazing door, keeping the thermostat at a lower temperature, using LED lights and unplugging devices when not in use. Secondly challenges was identified which were adherence to conserve energy. These are as follows: lack of self-responsibility, lack of education about harmful effects of decreasing natural resources, lack of awareness in young generations, heavy cost of energy saving devices, product affordability has been increased, preferences of using machinery facilities over the natural products and growth of industrialization. Lastly this paper suggest many other topics to be research for the future researchers.

**Keywords:** Energy Conservation, thermostat, LED, opportunities, challenges, awareness.

## **Introduction**

By using fewer energy services, energy conservation aims to cut down on unnecessary energy use. This can be accomplished by modifying one's behaviour to use less service or by using energy more efficiently for example, by driving less or driving pool. Through energy efficiency, which has a number of benefits, including a decrease in greenhouse gas emissions, a lower carbon footprint, and cost, water, and energy savings, energy conservation can be accomplished.

## **Energy Conservation in India**

India has made remarkable strides in its recent energy development, but there are still numerous obstacles to overcome, and the Covid-19 outbreak has caused significant disruption. India has recently encouraged the adoption of highly-efficient LED lighting by the majority of families, brought electrical connections to hundreds of millions of its residents, and sparked a significant increase in renewable energy sources, led by solar power.

There has been noticeable improvement in the standard of living for Indian citizens. The Covid-19 situation has, however, made it more difficult to find solutions to other urgent issues. These issues include the fact that many consumers lack access to dependable electricity, that 660 million people continue to cook with solid biomass, primarily firewood, that electricity distribution companies are in financial trouble, and that air quality in Indian cities is among the worst in the world.

India now consumes more energy than any other country in the world, thanks to rising incomes and rising standards of living. Since 2000, energy consumption has increased, with coal, oil, and solid biomass still meeting 80% of the need. India uses and emits less energy per person than the average country in the globe, and it also produces less steel and cement than the average country. India is once again starting a very dynamic phase in the development of its energy sector as it emerges from a Covid-caused slowdown in 2020. Millions of Indian homes plan to purchase new appliances, air conditioners, and vehicles during the upcoming years. With an annual urban population growth of the size of a city the size of Los Angeles, India will soon surpass China as the world's most populated nation. Over the next twenty years, India will need to expand its current power infrastructure to include a power system the size of the European Union in order to meet the increase in electricity consumption (India Energy outlook, 2021).

## **Home Energy Use and Energy Conservation Factors**

Energy conservation in the home is influenced by numerous factors. People must first be aware of the need for and potential solutions for reducing household energy use. Second, people must be inspired to practise energy conservation. Thirdly, they must be capable of exhibiting the necessary behaviours. Below, a brief explanation of each of these elements will be given.

### **A. Awareness**

The concerns associated with residential energy use are generally well known and are of concern to people (Abrahamse, 2007). The concerns associated with residential energy use are generally well known and are of concern to people. For instance, a large portion of individuals believe that the destruction of ozone in the high atmosphere is what causes global warming, while a much smaller portion believe that home heating and cooling is to blame. Public knowledge may have improved in recent years as climate change communication has increased. However, some misunderstanding is still probable given the intricate dynamics at play. In addition, most people are unaware of how much energy their actions actually consume (Bord et al., 2000).

### **B. Concerns for energy conservation**

Concern over environmental and energy issues is widespread in many Western nations (Abrahamse, 2007; Poortinga et al., 2002; Schultz and Zelezny, 1999). However, despite worries, people frequently do not respond accordingly, and overall home energy use is continuing to rise. Many people place a low importance on energy conservation in addition to being unaware of how different behaviours affect energy use. Concerns about the environment and energy issues are not the sole factors influencing energy use. Other important variables include status, comfort, and effort (Stern, 2000). When reducing energy use has significant behavioural costs in terms of money, effort, or convenience, people are less likely to do it. People are much more likely to engage in pro-environment actions like recycling than they are in activities like cutting back on driving, which have larger financial and lifestyle costs (Lindenberg and Steg, 2007). This is not to say that environmental issues and social norms have no effect on high-cost behaviour. Even at the expense of their own personal disadvantage, some people do cut back on their energy use.

### **C. The capacity to practise energy conservation**

Some people claim that they are unable to decrease their energy usage. It's possible that energy-efficient technology is unavailable, prohibitively expensive, or that workable alternatives are lacking. Contextual elements including the availability of goods and services, the state of the infrastructure, cultural norms, and economic issues all have a



significant impact on this ability. Psychological motivations are largely unimportant when these factors significantly facilitate or dramatically impede pro-environmental behaviours (Guagnano et al., 1995).

## Psychological Behaviour

The majority of psychological research to date has focused on how informational strategies affect behaviour and energy conservation. Much less attention has been paid to structural strategies. Studies looking at how structural strategies affect behaviour tend to focus more on intentions than on actual behavioural changes.

## Acceptance and Acceptance of Renewable Energy Sources

Decentralized energy and renewable energy sources are two of the many alternatives to fossil fuels that are currently being researched. Future study should focus on effective methods to introduce these choices. We must look into the elements that influence the acceptance and acceptability of such alternatives. Due to the lack of knowledge regarding alternative energy sources among many people, this is not a simple task to complete. Asking individuals their ideas about sustainable energy sources “out of the blue” will show knowledge gaps and false beliefs, but it does not give policy makers a solid foundation. The results of such investigations will be based on the researchers’ descriptions and what people have learnt from the media. When comprehensive information regarding the benefits and potential drawbacks of such energy sources is presented, public attitudes and preferences will be more solidified.

## Scheme of Chapterisation

Chapter Number	Name of Chapter
Chapter 1	Introduction
Chapter 2	Literature review
Chapter 3	Aims and objective of the study
Chapter 4	Research methodology
Chapter 5	Analysis and findings
Chapter 6	Conclusion
Chapter 7	Limitation and suggestions for future research
Chapter 8	References

## Literature Review

We have been taught the need of shutting off electronics and other appliances when not in use since we were young. Whenever we leave the house or when they are not in use, we typically turn off the fan, light, AC, and refrigerator. In addition to saving money, we implement these techniques to use less energy. Proper conduct and routines can aid in energy conservation. Energy cannot be created or destroyed; it can only be changed from one form to another, according to the rule of conservation of energy. An isolated system's total energy is constant over time in accordance with the rule of conservation of energy. The law of energy conservation applies to all kinds of energy. Before and after the transition, the total energy is constant.

Promoting energy conservation can be done by educating people more, raising their awareness of energy issues, or encouraging behaviour changes through environmental improvements. Two basic categories of measures can be used to encourage energy conservation in homes. In order to change people's knowledge, attitudes, motivations, cognitions, and norms around energy consumption and conservation, psychological methods are used. It is assumed that these adjustments will result in behavioural adjustments and, as a result, energy savings. Examples include the dissemination of knowledge, instruction, and modelling. The goal of structural strategies is to alter the environment in which choices are made in order to make energy saving more appealing. Examples include updated or superior goods and services, changes in infrastructure, pricing policies and legal measures. The majority of research on the psychology of energy usage has been on the use of informational tactics (Abrahamse et al., 2005). In general, information efforts only slightly alter behaviour. However, some informative tactics seem to be effective in encouraging household energy conservation. A few of them are prompts (Luyben, 1982), individualised social marketing approaches (Abrahamse et al., 2007; Daamen et al., 2001), commitment strategies (Katzew and Johnson, 1983), eliciting implementation intentions (Bamberg, 2002), modelling and personalization, and other methods (Schultz et al., 2007).

Informational techniques are most effective when individuals do not experience significant behavioural constraints and when proenvironmental behaviour is reasonably convenient and not extremely expensive in terms of money, time, effort, or social condemnation. Furthermore, the adoption of informational methods may be a crucial component of structural strategies used to compel people to alter their behaviour. Less research has been done on structural strategies in psychology.

The analysis is typically limited to the perceived efficacy of such measures, and the majority of attention is given to the implications of transport pricing (Steg and Schuitema, 2007, for a review). These studies show that most people believe that reducing car use is not

very possible, which is why they believe that transport pricing will not be very effective in doing so (Jakobsson et al., 2000). Studies on the real impact of transportation price, however, have shown that car use may be significantly impacted by transportation pricing.

The Singapore area licence programme and the London congestion fee are two prominent examples (Santos et al., 2004). This shows that price policies may reduce home energy use and that the benefits may be more than initially anticipated. Promoting the use of energy-efficient equipment is a clear strategy to reduce household energy use. In this regard, a variety of psychological elements are crucial (Midden et al., 2007). When energy-efficient appliances satisfy crucial needs, wants, and preferences, they will be more widely used. As rebound effects may happen, it is crucial to take into account any potential negative effects of energy-efficient equipment. This occurs when individuals use energy-efficient appliances more frequently since they use less electricity (Hertwich, 2005). In order to effectively promote energy saving, Midden and colleagues show how technology and behaviour are intertwined in many ways. They also provide a number of examples of how technological and behavioural elements might be incorporated into interactive techniques.

Environmental scientists have recently created sophisticated technologies to inform individuals in detail on the energy use connected to particular behaviours (Benders et al., 2006). These resources can be used to give people individualised guidance on how to cut back on their energy usage as well as feedback on how much actual energy was saved as a result of changing their behaviour. These devices are crucial for educating people about energy use. However, little is currently known about how ready people are to use these tools and alter their behaviour in response to the advice supplied.

## **Research Objectives**

1. To study the opportunities helps in saving energy in day to day life.
2. To analyze the challenges faced to save energy.

## **Research Methodology:**

### **Sampling and Data Collection**

The data for the research paper were gathered from people from all over Uttar Pradesh. A structured questionnaire was prepared for survey and distributed to respondents through digital platform using Google forms and structured questionnaire and personal interview (offline). The structured questionnaire was framed with closed ended questions and was

filled by the respondents in the month of November- December, 2022. The primary sources of data collection was structured questionnaire and secondary sources of information were national and international journals, Government reports, published research articles, theses, books, websites, magazines, newspapers, etc. The questionnaire was divided into three parts. The first section included the information on the demographic profile of the respondents. The second section consists of the first objective which was based on opportunities helps in saving energy in day to day life. Third section was the second objective which was based on challenges faced to conserve energy. Five point likert scale analysis was used to analyse the questionnaire ranging from strongly disagree:1, disagree:2, neutral :3, agree:4, strongly agree:5. Lastly conclusion was written on the analysis of the two objectives.

## Analysis and Findings

### Demographic Characteristics of Respondents

To achieve the mentioned objectives, a structured questionnaire was prepared and distributed to 200 respondents to all over Uttar Pradesh at the month of November-December, 2022 through online and offline both. 180 out of 200 respondents have filled the survey questionnaire. The gender distributions showed that 60% were males which are majority than females are 40%. The survey showed that age which major fall in the category is between 31-40 years and 60.4% were married. The educational qualification of the respondent's shows 45.4% post-graduation and 35.9% are graduates. If we talk about the occupation 63.3% were in private job, whereas government job had 20.5% respondents. Majority of the respondents were earning 3-6 lakhs annually through private jobs.

**Table1: Demographic Characteristics of Respondents**

VARIABLES		%
<b>Gender</b>	Male	60%
	Female	40%
<b>Age</b>	18-30years	25%
	31-40years	63%
	41-50years	10%
	51-60years	1%
	Above 60years	1%
<b>Marital status</b>	Unmarried	39.6%
	Married	60.4%

VARIABLES		%
<b>Educational qualification</b>	Undergraduate	16.6%
	Graduate	35.9%
	Post graduate	45.4%
	Doctorate	2.1%
<b>Occupation</b>	Government job	20.5%
	Private job	63.3%
	Business	15.5%
	Retired	0.7%
<b>Annual income</b>	Less than 1 lakh	8%
	1-3 lakhs	13.2%
	3-6 lakhs	55%
	6-10 lakhs	17.6%
	More than 10 lakhs	6.2%

### *Opportunities helps in saving energy in day to day life*

Table 2 represent the opinion of the respondents in the category of strongly disagree, disagree, neutral, agree and strongly agree. 62 respondents strongly agree with turning off the lights when leaving a room is necessary as it saves electricity which helps to protect our environment. 60 respondents agree that when a device is finished charging, unplugging it will not only save energy but also increase its lifespan. Modems, routers, and cable boxes are examples of devices that should be left plugged in because turning them back on often necessitates a lengthy reset. 71 respondents agree that we should plant trees. Trees and shrubs increase wildlife habitat, conserve soil and water, store carbon, moderate local climate by supplying shade, control temperature extremes, and enhance the ability of the land to adapt to climate change. These are all advantages that trees and shrubs provide for the ecosystem and for people like us. 68 respondents strongly agree that solar power devices helps to save energy. After installation, solar energy produces no greenhouse emissions and is pollution-free. Less reliance on fossil fuels and foreign oil. 64 respondents strongly agree that automated devices helps to conserve energy and money. 70 respondents agree that use double glazing door helps to reduce the consumption of the electricity and also give natural sunlight and fresh air in the rooms. 66 respondents agree that keeping the thermostat at a lower temperature helps the environment to protect from the emission of the harmful gas in the environment. 58 majority of the respondents agree that using led lights helps to save electricity consumption. 63 respondents strongly agree that cooking food with lid on helps the food to cook quickly and protect the nutrients from loss.

**Table 2: Opportunities Helps in Saving Energy in Day to Day Life**

<b>Opportunities helps in saving energy in day to day life</b>	<b>Strongly disagree (1)</b>	<b>Disagree (2)</b>	<b>Neutral (3)</b>	<b>Agree (4)</b>	<b>Strongly agree (5)</b>	<b>Total</b>
Turning off the lights when leaving a room	30	30	29	29	62	180
Unplug devices	20	8	34	60	58	180
Planting more trees	15	24	4	71	66	180
Solar power devices	4	16	38	54	68	180
Use automated devices	4	12	41	59	64	180
Use double glazing door	7	10	43	70	50	180
Keep the thermostat at a lower temperature	9	28	21	66	56	180
Using LED lights	10	17	40	58	55	180
Cook with the lid on	21	15	34	47	63	180

### ***Challenges faced to save energy***

Table 3 represents that 80 of the majority respondents strongly agree that lack of self-responsibility is the biggest challenge to save energy. 61 respondents agree that because lack of education in the society about harmful effects of decreasing natural resources. Lack of awareness in young generations is responsible for the harmful effects of deficiency of natural fossil fuels. Young generation can do wonder if there are utilised in the good way. 63 of the respondents agree that lack of awareness in the young generation is the challenge to save energy. Heavy cost of energy saving devices is the challenge for most of the people as it not affordable in their budget. 50 of the respondents agree on this sentence. Product affordability has been increased because of the working of the both partners in the family. Due to lack of time to spend in the kitchen and doing household work people buy the product as per their convenience. As a result it adds more consumption of the energy. Therefore 66 of the respondents agree that product affordability has been increased which is a challenge to save energy. 72 of the respondents says people prefer using machinery facilities over the natural products is the biggest challenge to save energy. Growth of industrialization helps to ease the life of this generation. Therefore 58 respondents agree on this statement.

**Table 3: Challenges Faced to Save Energy**

<b>Challenges Faced to Save Energy</b>	<b>Strongly disagree (1)</b>	<b>Disagree (2)</b>	<b>Neutral (3)</b>	<b>Agree (4)</b>	<b>Strongly agree (5)</b>	<b>Total</b>
Lack of Self-responsibility	10	10	19	61	80	180
Lack of education about harmful effects of decreasing natural resources	15	15	44	61	45	180
Lack of awareness in young generations	8	15	39	63	55	180
Heavy cost of energy saving devices	20	30	30	50	50	180
Product affordability has been increased	10	10	30	66	64	180
Preference of using machinery facilities over the natural products	14	12	14	68	72	180
Growth of industrialization	8	7	51	58	56	180

## **7 Governmental Initiatives to Promote Energy Efficiency and Conservation**

### **1. The Bureau of Energy Efficiency's standards and labelling (BEE)**

In order to give the consumer information on energy savings, the Bureau of Energy Efficiency (BEE) launched the Standards & Labeling programme for equipment and appliances in 2006. The goal of the BEE's energy efficiency labelling initiatives is to lower appliance energy usage without sacrificing the level of consumer service.

### **2. The Ministry of Power's Energy Conservation Building Codes (ECBC)**

The Ministry of Power introduced the Energy Conservation Building Code (ECBC) for new commercial buildings in 2007. It establishes minimal energy requirements for new commercial structures. The most recent edition of the ECBC was released in 2017, and it establishes guidelines for contractors, designers, and architects to incorporate passive design techniques and renewable energy sources into building designs. The code prefers life-cycle cost-effectiveness to achieve energy neutrality in commercial buildings and seeks to balance energy savings with occupant comfort levels.

**3. Under NAPCC, the National Mission for Enhanced Energy Efficiency (NMEEE)**

One of the eight objectives included in the National Action Plan on Climate Change is the National Mission for Enhanced Energy Efficiency (NMEEE) (NAPCC). By establishing favourable legal and policy frameworks, NMEEE seeks to strengthen the market for energy efficiency. The organisation also plans to support creative and long-lasting business models in the field of energy efficiency.

**4. School Education Program from NCERT and the Bureau of Energy Efficiency**

The next generation has to be educated about the efficient use of energy resources. In this regard, the creation of Energy Clubs serves to improve energy efficiency in educational institutions. The NCERT science textbooks for classes 6th through 10th will be updated to include a text/material on energy efficiency and conservation, according to plans by the Bureau of Energy Efficiency.

**5. Human Resource Development (HRD)**

The potential for increasing process and equipment energy efficiency through raising awareness is enormous. The adoption of energy-efficient technologies and practises in a variety of industries depends heavily on an effective policy for the development, retention, and upgrading of human resource skills.

**6. UJALA programme for the promotion of energy-efficient LED bulbs**

The UJALA programme aims to encourage residential users to use energy more efficiently, increase consumer awareness of the benefits of using energy-efficient appliances, and aggregate demand to lower the high initial costs of LED lighting. It should be mentioned that the programme was rebranded as UJALA after being known as DELP (Domestic Efficient Lighting Program) at first.

**7. National Electric Mobility Mission Plan, which promotes electric vehicles**

The National Electric Mobility Mission Plan (NEMMP) 2020 was introduced by the Indian government in 2013. It seeks to ensure national fuel security by encouraging the use of electric and hybrid cars. From 2020 onward, an ambitious goal is to sell 6-7 million hybrid and electric automobiles annually. The government wants to offer financial and tax incentives to jump-start this emerging technology; for instance, demand-side incentives to make it easier to buy hybrid and electric cars, and promoting research and development in areas like battery technology, power electronics, motors, and systems integration. (Clear IAS, 2018).



## Conclusion

Utilizing less energy is a choice and a practise known as energy conservation. Energy conservation practises include turning off lights when leaving a room, unplugging appliances when not in use, and choosing to walk instead of drive. Among the many advantages of energy efficiency are the following: Environmental: Enhanced efficiency can reduce greenhouse gas (GHG) emissions and other pollutants, as well as water use. Economic: Energy efficiency improvements can reduce individual utility costs, create jobs, and assist reduce the volatility of electricity prices. To achieve the mentioned objectives structured questionnaire was prepared. From the questionnaire following top 5 view are as follows: first objectives was to study opportunities helps to save energy in our day to day life. Planting tree was the first top received points by the respondents. Second. Third was the use of solar power devices to save energy. Fourth was to keep the thermostat at a lower temperature. Fifth was to use automated devices. From second objectives again top five opinions were studied. First was the lack of Self-responsibility among the respondents. Second was the preference of using machinery facilities over the natural products. Third was the product affordability has been increased which helps respondents to buy more products for their use. Fourth was the lack of awareness in young generations and lastly was the lack of education about harmful effects of decreasing natural resources.

If the above points carefully followed by the respondents than conservation of energy will become easy and people will not face environment issues.

## Limitations and Suggestions for Future Research

The present research has following limitations. Respondents received only 180 which is too small for highly populated state like Uttar Pradesh and therefore findings may vary if sample size could have been large. This study is focused only on the opportunities and challenges faced by the people to conserve energy. Government aspect was not covered in the questionnaire. If it was the part of the questionnaire than result can be compared between the opportunities given by the Government and received by the people. Researcher further suggest that study can be done in the area like people contribution for energy conservation. Consumer behaviour towards the scheme run by government can also be studied.

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**ISBN: 978-81-960940-3-4**

# **Cleanliness and its Impact on Employee Turnover**

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## **Abstract**

One of the most aggravating and ongoing problems that the organization and firm have experienced over the years is the staff turnover rate. In the last few years, employee turnover rates have risen across all industries. Therefore, it is of particular relevance to look into whether studies on lowering employees' intentions to quit their jobs are successful for businesses. Therefore, we contend that it is essential to conduct a thorough analysis when investigating the effects of cleanliness on employees' intents to leave their jobs.

**Keywords:** Turnover Intention, Cleanliness, Job Satisfaction, Employee Motivation, Two-way process.

## **Research Objectives**

Among the concrete goals of this research are:

- To grasp the concept of cleanliness;
- To understand the significance of a clean work environment;
- To generate a concept of a clean work area or space;
- To investigate the relationship between cleanliness and employee turnover;
- To solve the problem of employee turnover due to lack of cleanliness.

***Aradhana & Aathira Nandakumar***

## Research Methodology

Research methodology refers to the procedure of acquiring information and data with the intention of making business judgments.

This study's focus is mostly on descriptive elements. Descriptive research designs can aid in addressing the questions of who, when, and how they relate to a certain research topic, but they cannot offer definitive explanations for why.

Using variables or conditions present during a situation, descriptive research is used to learn more about the phenomenon's current state and to explain "what exists."

- The environment in which the subject is being observed remains unchanged and completely natural. Although if they generate data that can be studied, true experiments usually have a detrimental influence on the subject's regular behavior;
- Descriptive research is typically used as a stepping stone to more quantitative research methodologies since it gives some useful indications about what factors are worth investigating quantitatively based on the overall picture;
- You might be able to build a research project that is more tightly focused if you are aware of the limitations;
- Valuable data from descriptive research may lead to vital, actionable recommendations;
- Approach gathers a lot of data for in-depth research.

## Introduction

People will participate in a variety of endeavors, groups, and activities to support their way of life. However, it is impossible to estimate how much time people invested in these activities due to a variety of factors. People will alter or abandon their jobs and organizations to the extent that it is comfortable for them to do so. The intention to quit, also known as the turnover intention, is a requirement before leaving a job or organization (Ngamkroekjoti, et al, 2012).

The possibility that a person may quit their current employment is referred to as their "turnover intention." No matter the location, size, or type of organization, the intention of employees to leave has always been a major concern. In all areas of the economy, turnover is a serious problem with human resources and has an impact on profitability, product and service quality, and productivity (Long et al, 2012).

## Literary Review

(Zhong and Liljenquist, 2010) demonstrated that challenges to people's moral purity, such as shame over earlier immoral actions, will increase their need for physical cleansing in their investigation of bodily cleanliness as an essential metaphor of moral purity. In Zhong and Liljenquist's experiment, individuals felt as though they had regained their moral purity after washing their hands, and they decreased moral compensatory action, such as freely aiding a stranger. Workers will judge counterproductive work conduct differently in a clean workplace compared to a filthy one (Huangfu, G., Lv, F., Sheng, C., & Shi, X., 2017). Employees in a clean workplace will be more critical of counterproductive work behavior.

One of the biggest problems for any company is employee turnover because of the long-lasting effects it has. It is considered to be a serious problem, particularly in the area of human resources management. Today, a lot of organizations are concerned about employee turnover, which can be devastating for a business, especially if the lost workers were high performers (Gang, Lu Li and Sheng, 2021).

Many factors influence the causes of turnover in an organization. It is every Human Resource Departments' nightmare. There are two types of turnover: voluntary and involuntary. It is crucial to distinguish between voluntary and involuntary turnover since it is common for characteristics like work satisfaction to be linked to turnover; otherwise, the evaluation of this relationship in terms of all leavers will be incorrect (Perez, 2008). Voluntary turnover is when an employee leaves their position and the company of their own free will.

Both direct costs, such as replacement, and indirect costs, such as the strain on the remaining personnel or the loss of social capital, are considerable when it comes to voluntary turnovers. Turnovers that are both functional and dysfunctional are voluntary. Functional turnovers are resignations from poor performers, while dysfunctional turnovers are resignations from strong performers.

Additional classifications of dysfunctional turnover include avoidable turnover (due to lower pay, poor working conditions, etc.) and unavoidable turnover (due to things like family moves, serious illness, death, etc.), over which the organization has little to no control. When an employee leaves the company against their will, this is referred to as involuntary turnover (Taylor, 1998).

Turnover can be caused by a variety of factors. To some extent, these turnover intention factors differ from one organization to the next (Shah et al, 2010). There is no single factor that can be attributed to employee turnover intentions, and it is proposed to take a holistic approach to studying factors influencing employee turnover intentions (Jha, 2009).

## Employee Turnover Intention

This temporal progression forms the basis for the analysis of Herzberg's two-factor theory scholarship and the systematic assessment of employee turnover intentions. From the literature on Herzberg's two-factor theory and the current employee turnover intentions, we have discovered the patterns throughout time and extracted the essential themes.

Since employees constantly have the mindset of being ready for change, turnover of employees has become more and more prevalent, especially when the employee is experiencing push or pull circumstances. Turnover intents have been the typical and famous issues over the years. As a result, the majority of researchers are constantly interested in topics that will reduce employee turnover intentions and raise job happiness.

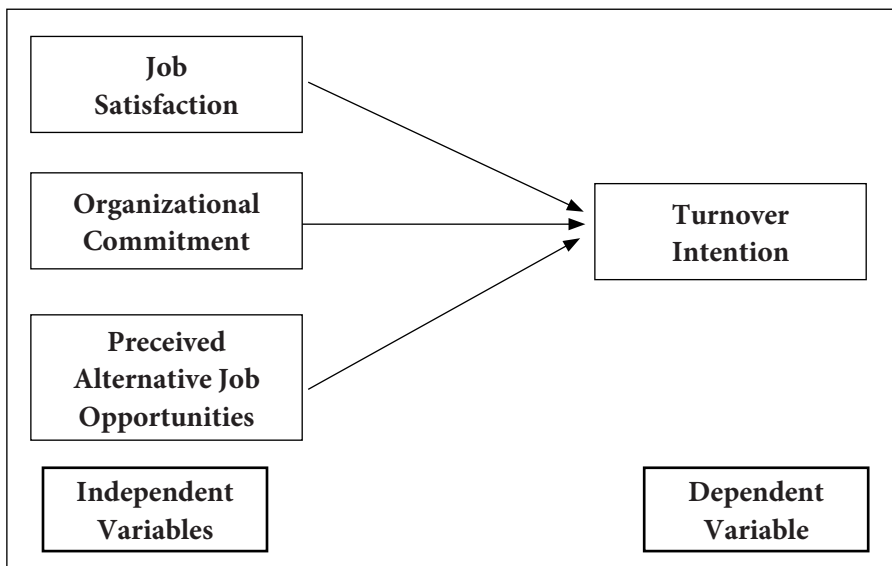


Figure 1: Factors for Turnover Intention

Studies and research into the link between an employee's motivation and employee turnover rate have grown as a result of the increased turnover rate that the global market was anticipating.

## Cleanliness in Workplace

Initial impressions matter. What do one think the chances are that a potential new client will conduct business with one if they visit one offices for the first time and find them to be messy and filthy?

The importance of keeping the office clean cannot be overstated. Recent studies have also revealed that cleanliness and clean work environments are becoming increasingly important in terms of customer satisfaction and, more importantly, employee retention in the organization. These are more important than price, quality, and customer service (Haneef, 2014).

Maintaining cleanliness in the workplace not only makes the environment healthier for workers, but it also frequently aids businesses in becoming more effective and productive. The most typical elements that lead to an untidy workstation include cluttered desks, leftover food, and waste paper. It is stated that a clean workplace boosts employees' professionalism and drive while also fostering a healthy work environment.

### ***The importance of cleanliness in the workplace***

- It may have an impact on workers' productivity, effectiveness, and wellbeing. In order to maintain strong staff morale and production levels, it is crucial to keep the workplace clean. Nobody feels motivated in an unclean environment;
- It promotes the efficiency, well-being, and safety of employees. For instance, keeping one office spotless can help one company experience fewer staff sick days preventing the transmission of diseases and germs through appropriate cleaning procedures;
- The productivity of employees can be increased by making provisions for a clean environment. Employee morale and motivation can be raised by maintaining cleanliness, which will help them feel more a part of the organization. Installing wall-mounted or free-standing trash cans around the office to make it simple to dispose of trash is one of the simplest ways to promote this (360 Services, 2014);
- The wellbeing of employees can be maintained by offering a clean workplace. Employees use fewer sick days in a setting where waste and litter are properly disposed of and surfaces are routinely cleaned, which boosts overall productivity (Raesgo, 2014);
- Both staff and customers have positive impressions of a business that is neat and organized. As a result, it is necessary to maintain cleanliness and hygiene both inside and outside of buildings. Ashtrays and outdoor trash containers are available for purchase by businesses for outside and smoking locations;
- Companies can save money by maintaining high standards of cleanliness in the workplace and avoiding costly renovations that may be required if the space is not well cared for. Office spaces are safer when they are kept clean since fewer potential



risks and accidents might happen. However, we acknowledge that occasionally cleaning standards do deteriorate due to increased workloads, adjustments, and changes in priorities.

One spend a third or more of one day at work, and every second one are there, one surroundings have an impact on one. Many people give their houses a lot of attention yet pay little to no attention to the cleanliness of their workplaces. All personnel working in the building should have a clean working environment.



Figure 2: ISSA Cleanliness in Workplace Awareness Brochure

## Maintaining Workplace Cleanliness

Some of the points to be kept in mind while keeping the workplace clean are:

- ***Clean everything from top to bottom:*** Cross contamination and the need to re-clean regions are reduced by top down cleaning. For instance, air vents, windows, and walls ought to be the primary areas of attention. Tabletops, phones, and chairs should be cleaned next in cubicle areas and conference rooms, and floors should be cleaned last. The second priority in restrooms should be cleaning the sinks and toilets, followed by mopping and drying the floors.
- ***Choose ones products wisely:*** To reduce waste while supporting cleanliness, it is critical to invest in high-quality, long-lasting restroom products. For example, today's toilet paper contains safe enzymes that eat away dirt when it comes into contact with water. This paper, which is safe for users and the environment, aids in the sanitization of pipes and septic tanks, thereby reducing the occurrence of costly plumbing issues and combating unpleasant odors. Meanwhile, some paper towels are made to be flushed away, dissolving like toilet paper to help prevent clogs.

The use of environmentally friendly cleaning supplies is essential because they can reduce exposure to potentially harmful or irritating chemicals. Look for readily available, non-toxic disinfecting wipes or sprays that have the ability to kill bacteria that are hiding on surfaces.

- ***Regularly replenish ones stock:*** To prevent hygiene disasters, perform routine stock checks and refill essential supplies like cleaning wipes, hand sanitizer, paper towels, and toilet paper before they run out. Consider keeping extra supplies on hand during seasons when illness is more prevalent, like winter, in case a corona virus or influenza outbreak occurs.
- ***Make use of signage to advocate for sensible actions:*** It's crucial to have the backing of the workforce in order to maintain a spotless workplace. Consider putting up posters encouraging people to wash their hands, cover their coughs and sneezes, and stay at home if they are sick.

Keeping a workplace clean to a high quality may seem difficult at first, but the benefits are felt by all parties. This is so that cleaning has advantages that go beyond improving a work environment's outward appearance (Anjum, A., Ming, X., Siddiqi, A. F., & Rasool, S. F., 2018). Regular and thorough maintenance is a must since it can have a favorable impact on worker satisfaction, productivity, and health.



Figure 3: Basic Cleanliness Maintenance in Workplace

It's time to reassess the strategy if one's firm is still having trouble getting its cleaning practices up to par. This checklist will assist in making sure one's cleaning program is simple, doable, and highly adaptable from plan formulation to implementation.

### ***Part 1: Making a plan***

- ***List ones to-dos:*** Choose what to sanitize versus what to clean (remove dust, grime, or clutter);
- ***Determine cleaning priorities:*** High-touch/high-traffic areas should be given priority over storage areas and infrequently used equipment;
- ***Specify how to clean or disinfect surfaces, areas, and equipment:*** as well as what cleaning supplies should be used, in step-by-step cleaning instructions.
  - ▶ When and how frequently specific locations ought to be cleaned or sanitized.
  - ▶ Someone on staff is in charge of sterilizing and cleaning certain places.
  - ▶ Who is in charge of applying the rules?
- ***Give detailed directions for disinfecting and cleaning electronics and equipment:*** To make cleaning simpler and to guard against damage to internal components, think about covering control panels and keys with wipe able surfaces. Always adhere to the product's directions and the manufacturer's advice;
- ***Make cleaning simple and quick:*** Set realistic expectations, give clear instructions, and make the tools and resources needed to finish the task available. Employee compliance is more likely to increase with task ease, leading to a tidy workplace;
- ***Analyze the availability of cleaning supplies and stock levels:*** The availability of resources, such as cleaning supplies, equipment, and PPE, will determine how consistently a new cleaning policy is implemented. Clarifying what and how much to order, as well as preventing cross-contamination, will be made easier by a well-defined and documented plan;

### ***Part 2: Implementation Advice***

- ***The cleaning schedule should be written out and distributed to all managers and staff:*** This needs to have a plan for cleaning, a checklist, and a sign-off page that distinctly states:

- ▶ What to sterilize or clean?
- ▶ What time and how often?
- ▶ How to proceed?
- ▶ Who is in charge of sanitizing and cleaning?
- ▶ Who is accountable for approving the cleaning schedule?
- ***Expectations should be communicated:*** Make sure everyone understands their role and emphasize the importance of employee safety, health, and a clean work environment;
- ***Begin the new policy by de-cluttering ones workspace:*** The cleaner and more sanitary the environment, the easier it will be to maintain;
- ***Develop a culture of cleanliness:*** It is critical to promote policies throughout the year in order to establish a mindset around health and safety (not just during roll-out):
  - ▶ Set up hand-washing and cleaning stations near high-traffic areas;
  - ▶ Display signs and posters to remind employees to practice healthy habits;
  - ▶ Set up a point system to hold managers and employees accountable.

## Clean Workplace and Employee Productivity

Employee productivity is one of the most important investments that any employer or organization can make. Because employees are responsible for a large portion of the work output, investing in a productive environment is an appealing sentiment for both employers and employees.

After all, everyone just wants to be able to do their jobs correctly (Haeruddin, M. I. M., Akbar, A., Dipatmodjo, T. S., Kurniawan, A. W., & Abadi, R. R., 2022). On that note, one of the most important factors that can influence employee productivity is the cleanliness of their workplace. Cleanliness has both direct and indirect effects on workplace productivity:

- ***Strengthens Focus at Work:*** Cleanliness improves employee concentration, first and foremost. Everyone is aware that when dealing with work, we occasionally have a tendency to divert our attention by performing tasks that have no bearing on the work we should be doing. People won't be sidetracked and want to clean up the office instead of doing actual work if it is tidy.

- ***Reduces stress at work:*** People must deal with stress in order to live their lives. But if it's not handled appropriately, it can become overwhelming and weaken various facets of one's life. This may result in underperforming and disengaged workers for employers. People may feel a little cramped and like they don't have enough room to breathe if the working environment is cluttered. Simply by keeping the office area clean, nice, and organized, one can ensure that one's office feels open even if there are partitions between each desk. In addition, mess can be quite distracting, particularly if it's on people's desks. Therefore, one should urge everyone to clean up any clutter from their desks before leaving the office.
- ***Employees are more content:*** If an employee is content, it is more likely that they will be more productive at work. One often has no control over what happens in their home life or outside of work that affects their mood. However, one can always do one's best to ensure that one's employees are in a good mood when they are in their second home. One of the simplest ways to accomplish this is to keep one's office space clean. After all, if the office is their second home, who wants to return to a shambles? No one. As a result, keeping the office clean is essential.
- ***Increases Morale and Motivation:*** Speaking of raising the mood, having a clean workplace has deeper psychological benefits such as raising staff morale and motivation. The best work can come from people when they are motivated, yet for the majority of us, motivation is a fairly transient emotion. Therefore, one should make every effort to seize that fleeting feeling. People are more likely to be in the right frame of mind and believe they are working in a great environment if the office is kept clean.
- ***Clean and Germ-Free Office Equipment:*** One of the main reasons why one should keep one's office clean is because it helps one keep one's equipment clean and germ-free as well. Cleaning because any equipment that doesn't get cleaned regularly can break down faster and work slower than it should normally. Aside from that, some office equipment can be hotbeds for germs and bacteria if one doesn't clean them. To have a productive workplace, one needs to keep one's equipment and tools clean.
- ***Less sickness and absences:*** An office will become a breeding ground for vermin, animals, and, of course, germs and bacteria if one keeps it filthy. Being surrounded by bacteria and germs makes it simpler for people to weaken their immune systems. It goes without saying that they will have to take time off if they become ill. Because of how filthy one's workplace is, it's very easy for people to become ill there, which will increase the number of absences. Simply maintaining cleanliness will prevent many people from being ill.

- ***Increases Employee Retention:*** If one don't maintain a clean environment, ones employees may find it quite unpleasant to work there. Most people would rather work remotely, or even worse, not at all. Make sure to hire professionals to clean the office frequently because a messy workplace might contribute to the low staff retention one may be experiencing. If not, ones workers can eventually depart before they settle in and start to perform better at work.
- ***Impact of Company Culture:*** A poor quality work environment not only has a physical impact on ones employees, but it also has a mental impact. They will feel as if they are not working in a real company, and they will believe that their work is meaningless. As a result, they have no motivation to work. If one want to change their minds, consider cleaning up the area and perhaps beautifying it a little to improve the situation.

## **Relating Herzberg's Two Factor Theory to Employee Turnover Intention**

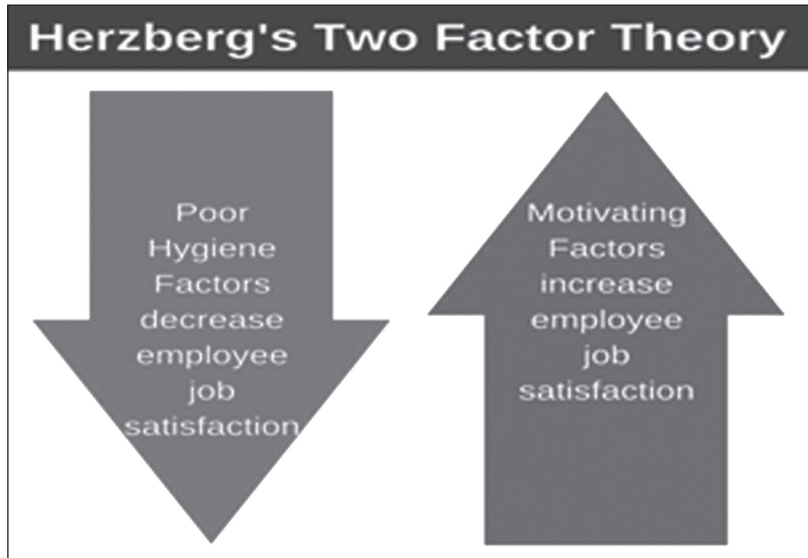
Herzberg's two factor theory identifies and analyzes factors for employee satisfaction, or motivating factors in the workplace, and factors for employee dissatisfaction, or demotivating factors in the workplace. The study focuses on the most influential factors, such as achievement, recognition, and so on. For factors such as satisfaction, company policies, supervision, and so on. For dissatisfaction factors that have a direct impact on the employee's perception of turnover. Herzberg's theory investigates not only a narrow area of turnover intention, but also almost all of the factors that influence an employee's turnover rate. It discusses some of the drawbacks of employing other theories.

Giving someone a reason or encouragement to do something is the act or process of motivation. Conscious and unconscious factors, such as the intensity of one's own needs and desires, the value of rewards and incentives for achieving specific goals, and expectations held both by the individual and by others, interact to produce motivation (Ganta, 2014).

Motivation influences a person's intensity, direction, and persistence in carrying out their intended behavior, which can yield excellent results when done correctly (McShane & Glinow, 2017). Motivation is a useful and potent tool for igniting the desire and propensity to begin or continue performing a task. Motivation can be defined as an action, force, or drive to satisfy one's own needs and reinforce desirable behavior in order to accomplish a specific target or goal (Bartol & Martin, 1998).



According to a psychology perspective, motivation is a process that stimulates an individual's performance, behavior, and productivity in order to achieve an objective by addressing their psychological or physiological needs.



**Figure 4: Herzberg's Two Factor Theory**

## **Conclusion**

As is common knowledge, an organization's most valuable asset is its workforce. Therefore, caring for them is absolutely essential to the companies. Organizations will only take action with regard to their workforce if they are aware of employee turnover intentions and the contributing reasons. Research and review can be used to achieve this. To provide guidance for academics, researchers, and organizations, this conceptual paper reviewed various empirical works that address the factors influencing employees' intentions to leave their jobs. It focused particularly on the significance of a tidy workplace.

The perceived organizational support, supervisor support, job autonomy, employee benefits, and opportunities for training and development are additional factors to take into account. Cleanliness affects health, satisfaction, and fosters a favorable company image, maintaining a clean workplace is crucial for employers, employees, clients, and investors. The simple line is that production rises and everyone wins when everyone is healthy.



Having a clean and hygienic office will allow one to keep running a profitable business even though one may not think about cleaning it every day or that it would be the first item on one's agenda. One must demonstrate one's dedication to creating a positive first impression as well as one's commitment to the wellbeing, safety, and morale of one's workers. All of these tasks and more may be done in a neat and organized office.

Numerous studies show that an organized, clean office environment increases productivity and employee satisfaction, reduces on-the-job injuries, and ultimately saves U.S. employers billions of dollars annually in sick days and paid leave. This goes beyond preventing the spread of illnesses and avoiding expensive fines. By reducing the accumulation of dust and grime and promoting annual inspections, regular cleaning of equipment and electronics will also increase the lifespan of valuable assets. The effectiveness of a workplace depends greatly on organization and cleanliness.

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**ISBN: 978-81-960940-3-4**

# **CSR (Corporate Social Responsibility) A Tool of Promoting Cleanliness in the Society**

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## **Abstract**

In present era the environment is significantly impacted by modern industries. Businesses misuse the natural resources they have access to and release dangerous pollutants, which accelerates the destruction of existing ecosystems and poses a severe threat to the planet's biological diversity. Therefore, it is necessary to take a variety of steps to lessen the negative effects that individuals, families, and entire civilizations have on the environment and to stop its degradation. CSR is a concept followed by companies in order to give it back to the nature, companies under CSR takes initiatives to promote cleanliness and hygiene in the social environment. The Swachh Bharat Abhiyan has received encouraging support, and many public and private businesses have already begun putting it into practice. By implementing numerous activities, CSR can aid in maintaining the environmental balance. The purpose of this paper is to discuss CSR and its efforts to advance social cleanliness.

**Keywords:** CSR (Corporate Social Responsibility), Awareness, Cleanliness, Hygiene, Health, Society, Initiatives.

## Introduction

Corporate social responsibility (CSR) is a strategic tool that includes economic, social, and environmental values in planning and strategy for businesses. The concept of corporate social responsibility (CSR) holds that businesses should give back to the community and take into account how their actions will affect the environment and the general public. It is strongly related to sustainability since it adds value on the economic, social, and environmental levels.

Individuals' health is directly impacted by hygienic and sanitary activities. Sanitation is not just about social development but also economic development. Poor cleanliness habits in the country is often a result of the unavailability of resources and lack of awareness among the people. To change this, the government also encouraged the corporates of the country to participate in the sanitary development of the nation. Businesses have a wide range of influence and significant impacts on the communities in which they operate. To reinforce hygiene best practices and promote their continuous adoption, they must be socially accountable to themselves, their stakeholders, and the general public. Businesses are encouraged to take on additional responsibilities to help social and sustainable development through the effective strategy of corporate social responsibility (CSR).

## Need for Study

CSR can be a revolutionary way of contributing to systematic social changes in which investments can produce social benefits in the areas of town planning, sanitation, cleanliness, waste management, hygiene etc.

Corporate Social Responsibility (CSR) is one way through which companies can demonstrate their commitments towards being socially responsible. In fact, CSR as an integral aspect of corporate that has double edge effect in terms of creating goodwill to the company and acting as a social and economic intervention to bring about large scale change in the country through their active participation and awareness programme. As we came across in our daily life that municipal corporations or semi government bodies of most of our cities are finding it difficult to manage the cleanliness, sanitation and hygiene condition in a most appropriate and proper manner.

Therefore, to bring before our academicians a very concrete thought through this paper, that how the society can be benefitted through the sustainable and active Participation of Business Houses for the proper development of our towns, villages and cities keeping in view the fundamental aspect of cleanliness which should be of International level.

## Review of Literature

Businesses are held accountable for returning resources taken from society since they are run to maximise profits and are trustees of those resources. In India, the idea of corporate social responsibility or CSR is not new at all it has existed for a long time under various titles and contexts. Given its significant impact on society as a whole, CSR is crucial for sustainable development initiatives. While challengers of CSR view it as a barrier to the economic function of business, proponents of CSR see the long-term profits for a corporation in this. The significance of CSR, however, cannot be ignored.

Rao and Subbarao examined the problems and issues with the Swachh Bharat Ahiyan. Gandhi's ideas on sanitation were a major topic of the study. The study came to the conclusion that it is the opportunity and duty of the general public, the media, social media, civil society, organisations, professionals, youths, students, and teachers to express their ownership of the campaign by simply reporting the instances of manual scavenging. (Rao and Subbarao, 2015)

McGaw examines what type of leader is required for constructing a sustainable global society and how we can best train people with these leadership characteristics. He views this as the biggest problem in the field of CSR implementation. This writer argues that the work and challenge will be to cultivate leaders for a sustainable global society through fostering innovation and the realization of a good transformation. (McGaw, 2005)

## Objectives

Some of the concrete objectives of this research are:

- To create awareness about clean and healthy practices in the society.
- To understand Corporate Social Responsibility activities or initiatives to promote cleanliness and well-being of the society.
- To know how companies maintain environmental balance through Corporate Social Responsibility (CSR).

## Research Methodology

This research is based on secondary research. The purpose of the research is to understand Corporate Social Responsibility (CSR) and its initiatives for clean and healthy surrounding. Secondary information was gathered from a variety of sources, including website reports, brochures, essays, news sources, policy documents, and research papers published in various journals articles.

*Salvi Chetana Ramesh Rajani & Aakansha*

## **Let's Understand Corporate Social Responsibility (CSR)**

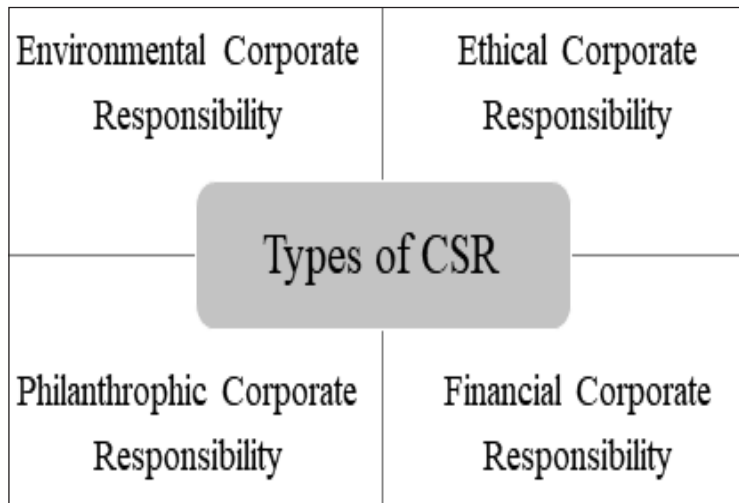
The term “corporate social responsibility” (CSR) has many meanings. CSR is a popular topic in today’s global world and has special significance because it meets the needs of both society and business. Generating a positive impact on society and maintaining social accountability are the goals of corporate social responsibility, a sort of business self-regulation. A corporation can embrace CSR in a variety of ways, such as by being environmentally friendly and eco-aware, encouraging equality, diversity, and inclusion at work, treating employees with respect, giving back to the community, and making sure business decisions are moral.

Depending on the specific company and industry, corporate social responsibility can take a variety of forms. Businesses can help society while building their brands by participating in CSR programs, charitable giving, and volunteer work.

Being responsible to oneself and one’s shareholders is a requirement for a corporation to be socially responsible. Businesses that participate in CSR initiatives frequently expand to the point where they are able to support the community. As a result, major firms are usually the ones that employ CSR strategies. In the end, a company has a greater need to provide an example of moral conduct for its associates, rivals, and industry the more well-known and prosperous it is.

From CSR to social purpose, there has been a transition in recent years. Many businesses have changed their focus from having a strategy for investing in the community and having a “nice to have” mentality to taking a holistic approach in which their goal is incorporated into everything they do. CSR can entail a wide range of strategies and programmes, from community involvement to sustainable business practises. Customers are becoming more and more demanding of the businesses they do business with. As a corporate citizen, a company should implement CSR as benefit to both itself and others. CSR may turn out to be beneficial to all parties involved.

## Types of Corporate Social Responsibility



### 1. *Environmental Corporate Responsibility*

The phrase “environmental responsibility” refers to a company’s dedication to environmental protection and sustainability. Every year, more companies prioritize sustainable practises and commit to taking the environment into account at every level of operations. This can includes lowering the company’s carbon footprint or greenhouse gas emissions, choosing sustainable resources by staying away from single-use plastics, and keeping environmental concerns at the forefront of all business processes. However, this obligation to protect the environment may go beyond the company’s commitment to sustainable growth. If your company has a mission that includes saving the environment, you may uphold that mission by inspiring workers to act.

### 2. *Ethical Corporate Responsibility*

The concept of “ethical responsibility” is an organization’s commitment to conducting business in a morally and ethically responsible manner that promotes human rights ideals, such as treating all stakeholders fairly, evolving in fair trade, and paying employees equally. Many companies will take a stand against injustices to human rights including child labour, racial or gender discrimination, and the push for a higher minimum wage in order to promote ethical responsibility. There are ways to promote ethics at your business by incorporating employees in the process, much like with environmental responsibility.



### **3. *Philanthropic Corporate Responsibility***

A corporation's intentions, ambitions, and objectives for actively bettering society as a whole are referred to as its philanthropic responsibility. Giving money from company profits to deserving charities in the neighbourhood, frequently in the form of a trust or foundation, is a significant component of corporate philanthropy.

Your public image as a corporate leader, which is essential in today's society, will be much enhanced by these kinds of charitable endeavours. Businesses can engage their workforce and implement CSR in philanthropy in a number of ways, such as by implementing giving programmes with the possibility of donation matching.

### **4. *Financial Corporate Responsibility***

The act of making financial decisions based on a commitment to doing well is referred to as financial responsibility. Investments in alternative energy sources, increased financing for educational initiatives, and financial support for regional charities to further their missions are a few instances of economic responsibility in action. Business executives are advised to look at operational cost savings in order to uphold economic responsibility and to put their duty to corporate citizenship at the centre of all financial choices. No matter what kind of CSR you implement, think about how you'll gauge the success and impact of your campaign. Discover how by viewing The Social Impact Show.

## **Principles of Corporate Social Responsibility for Swachh Bharat Abhiyan**

### **1. *Accountability***

A company should be held responsible for the effects it has on the environment, the economy, and society. It is accountable to individuals who are impacted by its decisions and actions, and it takes proper measures to stop wrong doing business practices from happening again.

### **2. *Ethical Behaviour***

A sense of community within the business world is fundamental to ethics. Despite being established with a constrained goal for economic growth, it should serve the community to resolve conflicts with the wider society. A company ought to conduct itself in an ethical manner in accordance with moral and decent values.

### **3. *Rule of Law***

A commercial firm is obligated to always follow by all relevant rules and regulations in their current form. It should remain knowledgeable about all legal interpretations of the situation.

Every choice made in carrying out the operations of this Abhiyan should be within the parameters of labour legislation, starting in the morning and continuing until the correct processing of trash.

### **4. *Transparency***

According to this idea, an institution should provide its stakeholders with accurate, factual, transparent, whole, and timely reports. This demonstrates transparency in corporate decisions and actions that have an impact on stakeholders, but it does not imply that confidential information will be made available to the public.

### **5. *Stakeholders***

Stake holders must play a significant part in this mission by offering their knowledge, resources, ideas, and expertise to the efficient processing of waste into its final form. Participants have expectations, which spark their interest in the organisation. Businesses have a responsibility to recognise these interests that are impacted by their decisions and to act accordingly. The relationship that stakeholders have with the company and their contribution to sustainable development should also be considered. The shareholders are now referred to as one of many key stakeholders, and they are seen as competing for influence with others like employees, customers, consumers, suppliers, competitors, trade unions, the environment, local communities, and society at large, to name just a few and the most common ones, in both academic and business literature.

### **6. *Human Rights***

The most valuable resources in a business organisation are its people. It should work to advance and defend human rights both inside and beyond the nation. It refers to fundamental freedoms to which every human being is entitled, including the freedoms of expression, the right to work, the right to food, the right to a minimum standard of health, the right to an adequate education, and the right to social security. A corporation is required to support these rights in some way.

## **Corporate Social Responsibility (CSR) and Swachh Bharat Abhiyan**

Businesses are required to restore resources taken from society since they are run to maximise profits and are trustees of those resources. CSR (Corporate Social Responsibility) is not as much a new concept in India it has existed for a long time under various names and guises. Given its significant impact on society as a whole, CSR is crucial for efforts toward sustainable development. While opponents of CSR view it as a barrier to the economic function of business, proponents of CSR see the long-term profits for a corporation in this. CSR, however, cannot be understated in terms of importance.

With inclusion of Swachh Bharat Abhiyan and Clean Ganga Mission. The Ministry of Corporate Affairs, Government of India notifying the provision of Section 135 of the Companies Act, 2013, Schedule VII of the said Act, and the Companies (Corporate Social Responsibility Policy) Rules, 2014 certain businesses that meet the requirements outlined in Subsection 1 of Section 135 are required to adhere to the rules pertaining to corporate social responsibility.

### **Activities carried out by Corporate Social Responsibility (CSR)**

Major corporate organisations have set aside funds for Swachh Bharat initiatives, including LandT, DLF, Vedanta, Bharti, TCS, Ambuja Cements, Toyota Kirloskar, Maruti, Tata Motors, Coca-Cola, Dabur, Aditya Birla, Adani, Infosys, TVS, and many others. One estimate states that the corporate sector has numerous cleanliness projects totalling \$1 billion in the works, of which \$500 million has already been allocated to the programme over the past few years. These initiatives involve, among other things, constructing restrooms in far-off villages and conducting training on behaviour modification, waste management, water hygiene, and sanitation practises. The government has determined that business contributions to the Swachh Bharat campaign will henceforth be included as CSR spend in an effort to attract corporate funding for the initiative. Additionally, Schedule VII of the Companies Act was changed by the Corporate Affairs Ministry to make it plain later on that contributions to Swachh Bharat Kosh will be considered appropriate CSR spending. As a result, the corporate sector, along with the government and the general public, is contributing to India becoming completely clean.

Examples of few companies who have contributed and supported the Swachh Bharat Abhiyan extensively:

**1. *Oil and Natural Gas Commission (ONGC)***

On Gandhi Jayanti, the Oil and Natural Gas Corporation (ONGC) began a significant cleaning drive as part of the Swachh Bharat Abhiyan at all of its work centres. All of the staff of ONGC’s vast operations area in Andhra Pradesh, Rajahmundry, made a vow to start the mission there. Other ONGC offices across the nation adopted this practise. As part of their CSR, the ONGC has committed to building restrooms in 2500 government schools across 26 districts and 13 States during the current fiscal year.

**2. *L and T***

In order to support the Swachh Bharat Abhiyan, infrastructure firm Larsen and Toubro declared that it would construct 5000 toilets around the nation as part of its CSR. L and T stated that it will build 2,000 toilets in the first phase, along with the L and T Public Charitable Trust, and will also contribute to other efforts like the provision of clean water, healthcare, and institutions for skill development.

**3. *Hotels and Real Estate Developers***

In the Delhi-NCR region, prestigious hotels managed by the global hotel group Carlson Rezidor, such as Radisson and Park Inn, will construct restrooms for girls attending schools. The staff of Lemon Tree Hotels also committed to spending 100 hours annually cleaning the areas around its locations around the nation.

A well-known real estate developer, Uni-tech, intends to actively include locals and other stakeholders in a campaign to clean up regions around the projects it has started around the nation. Ajay Chandra, managing director of Uni-tech, stated that a large-scale effort is needed to accomplish the aim and that it is not just about raising money but also about instilling a feeling of civic responsibility among the populace.

“Dear literate Indian, stop littering India,” reads a post on DLF Promenade’s official Facebook page. Use trash cans and sign up for the Clean India Campaign, the group has advised. It has also said it will collaborate with some schools and recruit students to help raise awareness and change mall visitors’ perceptions.

**4. *Water Aid***

Although there has always been a global awareness of Corporate Social Responsibility (CSR), the Indian government’s recent enactment of a new CSR Law, Section 135 of the Companies Act, has given it a boost.

The water industry businesses banded together to sponsor a group that focused on issues with water, sanitation, and hygiene in order to create Water Aid, which was founded by the private sector. The heritage and core competencies centre on working in partnership with businesses.

### **5. *SATO Tap by LIXIL***

The SATO Tap is a hand-washing option offered by SATO, a social enterprise of LIXIL Group Corporation that aims to address water, sanitation, and hygiene issues by offering affordable and simple-to-install sanitation systems to local communities worldwide.

As part of its vow to support the commitments of development partners and others, LIXIL has pledged USD 1 million for the project's execution, which could improve hand washing for 5 million people. This is in line with Prime Minister Narendra Modi's goal of creating an "Atmanirbhar Bharat" (or "Self-reliant India"). In addition to offering the SATO Tap, which is an affordable hand-washing station for low-income households, LIXIL has worked with UNICEF to increase its hand-washing and sanitation efforts in response to COVID-19. There are a variety of commercial and behavioural actions included in this list.

### **6. *PwC India Foundation's Safe Sanitation Infrastructure***

In order to assist kids continue their education with dignity and assurance, PwC India Foundation (PwCIF), in conjunction with the NGO Reaching Hand, donated gender-segregated restrooms and hand washing stations to schools in Bengaluru. The project was started with the intention of lowering the number of female students who leave school owing to a lack of access to menstrual health care and facilities for water, sanitation, and hygiene (WaSH). Along with providing sanitation kits to the kids, PwC India Foundation also trained the teachers on WASH as part of the intervention.

### **7. *HUL WASH Initiative***

In 2013, the village of Thesgora in Madhya Pradesh—which has one of India's highest rates of childhood diarrhoea—began the Lifebuoy "Help a Child Reach 5" on-ground hand washing behaviour change initiative. Through this ground-breaking programme, HUL was able to cut diarrhoea from 36% to 5%, and 26% more kids were washing their hands before meals.

Lifebuoy has partnered with organisations such as GAVI (Global Alliance for Vaccine Initiative), Project Hope, Power of Nutrition, and Bharat Scouts and Guides to help Indians develop the habit of regularly washing their hands.

In order to prevent children under the age of five from premature death in 14 districts of the state of Uttar Pradesh, Gavi and Lifebuoy launched “Safal Shuruaat” in 2017. This campaign uses brief movies that are distributed door-to-door in rural regions to raise awareness of WASH. This HUL CSR effort has already reached 1.5 million individuals, and its goal is to do the same by the end of 2020.

## **Implications**

- Promote cleanliness in the company:
- The importance of image is acknowledged by all stakeholders,
- Keeping relationships with stakeholders continuously,
- An understanding of how stakeholder interactions affect the company’s reputation.

## **Suggestions**

- Companies must operate and manage with ethics, transparency and accountability. Companies must conduct their business ethically and promote the adoption of this principle in all their business practices. Respect the interests of stakeholders responsibly.
- It is also the company’s policy to be a responsible corporate citizen, comply with all relevant laws, rules and regulations and promote the improvement of the quality of life itself and/or in close cooperation with relevant authorities and communities.
- The company must be responsible for the community and society and be involved in supporting community activities and be aware of the consequences that the behaviour of the company has on the people around it.

## **Conclusion**

Businesses are becoming more aware of their responsibilities to society and taking part in a variety of social and environmental initiatives. In order for CSR to be most effectively implemented toward its goals of sustained environmental, social, and economic growth, it is urgent to develop effective strategic policies and adopt a variety of instruments in accordance with the company’s history, content, and peculiarities in relationships with its various stakeholders. Corporate has undoubtedly contributed significantly to our nation’s sustainable development. Small and medium-sized businesses should be encouraged to

participate. Business ethics, corporate social responsibility, global corporate citizenship, and stakeholder management are all major aspects of corporate responsibility or sustainability. It should be possible for business to help with some social issues. This claim is supported by the rationale that business has the know-how to create strategies to solve societal issues in the form of its managers and executives. Businesses must step up to fill the void left by the government's reduced efforts to solve some social issues.

To conclude, it is essential that corporate participation in the nation's campaign for cleanliness be backed up by acts of selflessness and a sincere desire to prove to the rest of the world that India is capable of upholding the greatest standards of civic sensibility. So that our cities can breathe in a green atmosphere, all citizens and/or stakeholders should make a physical and financial contribution without bringing in ego, politics, leg pulling, etc.

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**ISBN: 978-81-960940-3-4**

# **A Study on Impact of Housekeeping Services and Practices on Customer Satisfaction with Reference to Chennai Hotels in Tamil Nadu**

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## **Abstract**

A hotel's housekeeping department is its foundation. In addition to maintaining the cleanliness of the hotel as a whole, it plays a significant role in many other hotel activities. It is one of a hotel's most important departments because it is difficult enough to keep track of and maintain all of the rooms and common areas. The efforts made by the housekeeping department significantly alter the hotel experience for guests. The study looked at how customer satisfaction and repeat business are affected by housekeeping services and practices. Hotels in Chennai, including five-star hotels, were selected as the population for this study. 150 completed questionnaires from these hotels' guests were gathered. The study used the following constructs: Cleanliness, cleanliness, guest satisfaction, and repeat business all come into play. A 5-point Likert scale was used to evaluate each statement based on the aforementioned constructs. Internal consistency, convergent and discriminant validity, and a significant amount of internal consistency were found in the findings. Four hypotheses were supported by the empirical findings. It was discovered that guest satisfaction was significantly correlated with cleanliness and decor; On the other hand, it was discovered that repeat business is positively correlated with laundry services. Additionally, it was discovered that Repeat Business had a positive relationship with Guest Satisfaction.

**Keywords:** : Housekeeping services, customer satisfaction, repeat business, hotel industry



## Introduction

Due to India's tourism industry's explosive growth and rising economic prosperity, the hotel industry is currently in the spotlight. The Incredible India Campaign, which aims to boost the hospitality industry and improve the tourism industry, is actively being implemented by the Indian Tourism Ministry. According to the Ministry of Tourism's 2017 report, India rose from its previous ranking of 52nd in 2015 to the 40th position in the World Economic Forum's Travel and Tourism Competitiveness Index (TTCI) in 2017. This achievement brought India's overall ranking up to the 12th position. Today, one of India's fastest-growing industries is the hospitality sector. According to the Ministry of Tourism, foreign tourist arrivals increased by 13.4% between January and March 2017, reaching 2.84 million from 2.51 million (Ministry of Tourism, 2017). According to Mishra and Ojha (2014), each region of India differs from the other in terms of food, music, dance, festivals, weather, ecology, flora and fauna, and other aspects. India's diverse cultures and geography make it an entirely unique destination for tourists. In accordance with the government's liberalization policy, this industry permits 100% foreign direct investment. (Shrivastava, 2011) of India As a direct consequence of this, numerous large international hotel chains have begun investing in India through franchising, partnerships, mergers, acquisitions, management agreements, and other means. India is home to a number of well-known international hotel chains, including JW Marriott, Hyatt, Meridian, Radisson, Sheraton, and Four Seasons. In India, numerous multinational corporations are collaborating and encouraging joint ventures. Numerous international fast food chains such as KFC, McDonald's, Subway, and Uncle Jack's, among others have established themselves in India already. More than half of the approximately 300 hotel projects approved by the government fall into the luxury hotel category. As a result, the Indian hotel industry's future holds tremendous opportunities.

The beautiful city of Chennai was the location of this hospitality-related study. Along with Mumbai, New Delhi, and Kolkata, it is one of India's four major metropolitan areas and a major centre for commerce, culture, and education. It serves as Tamil Nadu's capital. Chennai is still deeply rooted in its culture and tradition, despite its apparent "westernization." Chennai is the fourth-most populous urban agglomeration and the sixth-most populous city in India, according to the 2011 Indian census. The civic body in charge of the city is the Greater Chennai Corporation; It was established in 1688, making it the oldest city corporation in India and the second oldest in the world, after London. India Today named Chennai the best city in India in 2014. In 2015, the BBC named it the "hottest" city—a city that is worth visiting and living in for the long term—for its blend of modern and traditional values. It ranked ninth on Lonely Planet's list of the world's best cosmopolitan cities, and it was the only city in South Asia to make the list of National Geographic's "Top 10 food cities" in 2015. Due to its extensive musical heritage, Chennai was included on the

UNESCO Creative Cities Network (UCCN) list in October 2017. Chennai is a major film production center and the home of the Tamil film industry. It also houses more than one third of India's automobile industry. Chennai was chosen as the location for this study based on the aforementioned criteria.

## **Housekeeping Services and Practices**

A hotel is a huge unit that is made up of many different departments that work together to make guests' stays comfortable. Housekeeping is one of the most important departments in a hotel. The hotel's cleanliness, upkeep, decor, and overall maintenance are all the responsibility of housekeeping. A five-star hotel is a huge space with many rooms, corridors, restaurants serving a variety of cuisines, health clubs, swimming pools, spas, and other amenities, as well as a vast back area with lockers, locker rooms, stores, administrative departments, and various food production units, among other things. A challenge in and of itself is managing the cleanliness, upkeep, maintenance, and decor of these areas. A home away from home is created by the hotel's housekeeping staff. The primary goal is to provide value-for-money clean, well-maintained, comfortable rooms in inviting settings. Contract housekeeping services are in high demand at corporate offices, airports, airlines, hospitals, banks, cruise ships, and shopping arcades, in addition to hotels. As a result, contract housekeeping is also a lucrative business opportunity for entrepreneurs. A hotel survives on room sales, food and beverage sales, and additional services like a gym, laundry service, health spa, shopping arcades, sightseeing, and so on. Because a room can be sold multiple times once it has been made, the sale of rooms' accounts for a significant portion of a hotel's revenue. However, if the rooms remain unoccupied, there will be a significant revenue loss. As a result, it becomes abundantly clear that rooms are more perishable than food. The efforts made by the housekeeping department greatly alter the guest experience in a hotel. As a result, hotel rooms are its strength. If the decor is not appealing, the air is not odour-free, and the furnishings and upholstery are not spotless, the hotel may lose a customer as a potential guest. According to Singh, Saufi, Tasnim, and Hussin (2017), hotels can only achieve a high standard of service and quality if their operations are efficient and effective, able to exceed customer expectations and ultimately boost profitability. Rooms must be made available to guests promptly by the department whenever needed. Additionally, it must take care of the hotel's public areas, which must always be neat, clean, and inviting. As a result, the efforts of the housekeeping department contribute to a property's overall reputation. It operates all year round, 365 days a year. A hotel's housekeeping department is its foundation. It not only maintains the hotel's overall cleanliness but also makes significant contributions to numerous other hotel activities. It is one of a hotel's most important departments because it is difficult enough to keep track of and maintain all of the rooms and common areas.

## Guest Satisfaction

For the hotel business, customer satisfaction is an ever-evolving phenomenon. The difficulty lies in maintaining a high level of guest satisfaction (Hussain & Khanna, 2016). Retention of customers and brand loyalty can be achieved through customer satisfaction. Various approaches have been taken to determine guest satisfaction. An evaluation of the affective responses and experiences following a cognitive expectancy disconfirmation process across prior expectation and perceived performance of a product or service and its attributes is the conceptualization of customer satisfaction that has received the greatest level of agreement and acceptance (Oliver, 1980). It is obvious that the hotel will receive repeat business if a guest is pleased and satisfied. A happy guest will spread the word about the hotel to other people.

## Repeat Business

Image, along with customer satisfaction, which is frequently regarded as having the strongest association with intention, is an important variable in intention formation, according to Han and Hyun (2017). Increasing the quality of the service, product, or reputation is likely to result in the intention to remain faithful. The purpose of this study is to examine the impact of housekeeping services and practices on guest satisfaction and overall repeat business by providing insight into the hospitality sector. In order for hospitality professionals to efficiently design, organize, and implement the services and facilities of the housekeeping department, it is necessary to identify the importance of housekeeping operations in hotels. Additionally, it would assist the department in determining its training and staffing needs. In addition, it would concentrate on the aspects that are more significant and pertinent in relation to guest satisfaction and repeat business.

## Review of Literature

The literature discovers various related themes. Each of these is discussed below as follows:

***Perceptions of Services and Facilities:*** When choosing a hotel, amenities matter a lot. The amenities offered by a hotel or resort define it. According to the study that Sufi and Singh (2019) conducted, in order for hotels to achieve the desired classification, they need to implement changes such as increasing the quality of the décor in the rooms, placing superior guest room amenities, providing superior furnishings, and hiring professionals as employees. According to Bilgihan (2012), the hotel industry has seized the opportunity presented by in-room entertainment facilities and amenities to create new revenue streams by providing technology-enabled amenities that enhance the guest experience and are

reserved for individualized experiences. According to Beldona & Cobanoglu (2007), recent industry efforts to replicate home-like amenities in hotel rooms have focused primarily on room amenities and entertainment technologies. According to Bilgihan (2012), hotel managers need to be aware of the entertainment, technology, and leisure amenities that guests will purchase in their rooms. According to Amdekar (2006), such guests would expect their room amenities to be comparable to those in their homes or workplaces. As a result of the competition matching the amenities offered, guests came to expect them as a standard part of the lodging or hotel. Hotels started offering in-room entertainment, fitness centers, minibars, hairdryers, irons, and coffee makers in the following years (Gilmore & Pine II, 2002).

**Hospitality and Guest Satisfaction:** According to Qu, Ryan, and Chu (2000), “guest satisfaction” refers to a state of mind in which a customer’s needs, wants, and expectations have been met or exceeded, resulting in repeat business and customer loyalty. Skogland and Siguaw (2004) came to the conclusion that customer satisfaction is the key to long-term success. According to Sit, Ooi, Lin, and Chong (2009), service quality had a significant and direct effect on guest satisfaction. They were also positive about the connection between customer loyalty and satisfaction.

**Hospitality and Repeat Business:** Customer satisfaction and repurchase intention are regarded as distinct constructs. According to Choi and Chu (2001), satisfaction has an affective and cognitive component, whereas repeat purchase intention has a behavioral component. Bilgihan (2012) investigated the significance of offering high-quality services, technological applications, and amenities to increase customer satisfaction and likelihood of future purchases. Executives in the hospitality industry are able to provide guests with significant guest room expertise applications thanks to this research.

According to Kandampully and Suhartanto (2000), when choosing whether to return to, recommend, or demonstrate loyalty to a hotel, guests recognize that housekeeping is more important for guest satisfaction than hotel reception, food and beverages, and prices. According to Skogland and Siguaw (2004), hotel design and amenities are the primary factors that keep guests coming back.

## **Conceptual Framework and Hypotheses Development**

The purpose of this study is to investigate how housekeeping practices and services affect customer satisfaction and repeat business. Four aspects of the hotel’s housekeeping services—laundry, room amenities, decor, and cleanliness—are examined in light of the literature review. It is determined how these variables affect customer satisfaction and repeat business. The following hypotheses have been developed on the basis of the preceding:

H<sub>1</sub>: There is a positive relationship between laundry services and guest satisfaction.

H<sub>2</sub>: There is a positive relationship between decor and guest satisfaction.

H<sub>3</sub>: There is a positive relationship between room amenities and guest satisfaction.

H<sub>4</sub>: There is a positive relationship between cleanliness and guest satisfaction.

H<sub>5</sub>: There is a positive relationship between laundry services and repeat business.

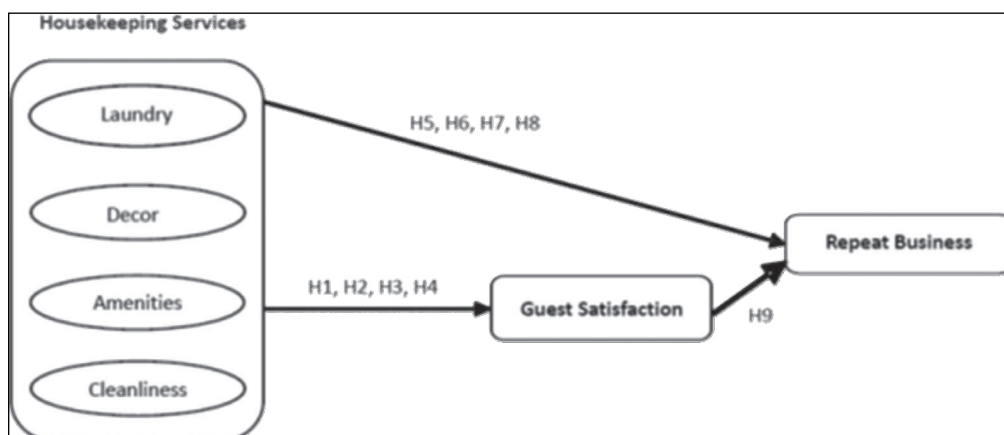
H<sub>6</sub>: There is a positive relationship between decor and repeat business.

H<sub>7</sub>: There is a positive relationship between room amenities and repeat business.

H<sub>8</sub>: There is a positive relationship between cleanliness and repeat business.

H<sub>9</sub>: There is a positive relationship between guest satisfaction and repeat business.

The conceptual model has been developed based on the above framed hypotheses. The model has been tested through the partial least square method in the following Figure 1.



## Research Methodology

This study's population consisted of hotels in the city of Chennai, including five-star properties. The Tamilnadu Tourism Department says that there are 21 hotels in Chennai, with 4500 in total. Ten hotels comprised the entire sample for this study. From guests of various hotels, 150 completed questionnaires were gathered. From July to November 2022, the study was carried out. Based on a literature review of previous studies, the study's scales were created. Laundry, decor, room amenities, cleanliness, guest satisfaction, and

repeat business are the constructs used in the study. All the statements based on the above constructs were measured on a 5 - point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

## Data Analysis and Results

Structural equation modelling (SEM) the data has been analyzed using a) technique. Another name for SEM is a second-generation method that provides simultaneous modelling of relationships between multiple independent and dependent constructs. The results were interpreted using the software Smart PLS 2.0, which is based on partial least squares (PLS). The two models used to evaluate the data are the measurement model and the structural model. According to Chin (1998), the measurement model is used to describe the connection between latent constructs and the variables that are related to them, whereas the structural model depicts the causal relationship between the constructs.

**Measurement Model:** The outcomes of the PLS-based measurement model are presented in Table 1. The analysis's output is used to assess both internal consistency and convergent validity. Average variance extracted (AVE) is used to estimate convergent validity, and composite reliability (CR) is used to evaluate internal consistency. To achieve internal consistency, Fornell and Larcker (1981) suggested that the value of CR should be at least 0.7. According to Hensel, Ringle, & Sinkovics (2009), a value of AVE that is less than 0.5 cannot account for more than half of the variance by its items or variables. To achieve the AVE value of 0.5, some of the constructs' components are eliminated. The item RA4—"Mineral water bottle is complimentary"—has been removed from the Room Amenities construct. Similarly, GS2—"Do you consider the hotel you stayed in to be in value for money?"—is removed from the Guest Satisfaction construct. With the exception of Guest Satisfaction, which is a construct based on a single item, all constructs have AVE values greater than 0.5, as shown in Table 1. In a similar vein, the CR values of all constructs are greater than 0.8. The model thus achieves internal consistency, reliability, and convergent validity.

*Table 1: Measurement Model*

Construct	Item	Loading	AVE	CR
<b>Laundry</b>	(L1) Bathroom linen is soft and of superior quality.	0.686	0.5947	0.8135
	(L2) Valet laundry service is quick & effective.	0.756		
	(L3) Hotel linen is spotlessly clean.	0.861		
<b>Decor</b>	(D1) Flower arrangement is good and placed everywhere in the hotel.	0.728	0.5075	0.8374
	(D2) The room decor is exquisite.	0.717		
	(D3) The hotel has spent huge capital in planning and sustaining decor of the hotel to attract more guests.	0.704		
	(D4) Flower arrangement helps in beautifying the environment.	0.723		
	(D5) Flowers are placed in rooms.	0.690		
<b>Room Amenities</b>	(RA1) Bathroom amenities are branded and of high quality.	0.786	0.585	0.8086
	(RA2) In room Safe is available in all rooms.	0.781		
	(RA3) Mini bar is available in all rooms.	0.727		
<b>Cleanliness</b>	(C1) Rooms are always clean, comfortable, and cosy.	0.827	0.6754	0.8617
	(C2) I always stay in a hotel which has spotlessly clean rooms.	0.778		
	(C3) Hotel has clean and hygienic surroundings.	0.858		
<b>Guest Satisfaction</b>	(GS1) Are you satisfied with the services of the hotel you stayed with?	NA	NA	NA
<b>Repeat Business</b>	(RB1) Rate your likelihood of returning to the same hotel in subsequent trips.	0.888	0.7341	0.8922
	(RB2) Would you recommend it to your friends and relatives?	0.855		
	(RB3) Do you wish to stay in the same brand of hotel in other places of India?	0.826		

*Table 2: Discriminant Validity*

	Decor	Guest Satisfaction	Laundry	Repeat Business	Room Amenities	Cleanliness
<b>Decor</b>	<b>0.71</b>					
<b>Guest Satisfaction</b>	0.42	<b>1</b>				
<b>Laundry</b>	0.55	0.36	<b>0.77</b>			
<b>Repeat Business</b>	0.28	0.52	0.42	<b>0.85</b>		
<b>Room Amenities</b>	0.56	0.46	0.61	0.43	<b>0.76</b>	
<b>Cleanliness</b>	0.33	0.49	0.39	0.40	0.58	<b>0.82</b>

Discriminant validity is performed to check the dissimilarity between the different constructs. Fornell and Larcker (1981) suggested that if the inter - construct correlations are less than the square root of AVE, then discriminant validity is achieved. It is shown in the Table 2. In Table 2, the diagonals represent the square root of the AVE, while the off-diagonals represent the correlations between the constructs. The square root of AVE is greater than the inter - construct correlations. Hence, the measurement model represents sufficient amount of discriminant validity.



**Structural Model:** The structural model is given in the Figure 2. The relationship between the various constructs is depicted in the model. Using Smart PLS 2.0 software, the bootstrapping procedure is used to test these relationships.

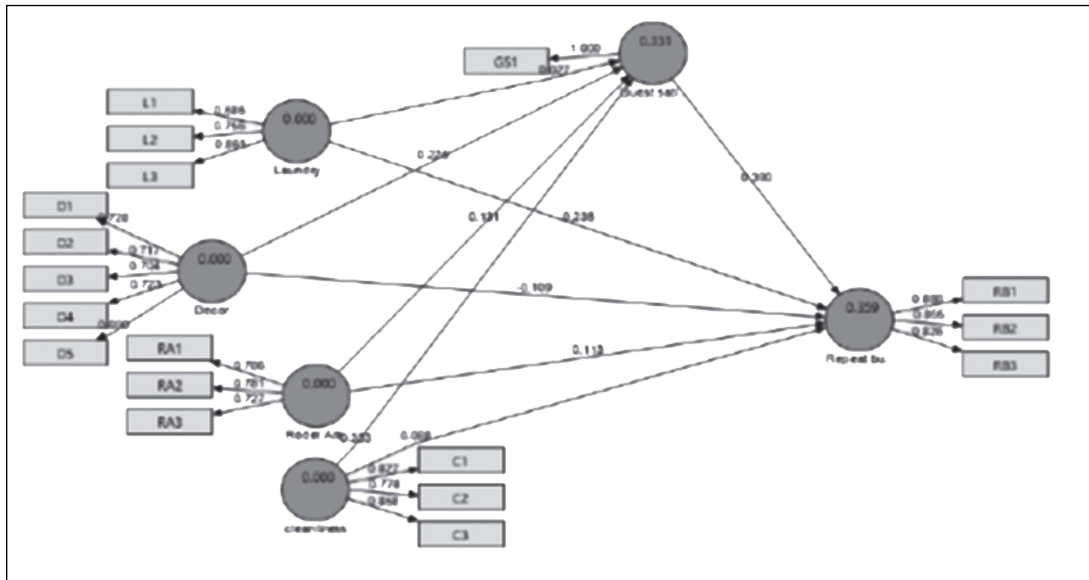


Figure 2: Structural Model Results

Table 3: Results of Hypotheses Testing Using Structural Model Analysis

	Hypotheses	Standard Error	Path Coefficient	Model-value	Decision
H1	Laundry ⇒ Guest Satisfaction	0.0862	0.0268	0.3112	Not Significant
H2	Decor ⇒ Guest Satisfaction	0.0838	0.2249	2.6824	Significant
H3	Amenities ⇒ Guest Satisfaction	0.0974	0.1306	1.3407	Not Significant
H4	Cleanliness ⇒ Guest Satisfaction	0.0775	0.3329	4.2979	Significant
H5	Laundry ⇒ Repeat Business	0.0929	0.2363	2.5434	Significant
H6	Decor ⇒ Repeat Business	0.0938	-0.1089	1.1617	Not Significant
H7	Amenities ⇒ Repeat Business	0.1169	0.1128	0.9649	Not Significant
H8	Cleanliness ⇒ Repeat Business	0.1034	0.0884	0.8555	Not Significant
H9	Guest Satisfaction ⇒ Repeat Business	0.0968	0.39	4.0298	Significant

Table 3 displays the Smart PLS-generated path coefficients and their t-values. Using the bootstrapping method, the software provides the t-values. The results of the tests of the study's hypotheses are presented in Table 3. According to Chin (1998), the standardized path coefficients ought to be greater than or equal to 0.3 at the very least.



## Discussion

The information was gathered from hotel guests in Chennai Tri-city. Results are obtained from testing hypotheses based on relationships between constructs. The following conclusions are offered in light of the data presented in Table 3.

It has been discovered that cleanliness and decor have a significant impact on guest satisfaction (H2, H4). The hotel's decor is found to be incremental in order to increase guest satisfaction. This result is comparable to Han and Hyun's findings (2017). They discovered that the physical environment influences guest perceptions of value, and that guest perceptions of value are a significant factor in determining customer satisfaction. The physical environment is reflected in the decor and cleanliness. In an attractive setting that has been carefully planned, the guests feel crowded. Similar findings were obtained by Weaver and Oh (1993), who came to the conclusion that cleanliness, well-kept rooms, safety and security features, furnishings, comfortable mattresses and pillows, high-quality towels, and personal care amenities are significant factors in determining customer satisfaction. Laundry and Room Amenities have no significant impact on guest satisfaction (H1 and H3 are not significant). This indicates that guests did not place a high priority on the laundry facilities and room amenities for their own satisfaction. The findings are in opposition to those of previous studies, such as Heo and Hyun's (2015) conclusion that luxury brand room amenities influence customer willingness to pay. Customers' estimates of the room rate and willingness to pay increased when luxury amenities were included in the rooms, according to their study. In a similar vein, the study by Cobanoglu, Berezina, Kasavana, and Erdem (2011) came to the conclusion that there was a positive correlation between the overall satisfaction of hotel guests and amenities like in-room technologies, Internet access, and business essentials for travelers. However, the findings of Choi and Chu's (2001) study showed that customer satisfaction was less affected by valet and laundry services.

It has been determined that laundry operations are significant for Repeat Business (H5 is significant). It has been discovered that, despite the fact that laundry does not contribute to guest satisfaction, it is considered significant when determining the intention to return. The additional structures: When deciding whether or not to return to a hotel, decor, amenities, and cleanliness were not found to be significant (H6, H7, and H8 were not significant). The findings are comparable to those of previous studies. According to Skogland and Siguaw (2004), the hotel's staff was the factor that had the greatest impact on guests' purchasing decisions and, as a result, increased their interest. According to Emir and Kozak (2011), the front office services, employees, housekeeping, and food and beverage services are the four primary characteristics that have the greatest impact on the intention of tourists to remain loyal.

Last but not least, the relationship between repeat business and guest satisfaction is examined and found to be significant (H9 is significant). The connection between the two was also found to be crucial in earlier research. According to Mohsan, Nawaz, Khan, Shaukat, and Aslam (2011), a guest's level of satisfaction was closely linked to the frequency and loyalty of their visits. Similar results were also obtained by Anderson and Srinivasan (2003), who came to the conclusion that e-satisfaction had a significant impact on e-loyalty and that the relationship was moderated by factors at the individual level for consumers and at the business level for businesses.

## Conclusion

Academics as well as hospitality professionals around the world are expected to benefit greatly from the study's findings. One of the most important business departments in the modern hotel industry is the housekeeping department. Hotels would be able to focus more on the intricate aspects of their operations if they had a better understanding of the indirect impact that housekeeping operations have on revenue and overall performance. The department's capital and operational investment planning can be simplified. The hotel would also be able to concentrate on more complicated and troublesome areas. Additionally, it would assist hospitality professionals in avoiding unnecessary expenditures, which carry significant costs in comparison to the benefits they provide. The government, "Cleanliness is next to godliness," Through the Swacch Bharat Abhiyan, India has also taken a huge step in raising awareness. The current study will help society understand the significance of housekeeping, one of a hotel's most important departments. Travelers always look for attractive, germ-free surroundings. In every part of the country, housekeeping will never lose its significance. The nation must be kept clean in order to attract tourists.

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**ISBN: 978-81-960940-3-4**

## **Media's Part in Generating Swachh Bharat Awareness**

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### **Abstract**

The role of media in generating awareness about the Swachh Bharat (Clean India) campaign, which was launched by the Indian government in 2014. The paper examines how different forms of media, including print, television, and social media platforms, have contributed to spreading the message of the campaign and mobilizing public support for its objectives. The paper also discusses the challenges faced by the media in promoting the campaign, such as the need for sustained attention, the risk of misinformation, and the need to reach out to marginalized communities. Overall, the abstract suggests that media has played a crucial role in generating awareness about the Swachh Bharat campaign and engaging citizens in the process of cleaning up their neighbourhoods and cities.

The development of a diverse range of media is one of the great achievements of our nation. Social media is significant because it allows for efficient simultaneous communication with a big number of individuals. Its goal is not just to inform the public about current events, but it also influences how we think about and perceive various social concerns. Media platforms like Television, Facebook, Instagram, and others are currently playing a bigger part in development-related communication. Social media made it simple to quickly circulate messages around the community and to spread awareness.

**Keywords::** Swachh Bharat Abhiyan, Role of Media and Social Media, Awareness.

## Introduction

“A clean India would be the best tribute India could pay to Mahatma Gandhi on his 150 birth anniversary in 2019,” said Shri Narendra Modi as he launched the Swachh Bharat Mission at Rajpath in New Delhi. . Swachh Bharat Mission was introduced as a nationwide effort on October 2, 2014, across the entire nation.

The Prime Minister encouraged people to realize Mahatma Gandhi’s vision of a clean and hygienic India while spearheading the mass cleaning drive. “Na gandagi kareng, Na karne denge” was the mantra he recited. Additionally, Shri Narendra Modi invited nine individuals to participate in the cleanliness campaign and asked each of them to recruit nine additional individuals. The Swachhta Abhiyan has evolved into a National Movement by urging individuals to take part in the drive. The Clean India Movement has instilled a sense of accountability in the populace.

The Mahatma Gandhi vision of a “Clean India” has started to take shape as residents across the country are now actively participating in cleanliness initiatives. People from various social groups have come out to participate in this widespread movement for cleaning. Everyone has lined up for the noble cause, from government officials to soldiers, Bollywood actors to athletes, businessmen to spiritual leaders. To make India clean, millions of individuals from all over the nation participate daily in cleanliness campaigns run by government agencies, non-governmental organizations, and neighborhood community centers. The nation as a whole also often organizes cleanliness initiatives to disseminate hygiene awareness through plays, and social media, and some hashtags were also created

The SBA has been widely disseminated throughout the nation thanks in large part to the media, which has also helped alter popular attitudes toward cleanliness. The most accessible and possibly least expensive method of disseminating information about SBA is through the mass media. The mainstream media, together with other channels of communication, has the power to positively influence public perceptions of SBA and improve knowledge of sanitation issues. Additionally, the public sees several advertisements in newspapers, television, and radio every day urging them to support this campaign. This enables the Abhiyan to grow and include everyone.

The honorable Prime Minister himself used the power of social media to promote the campaign back in 2014 he used Twitter to create awareness and urged people to join him in making a clean India, urged people to post videos and pictures on the account so that people around the country can watch and take inspiration to clean their area and slowing moving forward in cleaning the city they live in

Shri Narendra Modi has always publicly praised the use of social media by people. As part of the Swachh Bharat initiative, the hashtag “#MyCleanIndia” was also launched to promote the cleaning efforts made by Indians throughout the country. A citizen’s movement called “Keeda hai kya, desh saaf karne ka” seeks to support Prime Minister Narendra Modi’s Swachh Bharat Abhiyan. where people shoot the video of them cleaning the area and then posting in the social media

Some swachhbharat hashtags popular **on Instagram, Twitter, Facebook**, and TikTok are **#Swachhabharat, #MyCleanIndia, #SwachhBharatMission, #SwachhAmritMahotsav**

Information and communication technology are extremely advanced in the modern world. The media is one of the most crucial sources of information for quickly spreading information from one location to another. The media has had a significant impact on how people perceive themselves and how they become aware of various topics that are crucial to daily life. Print media, television, and radio are just a few of the different ways that mass media campaigns try to spread information and awareness among the public. Social media platforms are ubiquitous nowadays, and they have connected us in ways we could never have imagined five years ago. We instantly share information and updates with the networks of connections we’ve made and are then inundated with updates from those same networks.

## Research Objective

- To understand the various effective use of Media
- To generate awareness about Swachh Bharat
- To understand the impact of social media in creating awareness of Swachh Bharat

## Review of Literature

In their study titled “Exploring Youth Political Participation: A Social Media Intervention concerning Digital India and Swatch Bharath Missions,”(Sridevi C.T. and P. E. Thomas) examine the impact of Swatch Bharath campaigns. One of the main goals of this effort was to eliminate waste and maintain a clean environment. Unwanted garbage also includes outdated and unusable electronics, commonly known as e-waste, which must be properly disposed of. Both Swatch Bharath and the Digital India Mission have developed into social movements and are well-known on Facebook and Twitter. Swachha Bharat and Digital India face numerous challenges.

Social media is crucial for spreading awareness. In the modern world, it offers many firms the best means of communication. In addition to conventional broadcasting approaches, it makes use of social networks like Facebook, television, and websites.

Different types of mass media are crucial in influencing public perception and environmental issue awareness. Television is the mass medium that is being addressed here to explain environmental awareness because it is one of the most popular and widely utilized modern mass media in India and because it is an audio-visual medium, it disseminates information very quickly. The media's role has evolved to focus more on spreading knowledge and awareness of the current environmental problems. (Dr. Mohammed Raouf,) the project manager at Gulf Research Centre, however, asserts that the media has two responsibilities to play: the first is to inform the public about environmental policies and regulations, and the second is to reflect public concerns. . (Raouf, 2010).

To identify the emerging change factors and the source areas of scientific research and technological development likely to influence change and produce the greatest economic, environmental, and social benefits over the next 10 to 25 years, technology foresight entails systematic attempts to look into the longer-term future of science and technology and their potential impacts on society (UNIDO, 2005).

## **Research Methodology**

This research is based on secondary research, the purpose of this research is to understand the importance of Swachha Bharat Abhiyan and the role of social media in spreading awareness of Swachha Bharat Abhiyan. Secondary information was gathered from a variety of sources, websites, articles, and some the research papers published in various journals

## **Swachh Bharat Abhiyan's History**

The Comprehensive Rural Sanitation Programme was reorganized by the Indian government with effect from April 1, 1999, and the Total Sanitation Campaign was introduced. Nirmal Bharat Abhiyan was later given this name. The government introduced the Nirmal Gram Puraskar incentive program as a way to support the Total Sanitation Campaign by rewarding villages that have achieved complete sanitation coverage, maintain a clean environment, and have no open defecation issues.

The campaign was relaunched as the Swachh Bharat Abhiyan on October 2, 2014.



A Representation of the Swachh Bharat Mission Emblem

## Swachh Bharat Abhiyan's Objectives

- I. Eliminating open defecation
- II. Eliminating manual scavenging;
- III. Changing people's attitudes toward healthy sanitation practices;
- IV. Raising citizens' awareness of sanitation and its connections to public health;
- V. Assisting urban local governments with the planning, implementation, and management of waste disposal systems.
- VI. Enabling private sector participation in sanitary facility capital expenditures and operating and maintenance costs.

## Role of Citizen in Swachh Bharat Abhiyan

Every person in our nation has a responsibility to support the Swachh Bharat Abhiyan. It is crucial to raise awareness of Swachh Bharat. At least one person should hear about Swachh Bharat each day, and that person should be informed about how they may help. This might apply to any individual, including your maid, driver, or any stranger you meet on a bus or anywhere else.

Until you run out of people to teach about hygiene, this should be continued.



The following is a list of additional methods that citizens can help make India cleaner and more environmentally friendly:

- i) Degradable and non-degradable household garbage should be separated.
- ii) Dustbins should be used rather than leaving trash lying around.
- iii) We can also make a difference by abstaining from the practice of urinating in public places like vacant lots and on the ground.

### **Actions taken to Promote the Mission to Clean India**

- 1) On Sundays, children should be encouraged to watch films, fillers, and public service announcements with a message about the value of cleaning so they can develop the habit while having fun.
- 2) Being aware is crucial. A minimum of one person should be spoken to each day about "Swachh Bharat" to inform them of their role in the initiative.
- 3) News channels may host a brief discussion on the value of cleanliness for 10 to 12 minutes with a few different medical professionals to make people aware of the benefit of a clean area.
- 4) Science exhibits on the value of cleanliness at the federal and state levels may be created and presented in various places OR they may be carried out at the local level.
- 5) Every city needs the campaign to promote cleanliness that focuses on different issues.
- 6) Science competitions and quiz shows about the value of cleanliness should be organized at the national, state, and municipal levels.
- 7) Weekly talk show on television where the host interviews a notable public figure, movie or sports celebrity, health expert, or scholar about the value of good health.
- 8) The presence of trash cans is necessary for cleanliness. If someone observes a public space (such as a park, highway, bus stop, or railroad station) lacking enough trash cans, they should notify the appropriate authority, such as the Municipal Corporation in their area.
- 9) Use social media platforms to share videos and photos of clean India-related events and to use the provided hashtags, such as #MyCleanIndia and #SwachhBharatAbhiya, to generate further awareness.

## **The Role of the Media in Creating Awareness about Swachh Bharat Abhiyan**

All forms of communication that were available before the Internet and new media technologies are referred to as traditional media, including written materials (books, periodicals, and newspapers), broadcast media (TV, radio), film, and music.

On the other side, new media refers to digital entertainment and video games as well as the Internet and social media. It is important to note that, despite substantial cultural and technological developments, none of the media covered in this text have fully disappeared from use, even though various kinds of mass media experience ups and downs in popularity.

The media is crucial to raise awareness of the Swachh Bharat Mission, Social media can be utilized as a platform to upload pictures of the environment before and after it has been cleaned. Social media platforms can also be utilized to post footage of staff cleaning their workplaces and nearby locations.

### ***According to a survey done in 2019***

1. Maximum of 40.50% of respondents, it has been shown, think that social media is a useful tool for the clean India Campaign.
2. According to 36% of respondents, television is a useful kind of media.
3. 15.5% of respondents think print media is a powerful form of communication.
4. 89.5% of respondents are aware of the clean India campaign, or Swachh Bharat Abhiyan.
5. 67.5% of respondents think that this endeavor to clean up their city is a good one.
6. 79% of respondents were satisfied with the media's contribution to the Clean India Initiative

As of January 2021, there were 448 million social media users in India, a rise of 78 million (+21%) from 2020 to 2021. The most popular app in India is WhatsApp, which is followed by YouTube, Facebook, Instagram, and Twitter.

The media's involvement in the following initiatives by the public shows how important it is in making people aware of Swachh Bharat:

- i) An article on how "Desi businesses beat Facebook in the 'Swachh' apps race" appeared in The Times of India.

- ii) Vocativ claimed that one such app might alter how the public and government interact.
- iii) Another article about the mission of Clean India Apps was published in Inc42 Magazine.
- iv) The government would introduce a mechanism for tracking toilets built as part of the Swachh Bharat Abhiyan on a national scale in real-time. The government is using quite a few effective advertisements to educate the public about this.
- v) The Swachh Bharat App Tumblr Feed offers updates from specific groups, corporations, and Twitter users generally regarding group cleaning events, the state of cleanliness in India, or viewpoints on the Swachh Bharat Mission's goals.
- vi) During the March 16–22 Cleanliness awareness week, TheBetterIndia.com published an article on updates on the Silent Swachhata Revolution spearheaded by children in over 1 lakh villages in India and how a citizen can contact the Prime Minister via a twitter-based app about trash-related issues.
- vii) To attain the aim of a clean India, NIT Rourkela Ph.D. students and kids from Sacred Heart School in Tumkur created a short film on Swachh Bharat that emphasizes that the campaign should not be a one-day event but rather a way of life.
- viii) At the Indo-Nepali border region of Sunauli-Belihiya, which serves as the entrance to the birthplace of the Buddha, Lumbini, Nepal, the Indo Nepal Doctors Association launched the Swachh Bharat Nepal - Swasth Bharat Nepal Abhiyan on January 3, 2015, drawing inspiration from the Prime Minister of India.
- ix) The "Swachh Bharat Updates" component of the Swachh Bharat App features daily crowd-sourced updates (songs, videos, and news) on Clean India activities from all around the world.
- x) Using platforms like social media to post videos and pictures of activities regarding clean India and post them with the given hashtags like #MyCleanIndia #SwachhBharatAbhiya to create more awareness

Television is one of the most popular and often utilized modern mass media in India, and because it is an audio-visual medium, it disseminates information quickly. The media's function has evolved to emphasize informing the public and raising awareness of the challenges and issues related to cleanliness that we currently confront. We can observe that various television networks are contributing significantly to raising public awareness of environmental issues by airing programming on these topics: Discovery Channel, National Geographic Channel, and Animal Planet Channel, for example, ABP News has launched a campaign named "Yeh Bharat Desh Humaara" through which they have raised awareness among the general public and promoted cleanliness. On the other hand, NDTV has created

a program called “Banega Swachh India” that is broadcast on all of the stations that fall under the NDTV brand. To make India clean by 2019, the Zee Media group launched “Mission Clean India.” We can claim that our nation has hundreds of news outlets, including DD, ETV, NDTV, Zee TV, India TV, and ABP News, and that every single one of them has promoted the “Clean India” campaign by urging the populace to carry out this project.

## **Main Objective of Television Channels in Spreading Knowledge about the Mission to Clean India**

- 1) On November 14th, NDTV urged schools all over India to host “Swachhta Ki Pathshala.”
- 2) To promote children’s intellectual abilities, learning drive regarding the effect of a clean city, and self-assurance as learners about hygiene to help prepare them.
- 3) Investigating and exploring to try to find answers while developing observations with the aid of straightforward charts and sketches.
- 4) People should feel that hygiene is a vital aspect of life after viewing TV shows and getting inspiration through the show to do the same in their area.
- 5) Brand ambassadors, actors, politicians, cricketers, and other athletes should be brought in to deliver filler and public service messages about the significance and advantages of the “clean India Mission.” and putting up the show and encouraging the audience to do the same.
- 6) RB, previously Reckitt Benckiser teamed to launch “Dettol - Banega Swachh India,” a five-year initiative, with NDTV and Facebook., which has a comprehensive plan to handle India’s growing sanitation and hygiene needs. The program attempts to raise awareness of the significance of sanitation and hygiene, and it also collaborates with NGO partners to assist infrastructure for the building and upkeep of restrooms. RB India has promised to provide Rs. 100 crores over the course of the following 5 years to this program. Other TV networks create various other programs based on this.
- 7) Televisions can even show how different states in India have taken up the challenge of a clean India in their respective city like example Indore which has been named as the cleanest city in the country for two consecutive times not only that how Indore achieved this and what are the measure they have taken and the role of society in this process.

As of January 2021, there were 448 million social media users in India, a rise of 78 million (+21%) from 2020 to 2021. The most popular app in India is WhatsApp, which is followed by YouTube, Facebook, Instagram, and Twitter.

Talking regarding the younger generation people, people of this new age generation rather spend their time on social media as its a new and more efficient version of getting the news of the surrounding pre quickly and accurately rather than spending time in the newspaper as they have all the answers or the new or new trends that have been followed by the people in the tip of their figure. Social media is a platform where people from different parts of the country can be connected through various platforms like Instagram, Facebook, WhatsApp, Twitter, and Reddit these are the platforms that one can use to spread awareness not only to its country's people but also to people worldwide, just by using Hashtag one can create trend regarding any social problems Like #MyCleanIndia, #Meetoo, #MentalHealthAwareness

## **Conclusion**

To sum up, it can be concluded that the mass media, namely television programs, can be very helpful in spreading knowledge about the "Clean India Mission." Effective television programs, documentaries, short films, debates, and other forms of public education are urgently needed to raise the general public's knowledge of cleanliness and the Clean India Mission (Swachh Bharat Mission). To raise public awareness of cleanliness and to educate the general public, some intriguing science-based shows and videos must be developed locally. Documentaries can help this effort gain popularity.

Based on the research and conclusions, social media plays a significant part in the success of this campaign. It is also evident from this analysis that the majority of individuals only know about this campaign because of social media and television. India's population is largely aware of this program and campaign—nearly 90%. Additionally, it can be said that about 70% of respondents think that this campaign might help to make their city clean. The role of the media in this campaign was also successful, as most respondents expressed satisfaction with it.

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**ISBN: 978-81-960940-3-4**

# **A Study on Multiple Beach Activities Cause Littering in Edward Elliot's Beach**

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## **Abstract**

Practically every beach along every coastline is now in danger due to human activity. Large amounts of litter have contaminated beaches due to inadequate recycling and poor waste management in developing nations. Despite having a 7,516.6 km long coastline on the mainland, 43% of which are sandy beaches. Data on litter accumulation, particularly that of non-biodegradable garbage, one of the most prevalent and persistent contaminants in the marine environment, is scarce. In Chennai's sandy beaches, the amount and distribution of plastic trash were quantitatively evaluated. Edward Elliot's beach had a noticeably higher buildup of garbage. The likelihood of litter contamination on Edward Elliot's beach in Chennai has likely increased due to the extensive usage of beaches for entertainment, tourism, and a variety of beach activities. This paper examines the effects of litter on the marine ecology at Edward Elliot's beach to raise awareness among the students about the need to eliminate garbage by organizing beach clean-up activities.

**Keywords::** Litter, Litter pollution, Beach pollution, Edward Elliot's beach, Beach cleanup activities, Awareness.

## Introduction

Edward Elliot's Beach, often referred to as Besant Nagar Beach or the Bessie, is a natural urban beach that can be found in Chennai, Tamil Nadu, India's Besant Nagar neighbourhood. The beach was primarily reserved for white people during the colonial era. A police station and all-terrain vehicles safeguard the safety of beachgoers and those around.

Marine litter is defined as man-made and non-man-made objects that enter the marine environment either by irresponsible handling or disposal, purposeful or unintentional discharge or as a result of natural disasters and storms. The complexity of marine debris seriously jeopardizes the sustainability of the world's natural resources. Beach cleaners should report any signs of sea turtle crawling, nesting, egg theft, or hatching before they damage evidence. Beach clean-ups should be carried out only at low tide and during the day. Litter removal and non-mechanized raking should be used to clean the beach.

Tourism and beach activities are responsible for the majority of trash on Indian beaches. 40%–96% of all beach waste is plastic, mostly generated by tourism. The number of beach activities was the second-largest source of litter, after tourism. NCCR study was conducted on six beaches along the eastern and western coasts of India.

## Objective

1. To study beach litter pollution on Edward Elliot's beach
2. To point out some major sources of marine litter which was derived from beach activities and Tourism.
3. To study the impact of litter in the marine environment on Edward Elliot's beach.
4. To create awareness among the students to reduce litter by generating beach cleaning activities.

## Methodology

Data is the base of any research. In order to collect data pertaining to my topic, both qualitative as well as quantitative data collected from various primary and secondary resources. It provided a better and a clear understanding about the concept of multiple beach activities causing litters in Edward Elliot's beach and its relation with Swachhta which was very useful to figure out on where the strengthening of efforts by the people and by the environment protection clubs is required. The data mainly depends on following resources:

- a) Books, official reports, surveys by experts in the field of Ecology and environmentalism etc.
- b) Photos and videos related to the topic.

The study has been conducted using primary and secondary sources of data. As a primary data source, a set of well-structured questionnaires was distributed to 160 Public who are frequent visitors of Edward Elliot's beach, tourists and local shop vendors of beach. Among them, responses were received from 135 of them. The responses were further analyzed to conclude. Different literature reviews about similar research areas were considered and analyzed as secondary data sources. The data analysis has been done with the help of pie charts. The study was carried out on the public who reside in different parts of Chennai, the tourists who visit the beach.

## **Review of Literature**

### **Types of Litter Waste**

Based on how quickly they degrade, waste materials (or substances) are divided into two categories: biodegradable and non-biodegradable. Materials that can be broken down or degraded by microbes and other living things are known as biodegradable materials. Organic wastes like leftover food, kitchen scraps like fruit and vegetable peels, etc. are typically considered biodegradables. Non-biodegradable materials, on the other hand, are compounds that cannot be broken down or degraded by bacteria or other living things, and instead cause pollution. Inorganic wastes like plastic bags, cans, bottles, chemicals, etc. are examples of non-biodegradables.

### ***Beach Pollution***

A significant issue and cause for worry is marine contamination. Our capacity to use beaches for economic and recreational purposes may be restricted by pollution of coastal habitats. The majority of the pollution results from inland and coastal human activity. A polluted beach can pose a major health concern, diminish local economic opportunities, and deteriorate and damage coastal habitats.

Any toxic chemical that contaminates coastal habitats, including lakes and oceans, is referred to as beach pollution. It includes everything from oil and sewage to plastic, trash, and litter. One billion pounds of trash and other contaminants are thought to enter the



ocean annually. Due to the tides and waves, some of them wind up on beaches. The leftover debris settles to the ocean's floor, where it is either gathered in ocean gyres or consumed by marine animals which mistake it for food.

Chemicals and debris are frequently combined to cause beach pollution. All living things are harmed by this pollution, which also has negative economic and environmental effects. There are numerous factors that contribute to beach pollution, the majority of which are human-made and come from the land.

### ***Littering and Garbage***

Garbage and litter can arise from a variety of places, but they are mostly caused by human activity on land. Marine debris is unsightly and detrimental to human health, wildlife, and ecosystems. Any garbage that is not recycled or disposed of correctly eventually finds its way to coastal areas during periods of severe rainfall, via storm drains, streams, and rivers.

Coastal ecosystems can become polluted and contaminated by a variety of factors, such as:

- Beachgoers who leave their waste behind
- Fishermen losing or tossing out fishing nets and lines
- Improper disposal of household or commercial waste

## **Impact of Marine litter pollution**

### **1) *Health Risks***

Human health is seriously threatened by polluted beaches. According to the Environmental Protection Agency (EPA), swimming in sewage might make up to 3.5 million people unwell. A variety of ailments can be contracted by beachgoers through bacteria, fertilisers, animal and human faeces, and rubbish. Swimmers are susceptible to gastrointestinal distress, neurological conditions, respiratory problems, earaches, pinkeye, meningitis, and hepatitis. The majority of people are unaware that going to the beach caused their illnesses because there is frequently a delay between contact with contaminated waters and the development of symptoms. Public health worries over contaminated waterways can sometimes lead to the closure of public beaches.

**2) *Erosion***

Due to their unique habitat for various animal and plant species, dunes are significant natural features that shield inland areas from flooding.

**3) *Habitat Degradation***

Chemicals and rubbish pollution both disrupt and deteriorate land and marine environments. For instance, plastic pollution modifies the temperature of the sand where incubation takes place, which has an impact on sea turtle reproduction rates.

**4) *Harmful to Wildlife***

Around the world, beach pollution is thought to have an effect on over 800 different species of wildlife. Every year, more than 100,000 marine mammals, seabirds, and turtles perish as a result of swallowing plastic or being entangled in trash. Animals frequently mistake trash for food, which can result in choking, internal injuries, or starvation that results in death. Dolphins, fish, sharks, turtles, seagulls, and crabs are among the marine life that is most at risk from marine waste made of plastic. Because they consume up oxygen, harmful algae blooms are determinant to marine animals. When they die and decay, they consume oxygen, which frequently causes areas to emerge that have little to no oxygen. Large aquatic creatures' feeding supplies may be completely eliminated, and ecosystems may be destroyed.

**5) *Climate Change***

Extreme weather events have increased as a result of climate change, and they are more likely to bring larger levels of pollution to beaches. A lot of coastal habitats won't be able to support themselves due to the rate of sea-level rise and the anticipated acceleration. Beaches are susceptible to erosion or flooding due to sea level rise. The habitats of birds, sea creatures, and other species would also be at risk, as well as coastal towns.

**6) *Economic Toll***

According to research by the Natural Resources Defence Council (NRDC), pollution and contamination caused over 20,000 beach closures and advisory days in the United States in a single year. Near-shore bacteria levels that were beyond acceptable levels for public health were the cause of over 80% of closures. The local economy of coastal communities is directly impacted by closed beaches. Beach closures resulting from pollution not only degrade the beachgoing experience for locals and tourists alike, but also have an effect on regional companies and the tourism sector. The tourism industry supports many coastal villages seasonally or year-round.

## Nutrient Pollution

Both phosphorus and nitrogen are found in nature. On the other hand, an abundance can have a terrible effect on the environment and people's health. Algal blooms, which are hazardous to wildlife and dangerous to humans, are encouraged by higher chemical concentrations in coastal areas.

Industrial farming methods, commercial fertilisers, animal waste, Cleaning supplies dishwashing soaps and everyday objects are some sources of nutrient contamination.

Algae can grow much more quickly than usual when there is an excess of nitrogen and phosphate. This growth, which can completely take over a body of water, is frequently referred to as dangerous algal blooms. They harm aquatic environments, obstruct sunlight, and reduce oxygen levels.

### *Water contamination due to litter on beaches*

All manmade items that wind up in the water, the majority of which are made of plastic, are considered marine garbage. This debris, which comes from sources on land in 80 percent of cases, accumulates as a result of littering, storm gusts, and poor waste management. Numerous plastic goods, such as shopping bags and beverage bottles, together with cigarette butts, bottle caps, food wrappers, and fishing equipment are examples of common maritime garbage. Being such a persistent contaminant, plastic waste is particularly harmful. Decomposition of plastic products might take hundreds of years. Microplastic, or very small fragments of degraded plastic, is consumed by small creatures, which then take the chemicals in the plastic and absorb them into their tissues. Microplastics, which have been found in a variety of marine organisms, including plankton and whales, have a diameter of less than five millimetres (0.2 inches). The poisonous compounds become a part of larger animals' tissues when they devour microscopic organisms that absorb microplastics. This causes microplastic contamination to move up the food chain and finally end up in the foods that people consume.

Both prevention and remediation are solutions for marine contamination. In today's world, disposable and single-use plastic is widely utilised for a variety of purposes, including plastic bottles, shipping containers, and shopping bags. It will take time and money to change society's perspective on the use of plastic. On the other hand, some objects may make cleanup impossible. When plastic does float, it tends to gather in big "patches" in ocean gyres. These areas resemble pepper specks of microplastic in an ocean soup more than

trash islands, according to the National Oceanic and Atmospheric Administration. To tackle marine pollution, even some promising ideas fall short. Litter marketed as “biodegradable” frequently degrades at temperatures that are greater than those found in the ocean.

## **Prevention of Beach litter pollution**

At a high level, policy enforcement is a crucial component of the national effort to combat pollution. The Environmental Protection Agency in the US is primarily in charge of passing legislation and programmes to safeguard beaches, both preventatively and remedially.

Reducing industry and manufacturing waste, promoting organic farming, and using environmentally friendly pesticides are a few examples of policy solutions. Others include increasing money for state water-quality monitoring and implementing public awareness campaigns about potential health hazards. Encourage the development of green infrastructure, rainwater is absorbed by porous pavements, green parks, and roofs. There are several things that can be done on a personal level to lessen beach pollution. Although beaches are common areas, it is our duty to contribute to their upkeep.

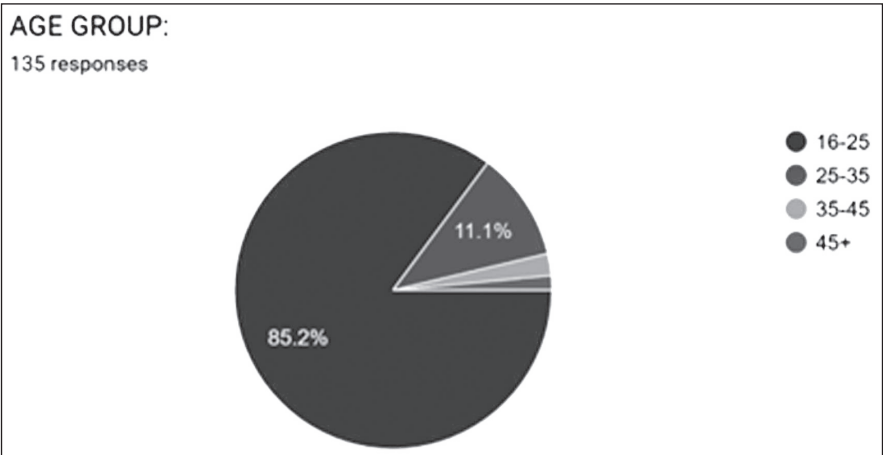
Rain barrels, eating organic food, using natural cleaning products, avoiding chemical pesticides, avoiding plastic use, choosing reusable bottles and utensils, organising beach cleanups or cleanups in your neighbourhood, and properly disposing of trash and plastics are just a few examples of simple solutions. Although beaches are lovely places for enjoyment, pollution has the potential to harm or even destroy them. We need to maintain coastal habitats at all costs since they play a significant role in human life.

### ***Awareness among the people to reduce the litter***

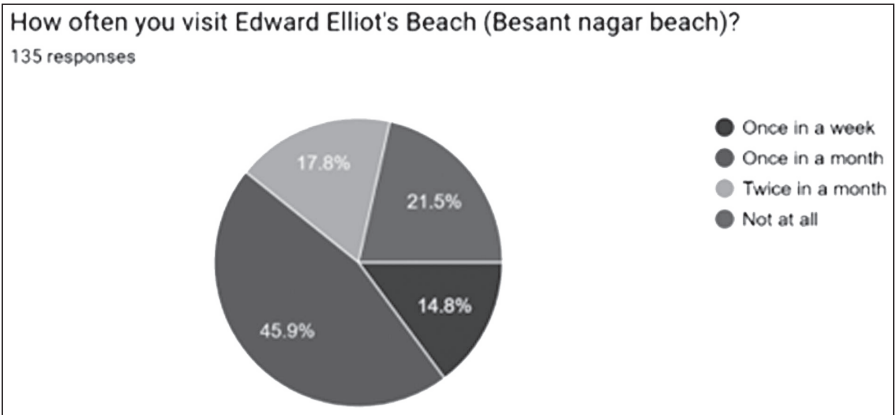
The perception of litter can be changed with widespread public knowledge. Among other things, consumer awareness campaigns, business awareness campaigns, documentary films, school and college efforts, and cleanup projects can all be included in a city’s strategic action plan for education and participation.

In order to motivate more people and organisations to take action, it is important to improve public understanding and community views of the risks associated with trash pollution and the possible remedies. Changes in individual attitudes and purchase patterns, more recycling and sorting, and ethical company practises are a few examples of community initiatives.

Findings

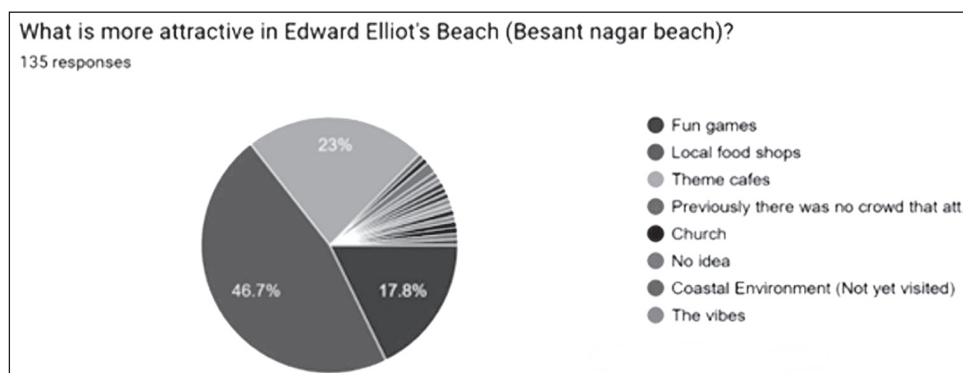


To understand the role of reducing litter on Edward Elliot’s beach, a survey was conducted among different age groups. The response received between the age group of 16 – 25 is 85.25 percent. The response received between the age group of 25 – 35 was 11.1 percent and 2.2 percent of people are between the ages 35 – 45. Only 1.5 percent of response was received from the age group above 45 years. Hence, we conclude that a large number of people are aware of beach litter pollution.

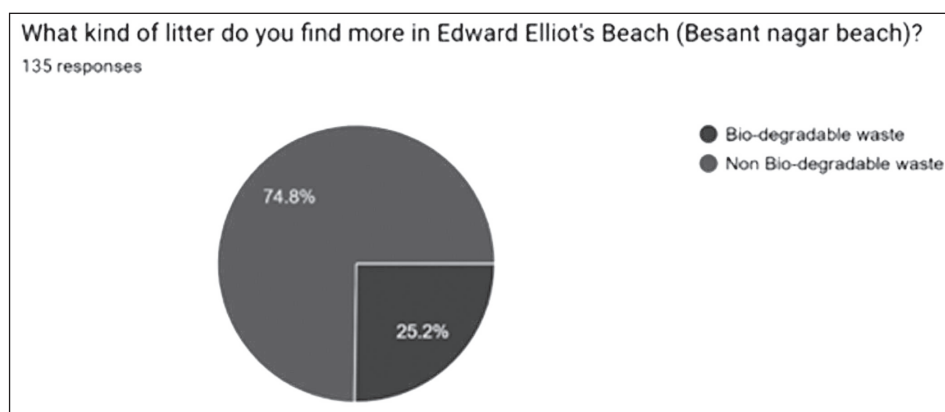


To know the effect of litter on Edward Elliot’s beach, it was compulsory to know about the active visitors of the beach.

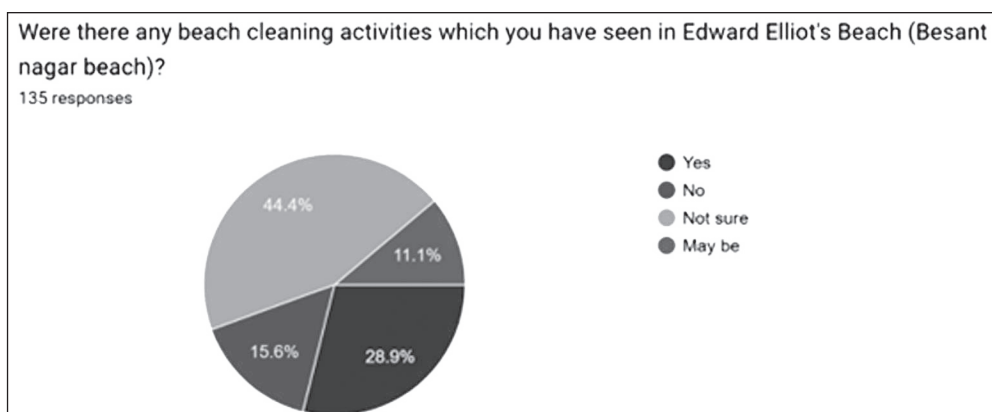
The pie chart clearly shows that around 14.8 percent of people visit Edward Elliot's beach once in a week, 45.9 percent of people visited once in a month. The graph also made it clear that around 17.8 percent of people visited twice in a month. According to the overall percentage, only 21.5 percent of people do not visit Edward Elliot's beach. Hence it shows that the majority of people have visited Edward Elliot's beach.



According to the responses, the pie chart shows that the 46.7 percent of people visit Edward Elliot's beach for local food shops, 23 percent of people visit for theme cafes and 17.8 percent of peoples are interested in fun games. So the rest other 12.5 percent of people visit for other activities (Astalakshmi temple, Church, Ocean view etc). Hence it is very obvious that majority of people visit the beach area for multiple beach activity, so it impacts large amount of litter in beach.



According to the responses, the pie chart clearly shows that the 74.8 percent of people noticed non-biodegradable litter in Edward Elliot's beach for and 25.2 percent of people found biodegradable litter. Hence it is very evident that majority of people found non-biodegradable litter in the beach area.



The survey done to know about the awareness of the beach cleaning activities in Edward Elliot's beach.

According to the responses, 44.4 percent of people are not sure about any cleaning activities going on the beach, Around 28.9 percent of people know about beach cleaning activities, whereas 15.6 percent of people are not aware of any beach cleaning activities. Around 11.1 percent of people were not sure and responded as 'May be'. The above pie chart clearly indicates that a majority of people are not aware of beach cleaning activity.

To understand the role of reducing litter on Edward Elliot's beach, a survey was conducted among the people, the sustainable way of reducing and controlling the litter is by conducting beach cleaning activities on weekdays, strict rules by the corporation, dustbins for local shops in beach and collection of those waste from the local shops every day, creation of clubs in schools, universities, and organization for cleaning activities twice a month, posting fines for the people whom all are not following the rules and regulation. Lastly conducting campaigns, awareness programs, and educating people about their responsibility towards the environment and society and the beach is a source of economy for many people.

## Conclusion

Despite having a 7,516.6 km long coastline on the mainland, 43% of which is sandy beaches. Data on litter accumulation, particularly that of non-biodegradable garbage, is scarce. In Chennai's sandy beaches, the amount and distribution of plastic trash was quantitatively evaluated.

Marine litter is unsightly and detrimental to human health, wildlife, and ecosystems. Garbage that is not recycled or disposed of correctly eventually finds its way to coastal areas. Coastal ecosystems can become polluted by a variety of factors, such as littering and improper disposal of household or commercial waste.

Algal blooms, which are hazardous to wildlife and dangerous to humans, are encouraged by higher chemical concentrations in coastal areas. This growth, which can completely take over a body of water, is frequently referred to as dangerous algae blooms. They harm aquatic environments, obstruct sunlight, and reduce oxygen levels.

A survey done to know about the awareness of beach cleaning activities in Edward Elliot’s beach. According to the responses, 74.8 percent of people noticed non-biodegradable litter in the beach area. 15.6 percent are not aware of beach cleaning activities and respond as ‘may be’.

Beaches are lovely places for enjoyment, but pollution has the potential to harm or even destroy them. We need to maintain coastal habitats at all costs since they play a significant role in human life. There are several things that can be done on a personal level to lessen beach pollution.

Public awareness campaigns, documentary films, school and college efforts, and cleanup projects can all be included in a city’s strategic action plan for education and participation. In order to motivate more people and organisations to take action, it is important to improve public understanding of the risks associated with trash pollution.

Beach cleaning activities on weekdays and strict rules by the corporation are some of the ways to reduce litter on Edward Elliot’s beach in Guernsey. There are also dustbins for local shops in beach and collection of waste from those shops every day. The beach is a source of economy for many people.

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**ISBN: 978-81-960940-3-4**

## **Cleanliness – The Matter of High Concern for the Swachhta Action Plan**

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### **Abstract**

Cleaning is an important habit of our life which is extremely useful for everybody and need to solid life way of life. Spring-cleaning should be the main need and substantial for each occupant of the nation, it is the best start of array of social issue from the all-purpose public just as raise the expansion of nation with its resident's development. Society of India think that cleaning is particular engagement & requirement and inhabitants of the country don't aware about the cleanliness and they would prefer not to think about germ-free particularly rustic people groups. In the republic there is lack of proper latrines, so entities compel to go outside for latrine due to these numerous folks confronted such a large number of infections issues as a result of the open defection.

**Keywords:** Cleaning; neatness; swachh mission; Household ; Sanitation; Quality; Population; social causes; historical; new trends.

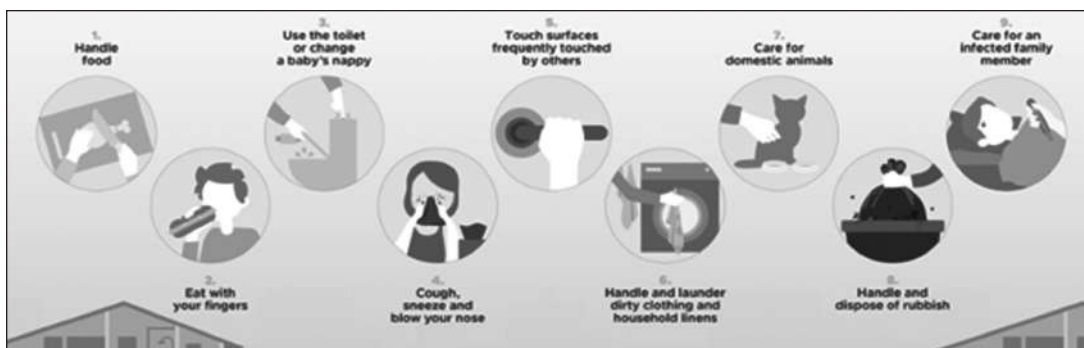


Figure 1: Art of Clean Living- Swachh Bharat Aim

## Introduction

“Cleanliness is piety” is the mantra of Mahatma Gandhiji which he illustrated, caused and required for individual and network cleanliness for an astounding duration. Cleanliness is a spotless propensity which is important to us all. Neatness is a propensity to keep ourselves “Physically & Rationally” clean incorporating home, pets, condition, environment, lake, stream, schools etc. Gandhiji had a progressive vision to clean the country. “Swachhta Mission” is coordinated with “Swachh Bharat Abhiyan” towards understanding this excellent vision. It helps in establishing a decent character and connection in the general public as it mirrors a perfect character. We should to keep up the earth and regular assets water, nourishment, land, cleanliness with the body neatness so as to make the probability of life presence eternally. “Swachh Bharat Abhiyan” a mass development the country over, the PM said that individuals should neither litter, nor let to others litter and reproduce the mantra of “Na Gandagi Karenge, Na Karne Denge”.



Figure 2: Cleanliness is next to Godliness by Mahatma Gandhi

Each parent ought to legitimately portray and talk about their children about the advantages, reason, need, and so on of the neatness. They should reveal to us that tidiness is the as a matter of first importance thing in our lives like nourishment and water. The Indians seem to give a tonne of consideration to the clean-up themselves, for it may; a similar one that we do not care much about the ecological order.

## Swachh Bharat Mission



Figure 3: Transformative change under the Swachh Bharat Mission

To accelerate the efforts to achieve universal sanitation coverage and to put focus on safe sanitation, the Prime Minister of India launched the Swachh Bharat Mission on 2nd October, 2014. “Cleaning and organising is a practice and not a project” A Review of Cleanliness Mission “Swachh Bharat Abhiyan” A Survey done for Thane District by Supreet Desai, Prof Sudeshma Roy. The Mission Coordinator shall be Secretary, Ministry of Drinking Water and Sanitation (MDWS) with two Sub-Missions, the Swachh Bharat Mission (Gramin) and the Swachh Bharat Mission (Urban), which aims to achieve Swachh Bharat by 2023, as a fitting tribute to the 150th Birth Anniversary of Mahatma Gandhi, which in rural areas shall mean improving the levels of cleanliness in rural areas through Solid and Liquid Waste Management activities and making Gram Panchayats Open Defecation Free (ODF), clean and sanitised. FDR would mean the end of faecal-oral transmission, defined as,

- no visible faeces found in the environment/village and,
- Every household as well as public/community institution(s) using safe technology option for disposal of faeces, as defined by the Ministry. The Mission shall strive for this by removing the bottlenecks that were hindering the progress, including partial funding for Individual Household Latrines from MGNREGS, and focusing on critical issues affecting outcome.

## Objectives of the Swachh Bharat Mission

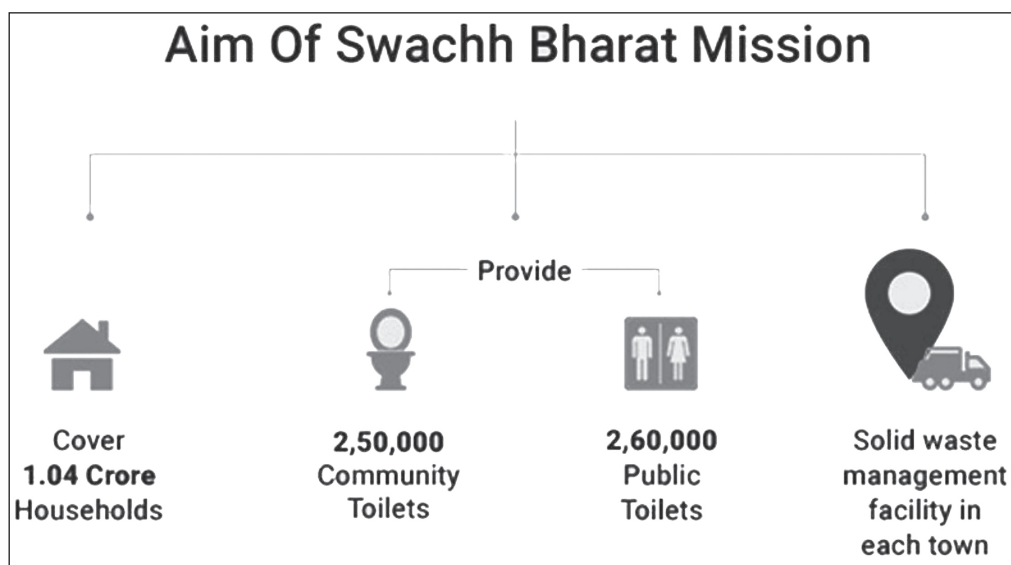


Figure 4: A Focus of Swachh Bharat Mission

- To bring about an improvement in the general quality of life in the rural areas, by promoting cleanliness, hygiene and eliminating open defecation.
- To accelerate sanitation coverage in rural areas to achieve the vision of Swachh Bharat.
- To motivate Communities and Panchayat Raj Institutions to adopt sustainable sanitation practices and facilities through awareness creation and health education.
- To encourage cost effective and appropriate technologies for ecologically safe and sustainable sanitation.
- To develop where required, Community managed sanitation systems focusing on scientific Solid & Liquid Waste Management systems for overall cleanliness in the rural areas.

The Nationwide Swachhta Mission will have the following six themes: -

- Clean Anganwadis
- Clean Surroundings e.g. Playgrounds
- Clean Self (Personal Hygiene/Child Health)

- Clean Food
- Clean Drinking Water
- Clean Toilets

## Toilets in Rural Areas



Figure 5: Usage of Rural Area Toilets

Prime Minister Narendra Modi spoke about the need for toilets in his remarks on Independence Day 2014. As of May 2015, 14 companies including Tata Consulting Services, Mahindra Group and Rotary International have pledged to construct 3,195 new toilets. As of the same month, 71 Public Sector Undertakings in India supported the construction of 86,781 new toilets, most of these toilets are a type of pit latrine, mostly the twin pit pours flush type.

Since sanitation and hygiene serves as an important preventive measure for the community health, primary care and well-being, the response would be tremendous if such activities will be conducted by medical and para-medical fraternity who would deliver such messages to them. It would serve as an investment for healthier and prosperous India in Swachhta Pakhwada: The Beginning of a Journey by Dr. Karpaga Priya P, Dr. Ashwini Katole, Dr. Gouri Padhy and Dr. Manisha Ruika.

By engaging in various Swachhta Pakhwada ventures over the years, the message of Clean Bharat was engraved deep and durable in our minds. The diversified programs under this fortnight celebration might have reached as many people as possible to at least ignite

the concept of individual's roles and responsibilities of sanitation and how in order to see a changed world, the change has to begin from one self according to the Concept of Swachhata in Ancient Indian Texts and its Relevance in 21<sup>st</sup> Century by Shri Girish Kumar and Dr Gyan Singh.

The World Bank will also provide a parallel \$25 million technical assistance to build the capacity of select states in implementing community led behavioural change programmes targeting social norms to help ensure widespread usage of toilets by rural households (India, World Bank sign \$1.5 billion loan pact for Swachh Bharat Mission, 2022) which is still on going.

### **Importance of Sanitation**



Figure 6: Importance of Sanitation from Ministry of Health & Family Welfare, GOI

### **Social welfare department gov.in**

Safe sanitation means promotion of safe disposal of human excreta, right use of toilet and avoiding open defecation as well as management of solid and liquid waste. Poor sanitation is a primary cause for many deadly diseases, deaths among children under age five, contamination of ground water sources, loss of family income on account of increased health costs, and compromised human dignity. In managing safe sanitation at each level - household,

community, and governments, understanding impacts of poor sanitation, contribution of all key stakeholders including communities, implementation of safe sanitation processes is considered crucial.

Addressing sanitation alone can reduce many of these unwanted effects among children. Children falling frequently ill, miss school often leading to poor performance. An infected child is also likely to spread infections to his/her peers. When girls reach adolescence, the lack of separate and clean toilets causes discomfort, deterring them from attending school during their period and eventually dropping out of school.

According to WPPM technology we can process plastic using manual, semi-automatic and automatic machines according to the availability of waste plastics. Any type of plastic of less than 100 microns is processed without segregation, transforming it into a product as per Newly Invented "Recycle Technology" to solve India/World Plastic Pollution Problem by Mr. Sachin Deshmukh and Mrs Riya Deshmukh.

### Need for Mass Awareness

Every segment of population, from primary school children to elderly persons need to be properly sensitized about inherent linkages of sanitation for public health. Besides roping in the educational institutions, particularly the schools in awareness campaigns, optimum use needs to be made of social media as well as electronic and print media to spread the message to grass root level. For an effective sanitation policy, the following elements must also be taken into account:



Figure 7: Effective Sanitation Policies



## 260 'PRAKRITI AUR SWACHHTA' - Environmental Sustainability through Cleanliness

- Need for mass awareness
- Social and occupational aspects of sanitation
- Coordination among administrative bodies/institutions
- Comprehensive approach
- Optimum use of technology
- Reaching the unreached
- Bridging the demand-supply gap

### **Role of Corporate Bodies/Public Sector Undertakings and Corporate Social Responsibility**



**Figure 8: Corporate Social Responsibility**

### **CSR India 2023**

Enterprises should be encouraged to participate in the Swachh Bharat mission as an essential part of corporate social responsibility (CSR).

There is realisation that a healthy workforce can contribute towards better services for their output. Getting popularity for marketing of their products and services or mere status also attract corporate houses towards taking up social causes and increasing interaction with people. Thus, Swachh Bharat mission can serve as a platform for the Corporate Houses to help address their CSR. The MDWS also has issued guidelines to facilitate the involvement

of CSR resources in sanitation works. States can use these guidelines as a base to develop their own procedure to attract/receive and utilise CSR funds. “Allocation of CSR fund by CPSEs for Swachh Bharat activities - A Group of Secretaries constituted for ‘Swachh Bharat and Ganga Rejuvenation’ has recommended for spending 33% of the CSR funds by Central Public Sector Enterprises (CPSEs) towards achieving goal of Open Defecation Free country.

## Conclusion and Findings

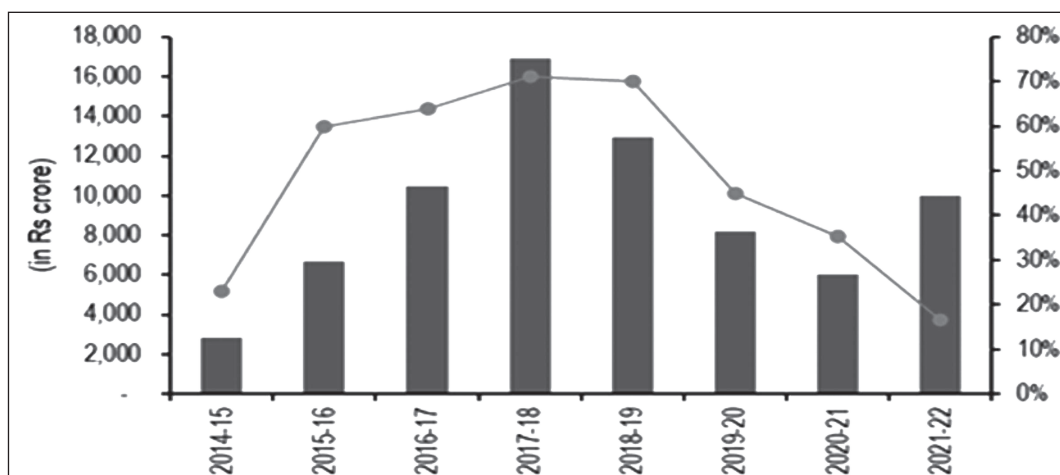


Figure 9: Expenditure on Swachh Bharat Mission- Gramin during 2014-2022

Swachh Bharat movement began by the Indian Government to clean and make a perfect-country. Presently individuals know for cleanliness surroundings they don't toss any trash on the streets and keep their encompassing clean. Numerous renowned characters are taking effectively investments in “Swachh Bharat Abhiyan” for the familiarity with sanitation and cleanliness environment and their territories. Numerous towns have likewise the piece of Swachh Bharat Abhiyan despite the fact that there is absence of open poop in the towns. A portion of the huge organizations were additionally put resources into this crusade they are contributing in the battle to construct the toilets, cleanliness environment; spare drinking water, and so on, and “Corporate Social Responsibility” is additionally a piece of SBA. The fundamental accomplishment is to make neat and clean 4043 towns for the execution of SBA, more than 60 percent of the world's “Open Defecation Free (ODF)”. Each resident of the nation should willingly volunteer to make this crusade a triumph as opposed to trusting that the administration will do. Let's also hope that this can change people's mentality toward cleanliness and be the change that everyone needs to see.

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**ISBN: 978-81-960940-3-4**

# **An Easy Guide to ‘Biodegradable Waste Management at Home’**

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## **Abstract**

Solid Waste Management is inevitable in our day to day activities. Biodegradable waste management is an essential part of solid waste management. Emphasis must be laid on environmental safety and solid waste management. It is crucial to the society in general, to spread awareness in order to cut down the generation of solid waste. Various studies reveal that municipal solid waste (MSW) provides a major contribution to the total amount of solid waste. Biodegradable organics are the major content of agriculture solid waste (ASW) along with some pesticides and heavy metals. It is necessary to minimize the total amount of solid waste as well as its hazardous effect on environment. This review is focused on easier and simple methods of biodegradable waste management at home.

**Keywords:** Solid Waste Management, Home, Plant waste, Food waste, Human waste, Animal waste, Paper waste, recycling, vermi-compost, organic manure.

## **Research Objectives**

- To know the basics of solid waste management.
- To understand the need of biodegradable waste management.
- To learn the types of biodegradable waste.
- To inquire the ill effects of untreated biodegradable household waste.
- To learn various methods of converting biodegradable waste into useful articles.

**Riya Susan Satish & Sushmitha Murugesan**

## Introduction

Any organic material that can be broken down by microorganisms into water, carbon dioxide, methane and other simple organic molecules through composting, aerobic digestion, anaerobic digestion or similar processes is biodegradable waste. It primarily consists of plant materials, soil, ash, and kitchen waste. Other biodegradable wastes include human waste, manure, sewage, sewage sludge and slaughterhouse waste. Additionally, some inorganic elements made of gypsum which can be broken down by microbes are included in this category. Biodegradable waste can be found in municipal solid waste or as green waste. In the absence of oxygen, it is decayed to produce methane by anaerobic digestion.

## Solid Waste Management

The term solid waste management mainly refers to the complete process of collecting, treating and disposing of solid wastes. In this waste management process, wastes are collected from different sources and are disposed of. This process includes collection, transportation, treatment, analysis and disposal of waste.



Figure 1: Segregation of Solid Waste

Solid and liquid waste management consists of four main segments, namely plastic waste management, grey water management, biodegradable waste management and faecal sludge management. The two types of solid waste include biodegradable and non biodegradable waste.

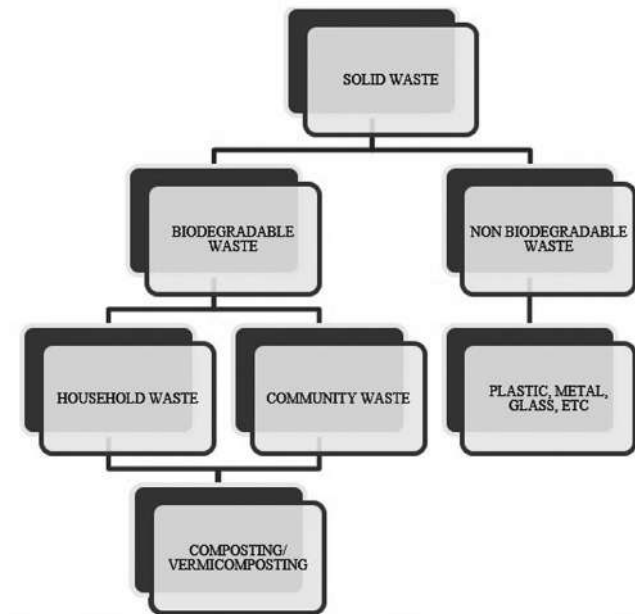


Figure 2: Types of Solid Waste

## Biodegradable Waste

### Components of Biodegradable Waste

The components of biodegradable waste management include the following:-

- Segregation of waste
- Collection and transportation of waste
- Treatment of waste
- Disposal of waste

### Segmentation of Biodegradable Waste

It is classified into two categories,

- Wet waste
- Dry waste.

Here, wet waste includes vegetable peels, fruit peel, egg shells, tea bags, flowers, leaves, cow dung, leftover food, rotten fruits and vegetables, etc. Dry waste includes cardboard box, paper waste, broken wooden articles, etc. The segregation is essential to determine the method of composting to be involved. Biodegradable waste could be converted into compost by simple composting methods, recyclable waste can be sold to the waste recyclers or can be sent to biogas plant.

## Composting

Composting is a process of controlled decomposition of the organic waste, where the organic matter further breaks down under bacterial action, resulting in the formation of humus-like material called compost. Factors affecting the process are:-

- **Microorganisms:** They help in breakdown of organic matter to produce carbon dioxide, water, heat and humus.
- **Moisture content:** It is necessary to support the metabolic activity of the microorganisms.
- **Temperature:** The temperature plays an important role by affecting the growth of microorganism in this process.



Figure 3, 4: Composts Made of Organic Matter

## Pros and Cons of Composting

Having compost can be useful and troublesome at the same time. The pros of a compost pit are:-

- Helps in improving the quality of soil
- It enhances the structure of the soil
- It is a cheaper soil conditioner

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- It is a fully organic fertilizer
- Less generation of waste
- Easy production of compost
- It is eco-friendly
- It serves as education for young kids
- Good feeling to act in an eco-friendly manner

The cons of a compost pit are:-

- It requires initial investment
- Its efficiency depends on the type and amount of organic waste used
- It causes an unpleasant smell in addition to worms
- It may attract rats, snakes and bugs
- It has an unpleasant physical appearance
- It involves plenty of work and needs constant monitoring
- Quality of compost depends on the ingredients
- Composting takes time
- It can lead to spread of diseases
- Composting needs some allocated space
- Due to generation of flammable gas, it may cause a fire hazard
- Black soldier fly larvae thrive in human feces, after processing, it can be a nutritious dish for farm animal and fish feed, also as biodiesel.

### **III Effects of Waste on the Environment**

Generation of waste is immensely growing in all countries over the world. Every year billions of tons of waste are generated. This is the result of waste accumulation from areas of residence, business and industries. The disposal of large amount trash is an enormous environmental problem. Municipal solid waste, industrial solid waste, agricultural solid waste and biomass deposits cause large-scale pollution of land and water.

The impacts of landfills and incineration are significant due of the potential increase in emission of greenhouse gas like methane and carbon dioxide. Later, when humans realized that waste is a potential source of diseases and infections, they dumped their biological wastes.



The first organized municipal dump was in 500 BC outside ancient Athens in Greece, where the regulations required all waste to be dumped at least a mile from the city limits and to be covered with soil. Until industrialization of the society, waste was mostly organic. So, it would decompose naturally. Later, mostly because of industrialization and urbanization, the amount of waste increased very rapidly.

It also acts an obstacle to growth of tourism. It also leads tarnishes the scenic beauty of a place. Landfills occupy a lot of space. A landfill is also a great breeding ground for millions of harmful microorganism, as it may contain household waste, medical waste, industrial waste, e-waste, radioactive waste and so on. These wastes also act as a source of food for stray animals. It also leads to harmful effects in them.

## **Possible Waste Management Options**

In India, at least 50% to 55% of municipal solid waste is a valuable resource to our country and it can be profitably recovered using different technologies through following processing options:

### **Wealth from Waste**

The organic fraction of municipal solid waste approximately contains almost 30% to 55% of biodegradable matter ranging from which it can be profitably converted into useful products like compost (organic manure), methane gas, etc. through the following processes:-

#### **(a) Waste to Compost**

- **Aerobic / Anaerobic Composting** – Composting is a process of converting biodegradable materials into stable mass.
- **Vermi-Composting** – Addition of earthworms into organic waste to produce vermicast or worm casting.

#### **(b) Waste to Energy**

- **Refuse Derived Fuel (RDF) / Pelletization** – The segregation waste into high and low calorific value materials, individually shredding them to uniform size, reducing its moisture content, then mixing them together to form pellets used in thermal energy.

- **Bio-methanation** – Through anaerobic digestion, methane gas and effluent sludge is produced in bio-gas production. After stabilization, sludge can be used as a soil conditioner.
- **Incineration** – Burning of wastes in the presence of excess air at higher temperature leads to liberation of heat energy, inert gases and ash. It is used in bio-medical management of waste.
- **Pyrolysis / Plasma Gasification** – Thermal decomposition of organic waste for energy recovery using plasma arc torch by heating of waste to converting into gaseous form.

## Recycling of Waste

Recycling of materials like paper, cardboards to transform it into useful resources. Paper waste includes newspapers, notebooks, magazines and so on. Paper can be recycled numerous times. They can also be reused for various purposes.

## Sanitary Landfilling

The rejected materials from compost plants, recycling and other inorganic materials like construction debris from MSW are sent to scientifically engineered landfills.

## Possible Household Waste Management Options

### 1. Pit Composting

- Less space requirement
- Should be away from drinking water source
- Suitable for small to large families
- It is not suitable for areas with high water tables

### 2. Single Pot Composting

- Less space requirement
- Should be protected from rain water
- Suitable to small to medium sized families
- Suitable for generating up to 2 kg waste per day

### **3. Tripot Composting**

- It can be kept in the garden as part of aesthetics
- It requires less space
- It is suitable for small families
- Suitable for generating up to 2 kg waste per day
- Should be protected from rain water

### **4. Kitchen Bin Composting**

- It can be kept in the kitchen
- It requires less space
- It is suitable for small families
- Suitable for generating up to 2 kg waste per day
- It is easy to maintain
- Should be protected from rodent attacks

### **5. Portable Bin/ Bucket Composting**

- It requires less space
- It is suitable for small families
- Suitable for generating up to 2 kg waste per day
- It is easy to maintain
- Should be protected from rain

### **6. Ring Composting**

- It is suitable for households and institutions
- Suitable for generating up to 2 kg waste per day
- Should be protected from rain

### **7. Pipe Composting**

- It can be adopted for a small family

## 8. Vermi-Composting

- It requires an isolated area
- It includes addition of earthworms

## 9. Composting of Human and Animal Waste

- It requires special care, as it is not like regular composting
- It must be protected from rain and snow
- It must have lots of ventilation
- A composting toilet can be used
- Human waste can be mixed with materials like ash, yard clippings or agricultural waste. Later it is covered to let natural bacteria and the animal agents of decomposition do their work. When the waste is naturally processed, the compost is dug up and spread it as a safe fertilizer on crop fields.
- It can be little expensive if electric composters are used.
- 2:1 ratio of healthy animal waste is mixed with sawdust, mixed, covered and maintained at 145 degrees for at least 3 consecutive days and cured for 6-12 months at least before use.

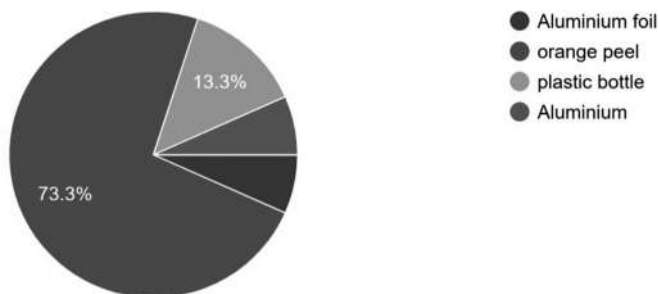
## Possible Problems Faced and their Solutions

1. **Smell** – It can be avoided by placing it away from home.
2. **Very slow decomposition of waste** – Addition of water and placing it in a warm area to support bacterial growth.
3. **Excess formation of worms** – Addition of neem leaves or neem powder.
4. **Very watery compost** – Addition of cocopeat to the manure.

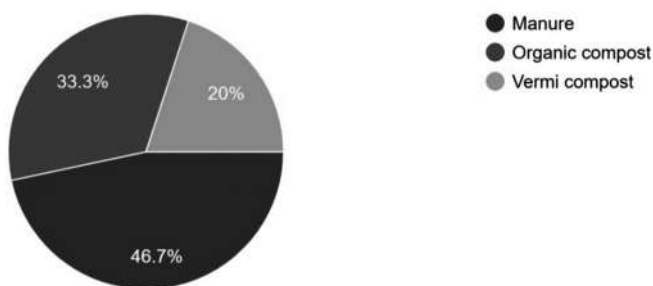
## Opinion of People Regarding Biodegradable Waste Management

A survey was conducted to figure out the level of awareness people had about biodegradable waste management and their role in it. The results are as follows :-

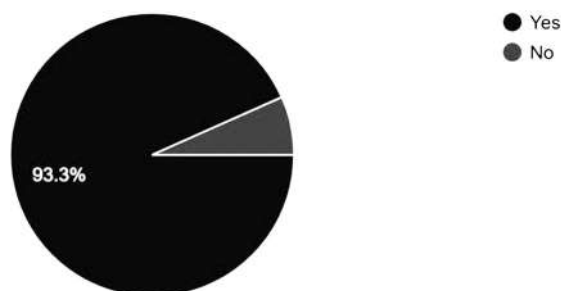
- When asked about an example of biodegradable waste



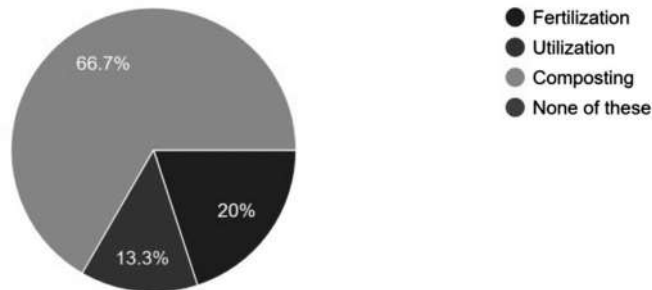
- When asked about their preferred method of converting household waste



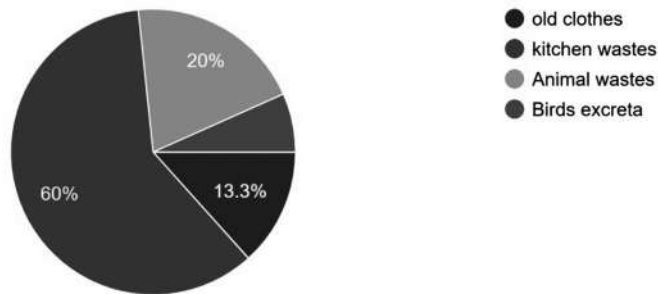
- When asked if it is good to practice biodegradable household waste management



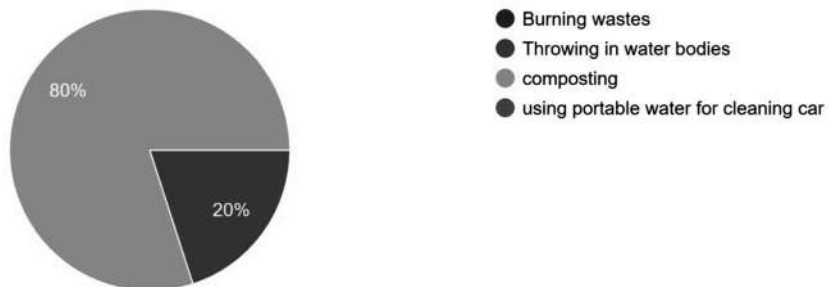
- When asked, these many people knew what composting was



- When asked about the type of input preferred in composting



- When asked about the best method to preserve the ecosystem



These are few conclusions taken from the survey conducted. It showed a very positive response towards biodegradable waste management and their interest towards making a better future for the upcoming generation.

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**ISBN: 978-81-960940-3-4**

# **Climate Change, Sanitation and its Impacts**

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## **Abstract**

Climate change represents the greatest challenge of the twenty-first century and poses risks to water and sanitation. Concerns for water supplies include damage to infrastructure from flooding, loss of water sources due to decreasing precipitation and increasing demand, and changes in water quality from water sources and within distribution of water. Concerns about sewage disposal include damage and loss of services due to flooding and reduced carrying capacity of water bodies that receive sewage. Key actions to reduce climate risks include integrating climate resilience measures into water security plans and improving water resource accounting and management. Policy prescriptions on technologies for service delivery and changes in management models offer potential to reduce risks, particularly in low-income settings. Water and sanitation services has major contribution to greenhouse gas emissions. Choosing wastewater treatment technologies, improving pump efficiency, using renewable energy sources, and in-system power generation offer potential for reducing emissions. Overall, more attention and research is needed to understand, plan for, and adapt to climate change in water and sanitation. As with many other climate change adaptations, the likely benefits from no-regrets solutions are likely to outweigh the costs of investment.

**Keywords:** Drinking water, WASH, sanitation, climate change, sustainability, climate resilience.



## Introduction

Climate change is the greatest challenge of the twenty-first century, with the potential to cause significant human and economic damage. The 21st Conference of the Parties to the United Nations Framework Convention on Climate Change, held in Paris in December 2015, saw a commitment by states to keep the increase in temperature to no more than 2°C compared to preindustrial levels and to attempt to limit the increase to 1.5°C. Even if successful, significant changes are likely to occur, posing an increasing threat to communities and infrastructure.

The increase in temperature, even if restricted to 1.5°C, is expected to result in significant changes in precipitation patterns. These changes in precipitation will affect local hydrology and consequently groundwater. More frequent extreme weather events can be expected, which, combined with land use changes, will lead to more frequent flooding events and, as settlements grow, will expose people to these events more. More uncertainty exists when considering impacts on water resource availability. Global projections often indicate greater scarcity due to changes in precipitation, rising temperatures, increasing demand, and reduced quality of resources due to pollution. These assessments, however, do not account for the available groundwater storage and the growing evidence that groundwater recharge may increase in future climate scenarios. Population growth, economic growth, and urbanization will increase pressure on water resources. Niang et al. conclude that these other factors will be more significant than climate change, at least for Africa.

As the magnitude and complexity of threats to water resources from climate change become better understood and documented, there is increasing emphasis on adaptive management. However, relatively little attention has been placed on how these threats will impact drinking water and sanitation services and their management, despite their importance to human health.

World leaders agreed on a new framework for development in 2015—the Sustainable Development Goals which include a goal on water with ambitious targets for universal access to drinking water and sanitation by 2030. Achieving sustainable universal access under the influence of climate change will be a critical challenge for the SDGs period. The SDGs also call for a focus on higher levels of service associated with much higher quantities of water, which will create further challenges. In addition to the targets on drinking water and sanitation services, SDG 6 also includes targets to improve water quality, improve water-use efficiency, implement integrated water resources management, and restore water ecosystems. All of these areas are impacted by climate change and in turn have an important impact on the resilience of drinking water and sanitation.

## **The Precedence of Water and Sanitation**

The provision of water and sanitation services and the associated sustained behavior change are critical to improved public health. Ensuring that these services are functioning and protecting public health is a priority for national policies worldwide. The health consequences of inadequate water and sanitation services are clearly documented. There are a variety of diseases attributable to poor water and sanitation, with diarrhea being the most important and best studied. According to recent estimates, nearly 1,000 children under the age of five die every day from diarrheal diseases caused by poor water and sanitation. This is a significant reduction in previous estimates, a trend primarily explained by a global decline in global diarrheal deaths between 2000 and 2012.

Systematic reviews have examined how water and sanitation services and hygiene behaviors affect health. The consistent finding with respect to endemic diarrheal disease is that reasonably designed improvements in water supply, water quality, sanitation, or hygiene are likely to reduce diarrheal disease by up to one-third. Recent research shows that for water supply, providing a safe and continuous supply of piped water results in the greatest reduction in diarrheal disease. Freeman et al. note that handwashing can deliver very significant reductions in diarrhea but that less than 20% of the global population routinely wash their hands at critical times such as before eating and after defecating. Under outbreak conditions, there is a well-documented association between water and diarrheal disease.

It has been suggested that improvements in the availability and quantity of drinking water are more important than improving the quality of water sources ; however, there is very little high-quality literature on which to base reviews. This finding may support the idea that better water availability supports better personal hygiene, which would be consistent with the significantly greater reduction in diarrheal disease associated with water piped into the home. This may also be because there are few longitudinal studies of water quality and few studies that consider the critical role of supply reliability in reducing exposure to contaminated drinking water. Hunter et al. note the importance of supply reliability in determining disease risk and emphasize that disruption of supply, even of short duration, can significantly increase health risk. Water quality studies may therefore overestimate the extent to which quality has improved, and the apparent reduced impact on diarrheal disease is a consequence of the fact that contamination still occurs.

## Present Levels of Access to Water and Sanitation

Monitoring of drinking water and sanitation supplies is carried out at the global level by the Joint Monitoring Programme (JMP) for Water Supply and Sanitation of the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF). The JMP has identified a number of technologies that studies have shown provide better water quality for water supply and better excreta separation for sanitation, resulting in relatively safer water and sanitation. However, this is questionable for some technologies, for example, the large number of sewer connections with no or inadequate treatment of waste. Estimates of coverage to safe water and sanitation are based on the use of these technologies.

It is estimated that in 2015, at the end of the Millennium Development Goal (MDG) period, 91% of the global population used an improved water supply, with 2.6 billion people gaining access to improved water between 1990 and 2015. The MDG target of halving the proportion of the population using an unimproved water source or supply was met in 2010. This still leaves 663 million people without access to improved water supplies, with most of these people living in rural areas. The proportion of the global population with a water supply piped onto their premises, the level of service at which significant health gains accrue, stood at only 58%. Urban populations were far more likely to have access to piped water on their premises than those in rural areas), although the gap decreased over the MDG period.

A systematic review of water quality studies found that 1.8 billion people consume water contaminated with faecal matter. Given the number of people relying on unimproved sources would account for only one-third of these people, this study suggests that more than 1 billion people are using "improved" water sources that are contaminated. In reality, this is likely an underestimate because there are few longitudinal studies and the importance of seasonality in influencing water quality is poorly represented. In addition, there are relatively few studies in low-income neighbourhoods and slums, where contamination would be expected to be more common. The Millennium Development Goal target for sanitation was missed by a wide margin, although 2.1 billion people gained access to sanitation between 1990 and 2015.

The Millennium Development Goals target was missed by a wide margin, although 2.1 billion people gained access to sanitation between 1990 and 2015. Only 68% of the world's population has access to improved sanitation, with access remaining very low in sub-Saharan Africa, South Asia and Oceania. Lack of access to improved sanitation is primarily a rural phenomenon, with only slightly more than half of all rural dwellers having access to improved sanitation. Open defecation remains a major public health problem, and its

elimination is explicitly identified as a goal in the SDGs. The majority of the remaining 1 billion people who practice open defecation are in South Asia and sub-Saharan Africa, two-thirds of them in India alone.

A small proportion of the population with improved sanitation can be assured that their waste is effectively treated before it is released back into the environment. Baum et al. found that 35% of people who have access to sanitation facilities defined as improved by the JMP are actually connected to sewage systems without treatment. Many of the people who use on-site sanitation facilities in urban areas also do not have access to fecal sludge management (FSM) systems that provide treatment of waste before final disposal.

## **Sustainability of Services**

The sustainability of many water and sanitation services is questionable, and estimates of sustainability should be treated with some caution because definitions vary and few longitudinal studies are available. A variety of reports have addressed the continued viability of water supplies in different environments. The most commonly cited study states that at any given time, about 40% of hand pumps installed in Africa are no longer functional. A more recent survey indicated that 25–40% of water points in Africa and 10–23% of those in South Asia were nonfunctional. In both regions, measures of overall service quality showed that effective service were even lower.

Sustainability is not simply an assessment of operational functionality at a given point in time, but must be viewed as a broader set of institutional, financial, and environmental issues. Even in the context of water supply functionality, the cause of the problem can often be unclear. There are a number of reasons for operational failures; here is a categorization of the types of failures. The various categories of failure are interrelated, and many of the underlying conditions and long-term trends directly influence the secondary and primary causes of failure. Nevertheless, the typology is useful to understand the nature and causes of failure in a rounded way.

## **Climate Change and Wash-Analogous Disease**

The links between climate change events and disease are increasingly well documented. Increases in global temperature have been linked to increases in diarrheal disease. positive associations between diarrhea of all causes and diarrhea caused by bacterial infections and an increase in ambient temperature. There was no association between viral infections and an increase in ambient temperature. There were significant regional differences, with bacterial infections most strongly associated with an increase in temperature in tropical zones. this

needs further investigation, as many of these areas have little access to water and sanitation and already have high rates of infection. WHO estimates that climate change will cause an additional 48,000 diarrheal deaths in 2030. A systematic review and meta-analysis by Philipsborn. found that an increase of 1°C in mean monthly temperature was associated with an 8% increase in incidence of diarrheagenic .

In a review of extreme water-related weather events, concluded that outbreaks were commonly associated with contamination of drinking water supplies. In a systematic review of the relationship between flooding and health, found that infectious disease outbreaks are much more likely in areas with poor water and sanitation services. They noted that epidemics of infectious diseases tend to occur only when there is a massive population shift due to flooding, and that there is good evidence of an increase in waterborne diseases after floods. Leptospirosis was identified as causing epidemics during floods and as a key post flood pathogen with cholera, hepatitis A and E, and pathogenic outbreaks post floods. poor water quality and sanitation were responsible for the statistically significant impact of flooding on diarrheal disease in only 2 of 16 provinces in Cambodia. found that rainfall was associated with the incidence of diarrheal disease in Ecuador and that water treatment reduced incidence, whereas sanitation and hygiene had no effect. Wade et al. found that there was a significant association between patients who came to Massachusetts emergency departments with gastrointestinal illness and flooding. This association was significant for the 0-4 day post-flood period and most significant in the 6-18 and 64+ age groups. analysis of four flood-related outbreaks in Bangladesh, found that *Vibrio cholerae* was the predominant pathogen and, although there was some variability, they concluded that other pathogens also contributed, notably rotavirus and enterotoxigenic. climate change is likely to lead to an increase in cholera outbreaks in the Bengal delta because increased brackish water flooding of the land would allow vibrios to survive longer in a viable but uncultivable state, and increased freshwater flooding would flush them into the water supply.. Other studies point to a link between disease outbreaks and droughts, e.g., cholera outbreaks in inland Africa. Some authors have also suggested that climate change may also have an impact on noncommunicable diseases.hypertension was more common among pregnant women who drank high-sodium Tubewell water in coastal Bangladesh. the potential risks of increased salinity in drinking water as a result of sea level rise and the transport of saltwater upstream due to storm surges during hurricanes. However, other factors, such as overpumping, may be more important for increased salinity.

## Climate Impacts on Water and Sanitation Services

The maturity of the literature regarding the impact of climate change on water deals with water coffer, but the literature is growing on the specific pitfalls to drinking water and sanitation services. Howard & Bartram give a global assessment of the adaptability of water and sanitation technologies and operation systems. They handed assessments of the robustness of technologies under a number of climate scripts.

There are adding figures of studies on specific pitfalls, for case the pitfalls posed by climate change to secure water force in glacierized basins in the Andes. A study in Nepal stressed the part that groundwater storehouse plays in adding the adaptability of small, community-managed water inventories to climate change. In elevated catchments, snowmelt and downfall give high streamflow during the thunderstorm, but groundwater storehouse sustains flows to springs throughout the time, offering a dependable, however much reduced, force.

The pitfalls from climate change relate to changes in temperature and in rush, leading to changes in hydrology and water demand, as well as to storm events that damage water and power inventories. The nature of the pitfalls relates to adding unpredictability in face water overflows and a consequent change in demand for groundwater, as well as cataracts and declining water vacuity. These changes may be endured in the same position at different times. Changes may be endured through short- term, changeable events and slow- onset events.

Short- term pitfalls include flash flooding and storm surges, where it may be possible to prognosticate the areas that are vulnerable and to some extent when specific events may do. Once underway, still, these events offer veritably limited time for action to be taken. For these types of events, reducing pitfalls requires previous planning and investment in both structural and nonstructural measures, harmonious with the accepted principles of disaster threat reduction. Slow- onset pitfalls include ocean- position rise, failure and water failure, changes in water quality, as well as some types of flooding. Although the impact on services of these events can be analogous to those of short- term events, planning responses may be different and operate over different timescales. preventative action should be possible, and for individual events there may be time to knitter responses to the specific nature of the event. The trouble from flooding is most acute when flash cataracts do, primarily because of their destructive force and limited warning, but slow- onset flooding can also be monstrosly grueling , as was set up in the United Kingdom when the Mythe pumping station was submersed and water force for,000 people was intruded.

Loss of water sources may do because of reduced downfall, because of overabstraction, or because inputs or budgets are destroyed in flood tide events. Distribution structure may be damaged by cataracts. famines may increase attention of chemicals and pathogens. impurity

may also do because water treatment systems, source protection measures, or distribution structure fail, or because of dislocation to transport and power systems that may beget water inventories to stop performing or help delivery of treatment chemicals.

Climate-related pitfalls interact with other aspects of the terrain and the current situations of service provision, as the volume of water used by homes varies depending on the position of service. Where climate change results in declining water vacuity, serviceability serving populations with water piped into homes may find securing sufficient water challenging. homes with access to water sources outside the home generally use multiple sources of water to meet requirements time- round( 59 – 61), posing major problems in maintaining acceptable quality and volume in a wide range of sources.

In some cases, the simple technologies used for lower situations of service are more vulnerable than the complex systems used to deliver advanced situations of service. This is primarily because the ultimate generally have better and further sophisticated operation systems, lesser access to finance and specialized coffers, and frequently better quality construction at the onset.

## **Impacts on Sanitation**

The impacts of climate change on sanitation structure are a blend of positive and negative, depending on the nature of the changes probably to do with climate change and changes in the types of technologies demanded by homes. The literature on climate impacts on sanitation is extremely meager, indeed though the impacts will be at least as significant as those for water force and in some circumstances may have lesser impact.

In countries likely to come drier, the impact on simple onsite sanitation structure may be positive, as groundwater pollution pitfalls may reduce as the distance between the base of recesses and groundwater( and hence travel time for pathogens) increases. Drying surroundings may also mean that seasonal groundwater flooding of recesses will be less frequent. Indeed so, similar technologies may be vulnerable to damage and destruction from short- term flood tide events. By discrepancy, both declining water vacuity and increased flooding will pose major pitfalls to sewerage and septic systems reliant on water. Securing sufficient water to insure conventional seamsters serve as designed may be problematic and, indeed for modified sewerage, securing sufficient volumes of water for flushing and operation may be grueling. Declining water overflows may negatively impact water quality in gutters entering wastewater, although at present the low rates of treatment in sewerage systems indicate that other factors may be more important than climate change for the foreseeable future.



Where periodic downfall increases or there's a shift to advanced intensity events, the impacts on sanitation may be more profound. For onsite sanitation, the pitfalls are primarily related to flooding and may have veritably serious public health counteraccusations. All onsite systems are vulnerable to flooding, and under more severe conditions this may affect in wide spillage of fecal matter in the terrain and to impurity of drinking water inventories. In a review of sanitation technologies, only dry urine- diverting latrines could be considered flexible, substantially because the absence of water made construction of penetrable tanks completely aboveground doable. Howard et al. considered hole latrines more flexible because of the acclimations that are doable. Septic systems were considered vulnerable not only because of flooding and discharge of the tank contents into the terrain, but also because of the threat of flotation due to increased groundwater situations.

Fecal sludge operation(FSM) chains may be vulnerable to climate impacts. In civic areas in particular, FSM as a system is gaining traction as the demand for low- cost toilets drives the demand for simple hole latrines, but space constraints avert approaches used in pastoral areas( replacing latrines once a hole is full). generally, FSM chains involve collection and transportation of waste in vehicles, with disposal in a treatment installation. easily, pitfalls of flooding will impact the capability of evacuating vehicles to pierce communities if roads come impenetrable.

Seamster systems are largely vulnerable to lesser downfall, particularly where combined seamsters are used. Indeed when seamsters aren't combined, the threat of damage to seamsters during flood tide events is high and advanced for modified seamsters that are generally laid at shallower depths. Wastewater treatment works may also be negatively affected because they're frequently low- lying and coming to gutters that are likely to submerge.

## **Water and Sanitation as Greenhouse Gas Emitters**

Water and sanitation services are contributors to hothouse gas emigrations because of the need for energy to power piped water systems and managed water and wastewater treatment shops. For case, Twomey & Webber set up that 5 of the United States' primary energy product and 6 of its electricity is used in public water force.

Sanitation systems directly produce hothouse feasts from the breakdown of excreta. Howard et al. note that using technologies with lower energy conditions should be considered a precedence in reducing the carbon footmark. It'll also be critical that advancements in operation, particularly in reducing unaccounted- for water, are realized as this reduces the quantum of water needed and accordingly reduced energy demands.



Mortal excreta, as with other organic material, is a implicit source of hothouse gas emigrations, although waste (solid and wastewater combined) accounts for lower than 5 of global emigrations. hothouse gas emigrations from assiduity and waste / wastewater doubled between 1970 and 2010 and that waste/ wastewater emigrations amounted to 1.4 Gt CO<sub>2</sub> eq in 2010.

Where wastewater treatment is used, Cakir & Stenstrom conclude that aerobic processes released lower hothouse gas for low- strength influent wastewater (grounded on biochemical oxygen demand), but that at advanced strengths anaerobic systems handed lower emigrations. The Intergovernmental Panel on Climate Change noted that the hothouse gas emigrations from septic tanks, latrines, and open- air defecation remain largely unquantified and a global methodical assessment is demanded.

Emigrations from wastewater are anticipated to rise by nearly 50 up to 2020 under a business- as-usual approach, with the primary contributors being in developing countries. It isn't clear how much would be related solely to mortal waste and how important to artificial waste also treated in external wastewater treatment shops. Good wastewater operation does reduce hothouse gas emigrations and thus it's reasonable to anticipate that, with adding sanitation content, these situations of emigrations may drop. unborn opinions on technology should give some consideration to measuring or estimating hothouse gas emigrations, and farther exploration is demanded to quantify the absolute and relative hothouse gas emigrations from the available sanitation options.

A number of studies have looked at specific serviceability and locales to determine likely hothouse gas emigrations from water and sanitation services. sewage treatment was the main source of emigrations from a mileage in Bahia state in Brazil. in South Africa, use of onsite sanitation systems where possible was likely to produce lower hothouse gas than sewerage and wastewater treatment, substantially because of lower energy conditions. This study also set up that sanitation options that reclaimed water to meet adding demand had the smallest carbon footmark when using a lifecycle assessment approach compared to the base condition or construction of new structure. lifecycle assessment approach and showed how carbon footmark could be integrated with cost to assess druthers for expansion for drinking water systems in Florida. a summary of indispensable styles of wastewater treatment that would produce smaller emigrations and where energy could be generated directly from waste.

The water and sanitation sector has significant implicit to induce important of its energy conditions from within its systems and potentially to be a net contributor to energy, therefore making systems energy positive. This in part is related to the use of biogas creators linked to treatment of sewage from septic systems but also includes the implicit to use microhydro

systems within pipes to induce electricity. Given the eventuality for choices that will reduce emigrations and the egregious climate- development cobenefits, there's a strong case for further climate finance to inflow to the water and sanitation sectors.

## Conclusions

The substantiation is adding of the implicit pitfalls to water and sanitation services posed by climate change. There are multiple pitfalls deduced from both changes in rush and increases in temperature, which relate to damage to structure leading to the loss of services and environmental impurity and to deterioration in water quality, impacts that will increase pitfalls to health. It's clear that these pitfalls are wide, affecting both poor and rich countries, and countries in temperate and tropical surroundings. There's good substantiation that impacts on water and sanitation services from climate change will lead to direct impacts on health. This is primarily deduced from contagious complaint, particularly diarrhea, but there's some substantiation that noninfectious complaint pitfalls will also increase.

Different technologies and operation approaches have veritably different adaptability to climate change. Strategies to manage the impacts of climate change are beginning to crop ; still, there remains important to be done, particularly in low- income countries and for small inventories in all countries. erecting climate adaptability into being threat operation approaches similar as water safety plans appears to offer one of the most cost-effective approaches to managing climate pitfalls, and analogous approaches have implicit in sanitation. still, in some cases investments in new structure or catchment operation will be needed. Water and sanitation services also represent important sources of hothouse feasts, although their overall benefactions remain inadequately quantified and this is an important exploration need. None the less, choices can be made to minimize emigrations through selection of technologies and through sound operation. Given that development benefits are likely to arise from conduct to make climate adaptability, further water and sanitation, programs should consider penetrating climate finance in the future.

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**ISBN: 978-81-960940-3-4**

# **Impact of Government Policies on Swachhta: A Policy Analysis of Swachh Bharat Mission (SBM)**

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## **Abstract**

Sanitation, or Swachhta, has always been a core concern of any government, which is why it is not a new concept even in India. The Government of India has always been very keen to achieve universal sanitation coverage as well as better sanitation practices. This paper gives an insight into the recent government policies on Swachhta as well as the impact of these policies from a larger perspective. It will further analyse the Swachh Bharat Mission (SBM) initiative on a broader level. Swachhta is now becoming a core concern of the current government, which is reflected in the various schemes and public policies of the Government of India. Furthermore, this paper will critically analyse the Swachh Bharat Mission, under the Department of Drinking Water and Sanitation, Ministry of Jal Shakti, Government of India.

**Keywords:** Sanitation, Swachhta, SBM, public policy.

## Introduction

The Swachh Bharat Mission (SBM) or Clean India Mission was launched on October 2, 2014, by the Government of India on the occasion of the birth anniversary of the nation's father, Mahatma Gandhi, to commemorate his efforts on sanitation and his faith towards better sanitation practices. Gandhiji himself believed that sanitation was more important than independence.

Sanitation basically refers to the improvement of public health conditions with respect to clean drinking water and waste disposal practices. and safe sanitation means the promotion of safe disposal of human excreta, the right use of the toilet, avoiding open defecation, as well as the management of solid and liquid waste.

Poor sanitation is now becoming a primary cause of many dangerous diseases, a high mortality rate among children under age five, groundwater contamination, loss of family income due to death, an increasingly high cost of living, and even compromised human dignity.

The United Nations' Sustainable Development Goals (SDG-6) emphasize the achievement of universal and equitable access to safe and affordable drinking water and adequate and equitable sanitation and hygiene for all. Although India has been able to achieve the Millennium Development Goals (MDGs) in the water sector, it is currently lagging in the sanitation sector. Joint Monitoring Programme (JMP) 2015 data show that around 564 million Indians practice open defecation out of a total of 946 million people in the world. Aside from that, approximately 10% of India's 419 million urban population practices defecation. This is a huge matter of concern for the Indian government. There is a pressing need for the Indian government to address these issues of sanitation practices and waste management as the urbanization of the Indian continent is growing enormously (Bharat & Sarkar, 2016).

In the first five-year plan initiated by the Planning Commission of India, rural sanitation was introduced. According to 1981 census data, rural sanitation coverage is only 1%. In 1986, the Government of India introduced the Central Rural Sanitation Programme (CRSP) with the objective of improving the quality of life of the rural people and also providing privacy and dignity to women. In 1999, a demand-driven approach under the Total Sanitation Campaign (TSC) was launched. (MoDWS, 2017)

After the success of the Total Sanitation Campaign (TSC), the Government of India launched "Nirmal Bharat Abhiyaan" on April 1, 2012. with the objective of accelerating sanitation coverage in rural areas so as to thoroughly cover the areas through renewed

strategies and various approaches. The Nirmal Bharat Abhiyan (NBA) was launched with the goal of reaching out to the entire community in order to create Nirmal Gram Panchayats. Due to implementational difficulties in the convergence of Nirmal Bharat Abhiyan (NBA) with the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), as funding from different sources created delays, this scheme failed, which further paved the way for the newly constituted National Democratic Alliance (NDA) government under Prime Minister Shri Narendra Modi to launch a full-fledged sanitation scheme named Swachh Bharat Mission or Clean India Mission.

## Review of Literature

1. **In Sanitation and Sustainable Development: Insights from Past to Present (2018)**, authors Sh. Girish Kumar and Prof. Subhakanta Mohapatra try to link the concept of sanitation, or cleanliness and hygiene, from ancient Indian texts like the Patanjali Yoga Sutra, the Rigveda, the Atharvaveda, etc. to the current sanitation practises as focused and practised by the Sustainable Development Goals (SDGs) and its targets (Kumar & Mohapatra, 2018).
2. **In Using immersive research to understand rural sanitation: lessons from the Swachh Bharat Mission in India (2018)**, authors attempt to gain an in-depth understanding of ground realities and community perspectives of the Swachh Bharat Mission-Gramin through an immersive research approach designed by Praxis, IDS, and WaterAid in which researchers lived in villages in recently declared open defecation-free districts of India (Abraham, et al., 2018)
3. **In Swachh Bharat Mission (Gramin) Bottlenecks and Remedies (2017)**, author R V Rama Mohan identifies bottlenecks that have hampered the progress of the Swachh Bharat Mission (SBM) and then proposes remedial measures to address the issue at large (Mohan, 2017).
4. **In Swachh Bharat Mission: Need, Objective, and Impact (2017)**, author Alka Chaudhary attempted to find out the need, objective, and impact of Swachh Bharat Mission (SBM) on the overall economic development of India (Chaudhary, 2017).
5. **In Swachh Bharat Mission (Urban) Towards Cleaning India: A Policy Perspective**, authors Girija K. Bharat and S. K. Sarkar discuss a wide range of measures that should be included in order to make Swachh Bharat Mission (Urban) (SBM-U) a success. (Bharat & Sarkar, 2016).

## Objectives of the Study

1. To study the objectives of the Swachh Bharat Mission (SBM).
2. To assess the impact of the Swachh Bharat Mission and recommend some corrective measures.

## Research Methodology

The methodology is based on secondary sources of data as well as information. This paper is based on a review of the literature as well as an examination of the ongoing government Swachh Bharat Mission (SBM). We summarised the review of the literature and other secondary sources of data from government websites and other online websites related to the Swachh Bharat Mission (SBM). This study attempts to analyze the impact of the Swachh Bharat Mission (SBM) on the general population at large, and finally, it will try to suggest some remedial measures to overcome the challenges and loopholes of this scheme to make it more beneficial and inclusive for the common people.

## Swachh Baharat Mission

To accelerate the efforts to achieve universal sanitation coverage and to put focus on safe sanitation, the prime minister of India launched the Swachh Bharat Mission (SBM) on October 2, 2014. And the nodal ministry will be the Ministry of Drinking Water and Sanitation (MDWS). It has two sub-missions: the Swachh Bharat Mission—Gramin (SBM-G) and the Swachh Bharat Mission—Urban (SBM-U). The aim of the mission is to declare all villages, Gram Panchayats, Districts, States, and Union Territories of India “open defecation free” (ODF) by October 2, 2019, as a tribute to the 150<sup>th</sup> birth anniversary of Mahatma Gandhi, by constructing over 100 million toilets in rural India.

Under this, the focus should be on improving the level of cleanliness in rural areas through solid and liquid waste management activities and making gram panchayats open defecation-free (ODF), clean, and sanitized. ODF refers to the cessation of faecal-oral transmission, which means that (1) no visible faeces should be found in the environment or village, and (2) every household, public, community, or institutional setting should use a safe technology option for faeces disposal. The mission is now moving towards Phase II, i.e., ODF-Plus. Under this, it will reinforce ODF behaviors and focus on providing positive interventions for the safe management of solid and liquid waste in villages.

## **Objectives of the Swachh Bharat Mission**

These are the main objectives of the Swachh Bharat Mission.

1. To achieve Open Defecation Free (ODF) status in all villages, gram panchayats, districts, states, and union territories of India by October 2, 2019
2. 100 percent collection and scientific processing, disposal, reuse, and recycling of solid as well as liquid waste
3. Conversion of unsanitary toilets to flush toilets
4. To improve the general quality of life of citizens by promoting cleanliness, hygiene, and safe sanitation practices
5. To influence people's attitudes toward safe and healthy sanitation practices
6. Motivates communities and local governments to adopt sustainable sanitation practices and facilities through awareness creation and health-related educational programs
7. To construct separate toilets for girls and boys in all schools
8. To install toilets in all Anganwadi Kendras
9. To strengthen the local bodies' ability to design, execute, and operate systems
10. To encourage cost-effective and appropriate technologies for ecologically safe and sustainable sanitation

## **Impact of the Swachh Bharat Mission**

The Swachh Bharat Mission (SBM) is India's largest sanitation campaign to date. With this much enormity and the target of a huge population, we will now see the impact of this cleanliness drive from a larger perspective.

According to the various ministerial data sources and ministerial websites, Swachh Bharat Mission (SBM) has been able to provide the construction of more than 100 million individual household-level toilets in rural areas and 6 million household toilets in urban areas. Additionally, around 6 million community or public toilets have been built in urban areas. And lately, 4,234 cities and more than 600,000 villages across the country have also declared themselves open defecation-free (ODF).



If we talk about urban areas, more than 81.5 thousand wards now practice 100 percent door-to-door collection of solid waste, and nearly 65 thousand wards practice 100 percent segregation of waste only at the source. Apart from that, around 150 thousand metric tonnes of solid waste are generated in urban centres, of which 65 percent are processed through various technologically advanced equipment.

In 2017, the Quality Council of India conducted an independent survey, and the findings of that survey reported that the overall national rural “household access to the toilet” coverage has increased to 62.5 percent and usage of toilets has increased to 91.3 percent. In this list, the state of Haryana topped all Indian states, with 99 percent of households in rural areas covered and toilet usage at 100 percent.

UNICEF’s study also finds that the number of people without a toilet has decreased from 550 million to 50 million and so on.

According to the World Bank report, 96 percent of Indians are using their own toilets.

The World Health Organization (WHO) reported that approximately 180,000 deaths due to diarrhoea have been averted since the launch of the Swachh Bharat Mission (SBM) in rural India.

The National Statistical Office (NSO) published a report in 2019 according to which 71 percent of rural Indian households had access to toilets as of 2018. In 2012, it was only 40 percent.

Other than that, a study conducted by Ashoka University concluded that the construction of toilets under the Swachh Bharat Mission (SBM) led to a reduction in the incidence of sexual assault against women both in rural as well as urban India.

The National Family Health Survey (NFHS) also finds that there is an increase in access to improved sanitation due to the Swachh Bharat Mission (SBM). Post-launch of the Swachh Bharat Mission (SBM), around 3.4 percent of households gained access to better sanitation as compared to earlier, when it was just around 1.5 percent.

## **Bottlenecks or Challenges to the Swachh Baharat Mission**

As of now, the Swachh Bharat Mission (SBM) has been a quite big achievement for the Government of India, but there are still some underlying issues that need to be discussed here. The following are some of the major issues that have hampered the success of the Swachh Bharat Mission (SBM):

1. Because India is a huge country, both geographically and in terms of population, implementing effective behavioral change among its people who have been using open defecation for decades is a herculean task that cannot be accomplished with a limited amount of manpower at the district, block, and village levels.
2. Acceptance and use of individual household latrines (IHHLs) are also hampered by the lack of a continuous water supply right outside the door. Otherwise, people were not ready to use the newly built IHHLs.
3. The total Swachh Bharat Mission (SBM) payments for individual household latrines (IHHLs) are released in two instalments. After the designated officers approve the sanctions for IHHL for an individual household, that family needs to invest Rs. 6,000 on its own to build a substructure for receiving the first instalment of Rs. 6,000. After the completion of IHHLs and the department's physical measurement, the second and final instalment will be given to that household. Thus, poor families, especially those belonging to the Scheduled Castes (SCs) and Scheduled Tribes (STs), do not have much to invest on their own to get the first instalment. And this is basically slowing down the progress of the mission in these areas.
4. There are also a large number of defunct IHHLs, which are either due to the non-receiving of the first instalment due to non-compliance with the approved substructure or due to a lack of physical measurement.
5. Yet the payment is done by direct beneficiary transfer (DBT) into the accounts of beneficiaries, but still there are huge discrepancies and corrupt practices in marking the beneficiaries and the involvement of middlemen on the pretext of providing the benefit of the scheme.

### **Remedial Measures or Suggestions Swachh Baharat Mission**

After discussing some of the major challenges to the Swachh Bharat Mission (SBM), now we will discuss some of the remedial measures that will try to overcome the above-mentioned bottlenecks or challenges.

1. There is an urgent need to increase the manpower required for behavioural change and raising awareness about safe sanitation practices, health risks associated with open defecation, the benefits of using household latrines, and the safe disposal of solid and liquid waste and for this purpose, only government officials are not enough; we need to increase the broad base of manpower by including the Civil Society Organizations (CSOs), Self-Help Groups (SHGs), and Non-Governmental Organizations (NGOs), etc.

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2. Adequate water supply at your doorstep: it is also very necessary to provide continuous water supply to each and every household so that people can use these IHHLs in an efficient manner. This, as well as other water-related schemes such as the "Jal Jeevan Mission," should work in tandem with the Swachh Bharat Mission (SBM).
3. Microfinance and better use of cooperatives for financing IHHLs – as poor households, mostly from the backward classes, schedule castes and schedule tribes were unable to finance under this scheme – could be very useful in resolving this issue.
4. Reviving the defunct IHHLs: A survey or audit is needed to mark the functioning and non-functioning IHHLs separately in order to address the issues of the defunct IHHLs. The government could introduce some incentive schemes for the revival and repair of these defunct IHHLs. And even further use of media houses or ad agencies could be beneficial for creating awareness about safe sanitation practices.
5. To avoid discrepancies and corrupt practises in determining the beneficiaries, the government needs to generate a continuous audit system and involve the different stakeholders, like civil society organisations (CSOs), self-help groups (SHGs), and non-governmental organisations (NGOs), etc., so that they can keep a watch on the ongoing process of identifying the beneficiaries. It will also limit the involvement of middlemen on a large scale.

## **Conclusion**

The current study is based on the descriptive analysis of various government and non-government data sources and a thorough review of the literature. It discusses various objectives of the Swachh Bharat Mission (SBM), analyses its impact, and finally suggests some remedial measures to overcome the existing bottlenecks. The study finds that, in the wake of growing sensitization about sanitation practices and waste management, the Swachh Bharat Mission (SBM) is definitely a big milestone in achieving 100 percent open defecation-free (ODF) status. The current ongoing global demand for waste management and the United Nations' Sustainable Development Goal (SDG) Target 06 (ensure availability and sustainable management of water and sanitation for all) somehow make achieving this target by 2030 compulsory. In order to achieve these targets in the stipulated time, missions and schemes like the Swachh Bharat Mission (SBM) will definitely help India reclaim its status on a global scale. Although the Swachh Bharat Mission (SBM) has some bottlenecks or challenges that should be addressed in an efficient manner to make it a success, to address these issues, civil society organizations (CSOs), self-help groups (SHGs), non-governmental

organizations (NGOs), and others should be held accountable for the mission’s success. These stakeholders should be provided with the technical or non-technical assistance required to meet the challenges so that we can be confident that India will meet these targets by the end of 2030, and that the Swachh Bharat Mission (SBM) will become the sole means of achieving this goal.

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**ISBN: 978-81-960940-3-4**

# **“A Study of Implementation of Best Innovative Housekeeping Practices at 5-Star Hotel, Pune”**

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## **Abstract**

This paper focus on implementation of environment sustainability programmed through best innovative practices in housekeeping department for this 5-star hotel of Pune consider the housekeeping department can contribute in a big way to making a hotel environment sustainability. In order to keep in track with the negative environmental consequences, hoteliers should implement and follow sustainable environmental practices in their daily operation routine. This Study tries to explore the best innovative environmentally sustainable housekeeping practices and its implementation at another category-star hotel. The study has covered 6 five-star hotel. There were 104 respondents the data collected through the semi structured question. The respondents for the study were staff and operational manager as they are responsible for the operation and indirect way contributing towards environment sustainability. This study concludes with the fact that housekeeping ecofriendly practices are followed and implemented by hotel but need to follow in an effective way which plays an important role in reducing the environmental issues and can be implemented by another star category hotel.

**Keywords:** Environment sustainability, innovative housekeeping practices, implementation.

## Introduction

Hospitality industry in the light of sustainability development can play an important role towards sustainability. So, it is an utmost and foremost responsibility of the hoteliers to implement sustainable practices in their daily operation. The word environment sustainability refers to conserving natural resources, reducing waste, minimizing pollution and maximizing sustainability. The environment is our basic life support system with the essential elements- air, water, food and land which are essential for life to flourish so it is very important to sustain it. The housekeeping is a department of the hotel industry especially responsible for cleanliness, maintenance, public areas, rooms and surroundings. Housekeeping may be defined as provision of a clean, comfortable safe and aesthetically appealing environment. The effort that a housekeeping department makes in giving a guest a desirable room has a direct bearing on the guests experience in a hotel. Housekeeping demands the employment of the most effective way. The housekeeping department has often not been given its due importance in hotels the volume of work undertaken by this department can be gauged by the fact in commercial hotel but other than hotel such as hospitals, hostels, residential homes, art galleries and museum. The aim of all accommodation establishments is to provide clean attractive and welcoming surrounding the keeping of the place clean and in a good order a necessity for a hotel to command and get repeat business. The housekeeping department can contribute in a big way to making a hotel for ecofriendly practices for environment sustainability. There is a undeniable relationship between the natural environment and housekeeping practices however some of the our practices and resulting collective consumption of natural resources have affected our delicate relationship with the natural environment. As a consequence, climate change has become a common discussion point within public discourse and although it may not be apparent how climate change can affect the various effects of our lives. It should be encouraged us to consider the environment impact. The some of our collective effort contributes to the detrimental impact on the natural environment. The housekeeping practices require the way it will contribute to the environment be modified continued desire and participate in implementation. For instance, a hotel housekeeping best practices can choose to implement certain program to divert recyclable and compostable waste from landfills which is common first step initiative and a net worthy effort.

### A. Problem Statement

The main reason of the study A waste audit conducted in the six properties indicated that waste generation in guestrooms varied from  $\frac{1}{2}$  to  $28 \frac{1}{2}$  pound of waste per day. Others departments in the hotels also generated 7 to  $8 \frac{1}{2}$  tons of waste per day. The amount of

waste was influenced by the number of occupants per guest room to investigate best innovative housekeeping practices to reduce and followed for environment sustainability and implementing by the different star category organization.

## **B. Significance of the Study**

The purpose of this study is to find out best innovative housekeeping practices followed by the hotel to protect the environment for sustainability and its implementation by another star category hotel. Slow global warming by recycling of Guest Supplies of Hotel can have something to do with the Earth's overall health and keep the air water and land clean. The essential because the issues of waste are created at upwards of 1 kg per night a large amount when multiplied by the numbers of hotels and guests around the world it will be increase enormous. Many Hoteliers are responding but effectively they are not applying to the waste challenge. By this study researcher showing comparison of the Hotel for eco-friendly or new innovative practices recycling of Guest supplies which is most of the Hotel not following recycling standard method.

## **Literature Review**

According to (*Adesina Ibraheem Kukoyi, Ngozi Ezenagu, 2013*) shows in their paper most investors only carry out feasibility study on the profit forfeiting the sustainability of the business which depends on the environment. This research made extensive use of interview and questionnaire as instruments of data collection. In conclusion, the paper recommends sustainable measures to mitigate the activities of hospitality business on the environment. [1]

(*Baratta Rossella, Sánchez Vargas Alfonso, Ugolini Marta 2018*) stated in their research paper to explore the validity in a real context of two theoretical frameworks, the first dealing with modalities and the second addressing motivations and barriers, for the implementation of sustainable behaviors in lodging facilities. The possibilities to reduce operational costs and to meet the expectations of more sensitive customers are among the main motivations of sustainability, while upfront investments and lack of support from public administrations are mentioned as main barriers.[2]

(*Chand Mohinder, Garge Sumit 2017*) has mention in their research paper exploring the ecofriendly practices prevailing in the Indian hotel industry. A structured questionnaire was development to collect the information from hotels The results indicate that there are certain eco-friendly practices which prevail in Indian hotel industry and out of those practices there is a specific set of practices which emerged as most important for the future growth of the organization. [3]



(*Das Parikshit, Ranjan Mallika, Mukherjee Sugata, Sarkar kalyan , 2020*) conclude in their study which was conducted among cities of Delhi NCR. Fertilization will live only language to the behaviors and attitudes of consumers. Buyers of construction services that take advantage of specific environmental practices terribly chosen for their property. It was found that buyers were unwilling to pay more for the adoption of inexperienced practices. The construction trade will be necessary to create investment from an inexperienced trainees must be thought of as environmentally friendly. [4]

(*Fabricia Silva da Rosa, Luana Caroline Silv, 2017*) explain in their research paper basically focus on mapping the theme of sustainability management in hotels, according to the delimitations set by researchers. To accomplish this purpose, we used the Knowledge Development Process - Constructivist (ProKnow-C). At the end of the survey, 13 articles were identified, published in international journals within the framework established by the researchers. Results of the analysis of the articles of the BP demonstrate that the most are current themes.[5].

(*Goni Ariani Feybi, Abdul Shukor Syaimak, Mukhtar Muriati, Sahran Shahnorbanun 2015*) The aim of this paper is to outline the research trend, define the literature categorization and research focuses of environmental sustainability engineering research from the perspective of historical evaluation based on the top five highest impact factor journals in the Journal Citation. The research in sustainability is growing rapidly and two research focuses appear at the highest count water research and pollution control and prevention. Moreover, the Journal of Environmental Science and Technology has emerged as the journal with the highest sustainability research published over the years. [6]

(*Heesup Han, 2017*) paper provides the values of the latest studies on the special issue of environmental sustainability and consumer behavior in tourism and hospitality. This study as an introductory paper along with other articles in this special section help enable a collaboration platform across tourism and hospitality fields in pursuit of universal goals for promoting pro-environmental consumption and environmental sustainability [7]

(*Joseph Corina, Nichol Obrin Esmie, Abdullah Binti Chan Sue Valerie, Jussem Melvin Patricia 2016*) The purpose of this paper The content analysis reveals that there is a low disclosure of sustainability information on the hotel's website. Their research contributes to the CSR literature in the hotel industry particularly in an emerging economy in terms of promoting the participation in the Environmental Award competition and disclosure on the website.[8]

(*Mathur Shweta, Khanna Kavita, Kumar Saxena Sanjeev 2017*) The research paper is an empirical work to ascertain the awareness and satisfaction levels of the hotel guests on the sustainability practices in Five Star hotels in Delhi. the study establishes a direct relationship of sustainability practices with customer's satisfaction in Five Star Hotels in Delhi, however, it reveals that the prevailing sustainability practices do not satisfy the guests to a considerable extent.[9]

(*Mbasera Miriam, Plessis Du Engelina, Saayman Melville, Kruger Martinette, 2016*) their research focus the environmentally-friendly practices in hotels in Zimbabwe and South Africa and establish the contribution that hotels are making towards mitigation of the negative environmental effects [10]

(*Nazar Hussain Ashaq, Akhthar Shahanaz, 2020*) Research explore existing environmental practices and its implementation it conclude that implementation of eco-friendly practices leads to environmental sustainability. [11]

(*Tiwari Sonali, Dambhare Ankit, Tripathi Ranjeeta, 2020*) shows in their research that exploring the eco-friendly practices exercised in star category hotels of Lucknow and as well as the challenges faced by the hotels in the implementation of green practices in their operations. The findings also revealed that initial investment cost for green set-up is very high which is one of the prime challenge faced by the hotels in the implementation of green practices.[12]

(*Upadhyay Arvind, Vadam Celine, Mohan Sushil, 2005*) research paper explores the various issues linked with sustainability and energy consumption in hotel industry. The industry is waking-up and stakeholders are starting to get involved. Among hotel chains' tools to control environment management within their hotels, operating contracts is a strong one. Indeed, operating contracts are setting up the rules and requirements a hotel needs to fulfill in order to enter a chain. [13]

## Research Methodology

Literature search was done to find out research work done on various sector for environmental sustainability and its implementation. The field study of a qualitative design was aimed interviewing Managers and staff those are directing responsible for housekeeping operation. This study uses an online survey for data collection. A total of 107 representative questionnaires were collected and 104 representative questionnaires are valid. All of the respondents are confirmed to be 18 years of age or over. The scale was adopted and adjustment was made in order to facilitate this study. From the adopted scale

the researcher developed the scale below. The questionnaire were used to rate the extent to which participant agree or disagree with a statement to facilitate this a five-point Likert- type scale ranging from 5(strongly agree) to 1 ( strongly disagree ) was used.

## Result and Analysis

Demographic Information Table 1, the survey administered was able to capture 104 respondents. After an analysis of the data a general picture of the respondents was generated.

Table 1 provides demographic information regarding the respondents' gender. This table includes frequencies and percentage of each gender base on the analysis it was noted that 53.04 % of the respondent were female (n = 51). The majority of the respondent from age between 18–50-year-old.

**Table 1: Gender Frequencies**

Gender	Frequency	Percentage
Male	50	52%
Female	51	53.04%
Missing Values	03	3.12%
Total	104	100%

Table 2, the Manager and staff rating of forinnovative best practices selection factors. This was accessed by a Likert scale from 1 (Not at all well) to 5 (excellent well). Overall, the staff know the concept between the “somewhat well” and “very well” (Table 1), indicating average Overall, the respondents have average for pay roll analysis and high for Training housekeeping practices (Mean = 4.73), (SD = 0.073).

**Table 2: New innovative Best Practices Implementation**

New Trend	N	Mean	Std Deviation
Staff Retention	104	4.16	0.083
Pay Roll Analysis	104	4.66	0.167
Training	104	4.73	0.073
Ergonomics	104	3.16	0.082
Information Technology	104	3.22	0.322

Table 3, the Manager and staff rating of housekeeping best practices selection factors. This was accessed by a Likert scale from 1 (Not at all well) to 5 (excellent well). Overall, the staff know the concept between the “somewhat well” and “very well” (Table 1), indicating average Overall, the respondents have a average for selection housekeeping practices in which they used recycling process more for shampoo and conditioner for maximum. (Mean =4.83), (SD = 0.083).

**Table 3: Manager and Staff Rating for Housekeeping Best Practices**

Implementation Factors	N	Mean	Std . Deviation
Guest bathrooms are designed to avoid wastage of water	104	4.50	0.250
Partially used shampoo and conditioner bottles are refilled and reused	104	4.83	0.083
Rain water is used at appropriate places e.g., flush system	104	3.33	0.333
Eco-friendly chemicals are used in hotel	104	3.16	0.083
Use of natural lighting during daytime hour	104	4.66	0.167
The hotel use energy efficient appliances	104	4.16	0.083

## Recommendation and Suggestion

It is recommended that energy efficient implementation Implement Water conservation programmed Implement 3 R' reduce, reuse and recycle establish a green brigade and green team use of ecofriendly product and supplies harvesting rainwater reward hotel for eco-friendly practices use eco-friendly cleaning product and amenities drink lobby coffee wash soap and go concept and new trends practices as well which include pay roll analysis, staff retention , Ergonomics and training and information of technology play an important role where they need to work and implement it more efficiently by other category star hotel. The research should investigate more hotel managers and staff because the demographics have limited diversity in Pune e.g. the sample size is not enough to be representative to implement in other areas. Moreover, the research should include more responses. Surveys should be conducted in maximum hotel to get a better idea of innovative housekeeping practices.

## **Conclusion**

The study also indicated that the respondents taken staff now days they are aware about environment friendly concept as earlier only managers taken into consideration in fact guest are more conscious about all the housekeeping best practices it has been follow like linen changing after two days if it is not used and water conservation and energy conservation practices still need more strictly it has to be follow taken into consideration environmental sustainability as one of the major and important practices. This research limited to certain hotel will be taken more hotel as respondent were limited in housekeeping department and can observed more innovative practices in other sector as well.

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**ISBN: 978-81-960940-3-4**

# **A Study on Biodegradable Household Waste**

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## **Abstract**

**Purpose:** The goal of the current experiment is to investigate the effects of active (using an external aerator) and passive (natural) aeration on the composting of household biodegradable wastes.

**Methods:** Continuous loading was done for 60 days in order to assess how well these reactors suited household situations. Both the reactors were loaded with cooked as well as raw vegetable and fruit trash. Temperature, pH, C/N ratio, moisture content, total organic content, and Total Kjeldahl are physicochemical variables. At various phases of the composting process, nitrogen and seed-germination metrics including the Germination Index (GI) and Root Length Index (RLI) of the mulch were examined.

**Results:** The findings confirmed that while both kinds of aeration appeared to have operated well under continuous loading, the actively aerated reactor required a shorter maturation period—37.30%—than the naturally aerated reactor.

**Conclusion:** Due to considerably lower odour and fly annoyance, active aeration was determined to be more acceptable for residential circumstances

**Keywords:** Compost reactor · Total Kjeldahl Nitrogen · Germination parameters · Maturation period.

***Shatakshi Arya & Nihil Thomas***



## Introduction

Municipal solid waste (MSW) has been identified by the World Bank as one of the three primary sources of environmental deterioration in Asian countries (Letcher and Vallero 2011), thus authorities must give it top priority and take prompt action. Inadvertently affecting the development of solid wastes, especially in India's metropolises, industrialization and urbanisation have elevated the importance of solid waste management (SWM) to a critical concern. Solid waste is produced and processed at different rates, and this discrepancy has caused issues with the environment, society, and infrastructure. As a result, the threat of SWM must be addressed immediately. For effective SWM, the current centralised waste management model needs to integrate several MSW treatment processes based on the waste's composition. Given that 40–50% of solid waste generated in India is organic (2016 India Manual on MSW Management), Decentralized composting is one such strategy, which is widely used, easy to use, cost-effective, and supported by the general people (Diaz et al. 2007). Since the 1990s, there has been a tendency toward smaller, manually run composting facilities at the local level, which are primarily the result of citizen initiatives or non-governmental organisations (NGOs) with funding from foreign sources. According to Suthar and Singh (2015), the majority of household wastes are biodegradable, making them effective for producing products with added value (compost/manure, biogas, digestive slurry, etc.) for sustainable urban habitat development and land restoration programmes. The benefits of a decentralised strategy include (a) composting helps communities' fragile waste situations by combining with primary garbage collection, and inhabitants rely less on the current SWM system. (b) Decentralized composting can be implemented with less capital expenditure and operating expense by using the right technology. (c) Because manual composting involves labour-intensive processes, it is more readily incorporated into the socioeconomic context and current level of development in India. It also provides the less fortunate members of Indian society with new employment options and a means of income. (d) Decentralized composting enables the reuse of organic wastes where they are produced, lowering the amount of trash that must be transported and the related costs, and increasing waste recycling. (e) If sufficient funds are available to cover the expense of construction, small-scale composting of kitchen and garden wastes is still feasible in cold weather (Zurbrugg et al. 2004; Ravi Kumar et al. 2009; Arrigoni et al. 2018).

Decentralized solid waste management is a method that treats a specific quantity of wastes at the place of generation in order to create a liveable and sanitary environment. It entails the handling of MSW by a number of neighbourhood small waste management facilities. The various composting techniques that support decentralised waste management include in-vessel compost reactors, drum compost reactors, and bioreactors for composting organic

wastes. Using locally accessible resources, decentralised compost reactors can be deployed successfully and the amount of time needed to convert trash into compost or soil conditioner can be decreased. Using compost accelerator culture grown on the local crop jowar (*Sorghum vulgare*), a lab-scale study was conducted for the in-vessel composting of household wastes. The results produced good humus that can be used to improve poor physical soil and some essential plant nutrients (Iyengar and Bhawe 2006). Four bench-scale thermophilic reactors were set up to study continuous thermophilic composting (CTC) of MSW's organic content. The thermocouples were implanted in the compost pile and connected to a recorder, and the compost reactors were set up in incubators. In the four CTC runs, mature compost products were obtained with quality comparable to or better than that which had been stabilised for 28 days after composting for 14, 16, 18, and 19 days, respectively (Xiao et al. 2009). The compost produced from both mechanically and manually operated bioreactors met nearly all of the quality requirements outlined in the India (2016) manual on MSW treatment standards, and may therefore be utilised as a soil amendment to boost soil fertility. For decentralised composting to be effective, waste must be separated at the home level (Manual on MSW management India, 2016). Urban local bodies (ULBs) in places like Bengaluru, Chennai, Delhi, Hyderabad, and Mumbai have achieved waste segregation efficiency of 80-85% at the household level, according to a study on the subject. Decentralized composting can therefore be included into current waste management to solve the SWM issue. Different organic materials are converted into more stable molecules by the aerobic, microorganism-mediated, solid-state fermentation process known as composting. Compost is the end result, and it helps to improve the soil's physical, chemical, and biological characteristics. Physical parameters such as aeration rate, temperature, moisture content, and pH are crucial for the stability and maturation of compost. Aeration is an essential and natural part of composting; it removes heat, excess moisture, carbon dioxide, and other byproducts of decomposition while supplying the oxygen required for aerobic biochemical activities. The current study intends to analyse how aeration affects the decentralised composting of organic waste from homes. Two compost bioreactors are used in an experimental setting for this purpose, one of which has active aeration (using external aeration), and the other of which serves as a control bioreactor (with natural aeration). Physico-chemical and seed germination characteristics will be used to assess the quality of the compost from both reactors.

## **Materials and methods**

### **Experimental Setup**

Two composting reactors were set up in a lab to investigate the effects of active and passive aeration on the composting of household biodegradable wastes. 50 L capacity tapered polyvinyl chloride (PVC) containers were used to hold around 46 L of biodegradable trash

poured into them throughout a 60-day span. The container's top and bottom diameters were 420 mm and 300 mm, respectively. Its height was 475 mm, and its thickness was 1.0 mm. One of the design requirements for selecting this size of container was that it had to be urban-friendly without posing a threat to nearby urban residential housing units. In the shape of a central shaft (shaft material: acrylic) measuring 35 mm in diameter and 11 numbers of acrylic fins measuring 4 mm in thickness, a mixing arrangement was offered. These to guarantee adequate mixing at various levels, fins were given at various depths to the central shaft. The length of the fins varied in accordance with the tapered form of the PVC container. Two circular acrylic plates, one with a 290-mm diameter and a 6-mm thickness, and the other with a 150-mm diameter and an 8-mm thickness, were supplied at the bottom of the reactors to reinforce them for a weight of about 40 kg after 60 days. These plates were stacked one on top of the other, and a central 36 mm diameter hole was made in each plate to accommodate the placement and support of the central mixing rod. In order to assure air supply at various levels, perforated pipes of 15 mm diameter were put through top plates of acrylic that were 4 mm thick at various depths. Six sets of four 4-mm diameter holes were drilled around the centre rod arrangement at the base of each reactor container in order to collect and remove leachate. Leachate was collected in a tray that was provided at the bottom of the reactor stand, which had a 300 mm height. Both reactors had the exact same dimensions. The sole difference was that in an actively aerated reactor, a central mixing shaft slit measuring 5 mm by 5 mm was constructed, through which aeration pipe was inserted. Fig. 1 explains the compost reactor's specifics.

### **Household Organic Waste Used for Composting**

From the canteens in Chennai, food trash was collected. No previous treatment (such as cutting the wastes or segregating them) was done for the wastes in order to make the composting process user-friendly. However, the following approximate ratio of wastes was put in both reactors for composting to imitate the home solid wastes:

Cooked food waste: 65%, Vegetable waste: 23%, Fruit waste: 12%.

### **Loading details**

For 60 days, both actively and passively aerated reactors received constant loading. Four times each week, 720 g of food wastes were fed into the reactors, and once per week, 720 g of fruit and vegetable wastes were added. The reactors were exposed to shock loading of 2500 g per reactor at intervals of 15 days in order to examine the impact of rapid loading on the maturity of the compost.

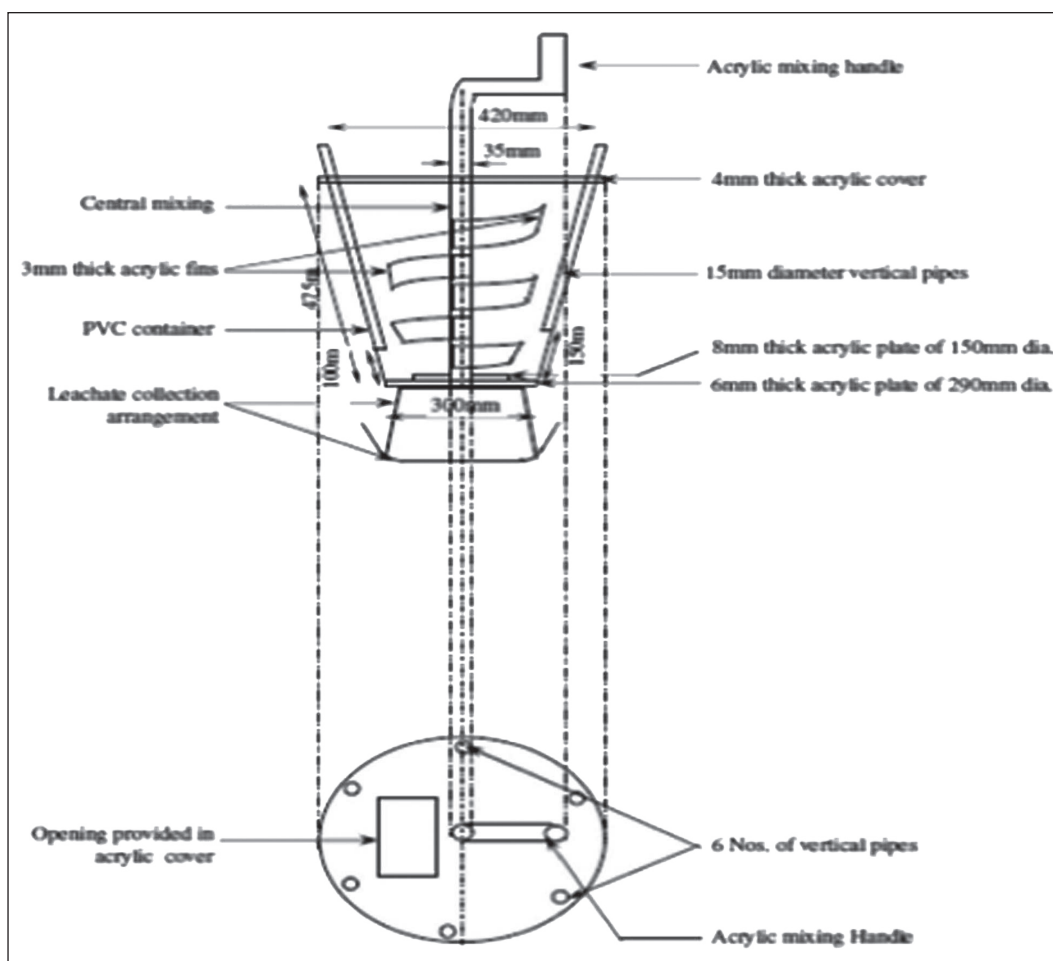


Figure 1: Details of Compost Reactor

## Aeration Details

Daily waste mixing took place in a passive aeration reactor with passive aeration; no external aeration was offered. Based on the numerical value of air flow rate, 0.021-0.026 m<sup>3</sup>/kg/h proposed by Schulze (1960) for reactor-type composting, the active aeration rate of air flow for active aerated reactor was computed. In calculating the air flow rate, important environmental parameters including microbial respiration (oxygen uptake) are taken into account (Schulze 1960, 1961). Air flow of 0.88 m<sup>3</sup> per hour was necessary for the total trash load of 42 kg. Two cycles of intermittent air flow were used to provide aeration.

The temperature of the composting materials determined the length of each aeration cycle, which varied from 2 to 5 hours. As continuous aeration might create gradients within the composting environment, resulting in excessive dryness and persistent cold zones where air enters, intermittent aeration was favoured. The waste mixture resembled that of a passively aerated reactor.

### Physico-Chemical Parameter Determination

Temperature and pH were evaluated every other day throughout the loading phase, whereas moisture content and total organic carbon were measured once per week. An analogue portable thermometer was inserted at four different depths to measure the temperature of the compost material in each reactor. Using a pH electrode, trash was combined in a 1:5 ratio with deionized water and agitated. After one hour of settling, the pH of the liquid phase was determined. Using the % dry weight technique, moisture content was determined by drying at 105 °C to a constant weight. Chemical characteristics such as Total Kjeldahl Nitrogen (TKN) (acid digest) and Total Organic Carbon (TOC) were measured during the maturation phase by loss on ignition at 600 °C for two hours, respectively (Iyengar and Bhawe 2006). Total phosphate (acid digest) and soluble phosphate (distilled water extraction) were also measured using the vanadomolybdophosphoric technique, and total potassium was quantified using flame photometry fitted with element-specific filters.

During the maturation stage, germination metrics including the root length index and germination index were assessed once a week. Water extracts of compost samples were created to measure these characteristics; mulch was suspended in water at a ratio of 1:9 (wet weight/volume) and stirred for 10 to 15 minutes. A 3-hour contact time was allowed after mixing. After the solids had settled to the bottom of the flask, the extract was extracted from the solids. Ten *Triticum aestivum* (wheat) seeds were planted in a petri dish with a diameter of 9 cm and a lining of filter paper for the Germination Index (GI). A 10 ml aliquot of extract in various dilutions was then added. The seeds' germination in 10 millilitres of distilled water served as the control. The petri dishes were incubated for 72 hours at 25 °C in the dark. After three days, the proportion of seeds that germinated as well as the size of the sprouts and roots were measured. By counting the number of seeds that germinated and measuring the length of the roots, the impact of fertiliser was assessed. According to the formulae below, the germination index (GI) and root length index (RLI) were determined:

$$GT = A / B \times 100\%,$$

where GT stands for germination test, A represents the number of sprouted seeds for fertilizer-treated seeds, and B represents the number of sprouted seeds in distilled water (control).

$$RL = C/D \times 100\%,$$

where D is the average root length of seeds soaked in distilled water (control) and C is the average root length of seeds treated with fertiliser on average (in millimetres) (mm).

The Germination Index (GI) was calculated using following

formula (Stabnikova et al. 2005):

$$GI = (A \times C)/(B \times D) \times 100\%.$$

## Results and Discussion

### *Leachate analysis*

At intervals of 15 days, the leachate was collected. During the loading and maturation periods, many leachate parameters were examined. Because 65% of the biodegradable trash utilised for loading was made up of cooked food waste, it was noticed that the leachate collected was high in oil and lipids. Table 1 lists the different leachate parameters from active (A) and passive (P) reactors that were studied.

### *Volume reduction*

Based on the density of biodegradable waste, which for middle-income nations ranges from 170 to 330 kg/m<sup>3</sup> (Manual on MSW management India 2016), volume reduction was predicted. A density of 200 kg/m<sup>3</sup> was used to calculate waste density. Table 2 displays the volume decrease in active and passive aerated reactors.

### *Temperature*

The stability of the final organic product and variations in the temperature of the mulch are indicators of microbial activity during composting. To achieve the greatest microbial diversity and a high rate of biodegradation, According to Bertoldi et al., the temperature must be between 30 and 45°C. The temperature in the actively aerated reactor began to rise over the maturation time, reaching a maximum temperature of about 38 °C before stabilising at the conclusion of the period at a temperature of 32 °C. The actively aerated reactor's temperature profile revealed that the composting process began at room temperature (mesophilic range) and went to and through a near thermophilic phase, with a maximum temperature of 40°C.

First, evaporative cooling (the evaporation of water), which accounts for probably 80–90% of the heat loss in active or forced aerated composting, is the predominant method of heat removal. The second factor, the influence of ambient temperature, which was around 10 °C (experimental study was conducted during winter season), combined with the absence of thermal insulation to the reactors, had a significant impact on the temperature developed within the reactors. In such systems, the contribution of conduction to heat removal may be small. But for nine days, the active aerated reactor's temperature developed at 38 °C, which was near to the sanitization temperature specifications set by the US Environmental Protection Agency. Fig. 2 displays the temperature fluctuations inside the reactors.

### ***Moisture content***

In active aerated and passive aerated reactors, the substrate moisture content during the loading phase was 83.91% and 83.20%, respectively. These high values are attributed to the substrate's nature, and the home food waste fraction from MSW may have a high moisture content of up to 70-85% due to the nature of the most prevalent food waste categories with high water content, particularly fruits and vegetables. Other research projects have provided similar moisture content estimates.

The moisture content was 32.19% in the actively aerated reactor and 33.43% in the passively aerated reactor at the conclusion of the maturation period. The reported values exceeded the FAI (2007), Ministry of Agriculture and Rural Development, India, standard range of 15-25%. Fig. 3 illustrates how the moisture content of compost that has undergone active and passive aeration has changed.

**Table 1: Analysis of the Leachate Generated from active (A) and passive (P) Reactors**

Leachate parameters	Loading period (0–60 days)		Maturation period (61–110 days)	
	A reactor	P reactor	A reactor	P reactor
Quantity of leachate (ml)	422 ± 72	525 ± 75	122 ± 72	170 ± 75
pH	6.95 ± 0.45	6.05 ± 0.55	7.5 ± 0.5	6.5 ± 0.5
Chlorides (mg/L)	3000 ± 1500	3750 ± 1250	1300 ± 800	2600 ± 600
B.O.D (mg/L)	5600 ± 600	6750 ± 450	2150 ± 650	3450 ± 550
C.O.D (mg/L)	7200 ± 700	7650 ± 650	2750 ± 750	4200 ± 900
Total solids (mg/L)	30000 ± 3000	33500 ± 3500	14500 ± 2500	17500 ± 2500
Oil and fats (gm/L)	0.495 ± 0.045	0.525 ± 0.075	0.275 ± 0.075	0.400 ± 0.100



Table 2: Volume Reductions within the Reactors

Reactor type	Initial volume (m <sup>3</sup> ) of waste in reactor	Final volume (m <sup>3</sup> ) of waste in reactor	% volume reduction
Actively aerated reactor	0.20	0.0154	92.30
Passively aerated reactor	0.20	0.0305	84.75

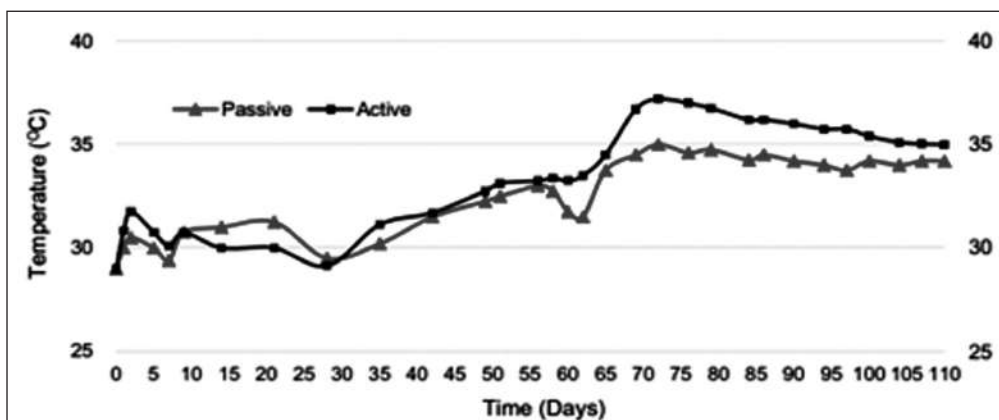


Figure 2: Variation of Temperature within the Compost Reactors

## Total Organic Carbon (TOC)

The carbon content of the finished product after five days of sun drying was 36.78% in an actively aerated reactor and 40.12% in a passively aerated reactor, indicating that the mulch in the passively aerated reactor needed more time to mature. The TOC concentration of compost from an active aerated reactor was slightly higher than the FCO guidelines, which provide for a minimum total organic carbon content of 16% and a maximum allowable exceedance limit of 33.30%. Similar to this, studies on the stability of organic waste during composting revealed high TOC concentrations. Variations in the amount of total organic carbon in compost reactors have been shown in (Figure 4).

## Germination Index (GI)

When shock loading was applied to both reactors, a decrease in these values was seen. For each reactor, the ultimate GI values were 81.72% and 71.11%. These results demonstrated that the actively aerated reactor's final output was mature and devoid of phytotoxins. The



higher GI values at the end of maturation are caused by the final product's higher nitrogen content; however, the final product from a passively aerated reactor needed an additional 2 weeks to mature, and the Germination Index value for compost reactors varied throughout the maturation period.is shown in (Figure 5).

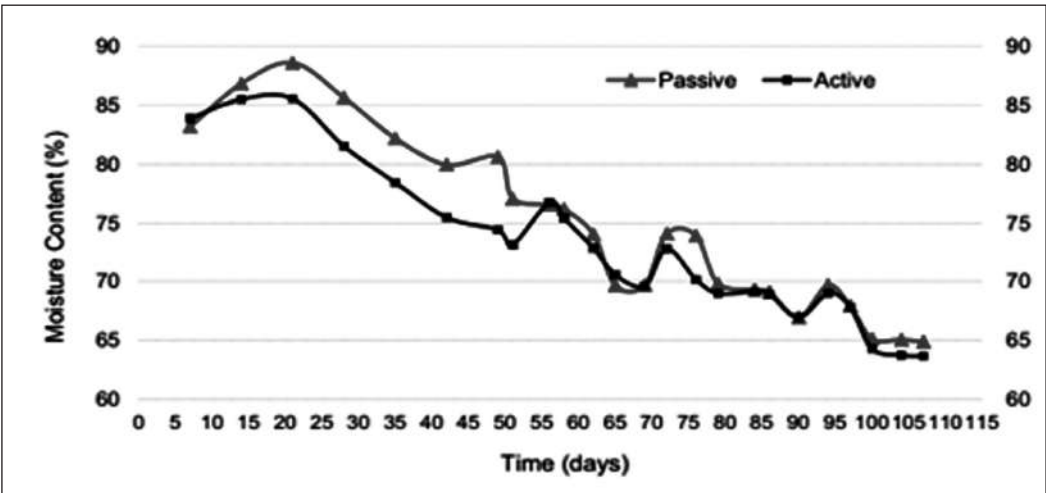


Figure 3: Variation of Moisture Content within the Reactors

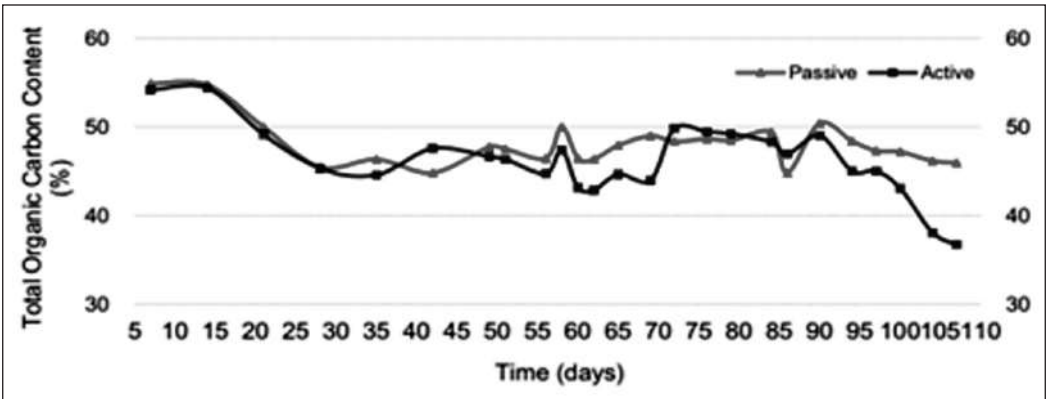


Figure 4: Variation of Total Organic Carbon Content within the Reactors

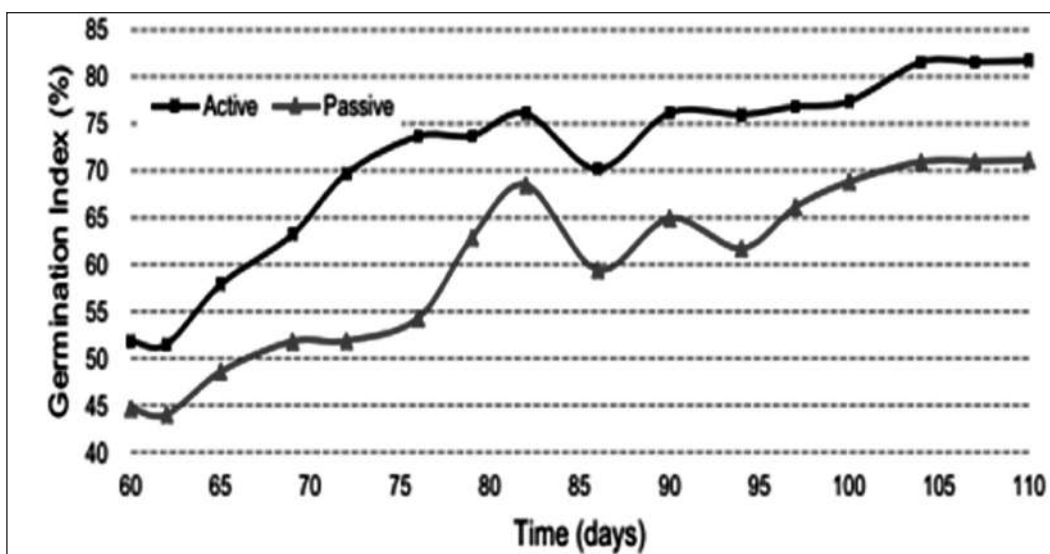


Figure 5: Variation of Germination Index during Maturation Period

### Root Length Index (RLI)

Alike Germination Index, Root Length Index (RLI) is also a measure of phytotoxicity and maturity of the compost. Initially, the RLI value for the actively aerated reactor was 54.93% and for passively aerated reactor, it was 46.89% and these values steadily grew as the maturation period went, whereas the ultimate RLI values were 83.98% and 73.02% for the respective reactors. These results demonstrated that the actively aerated reactor's final output was mature and devoid of phytotoxins. It took the finished product from the passively aerated reactor around 2 additional weeks to develop. Figure 1 explains how the values of the Root Length Index change over time for active and passive aerated reactors (Figure 6).

### Phosphorus Content

Food trash, which is frequently found in Indian household garbage and contains a high phosphorus level, includes whole wheat bread, potatoes, garlic, and peanuts. The range for phosphorus content recommended by the Fertilizer Control Order is 1.59-1.80%, with 0.5% being the threshold for compost. The amounts of phosphorus in active and passive reactors at the start of the maturation phase were 0.74% and 0.61%, respectively. This is brought on by the reactors' slow build-up of waste that is high in phosphorus. This phosphorus concentration grew somewhat in both reactors over the maturation phase. The final phosphorus level measured was higher than the FCO-recommended value at 1.02% in the actively aerated

reactor and 0.91% in the passively aerated reactor. For the phosphorus concentration in mature compost, studies examining the chemical characteristics of compost made from organic waste have indicated a range of 0.3–5.5%. Changes in the reactors' phosphorus concentration during the maturation phase have been recorded in (Figure 7).

### **Total Kjeldahl Nitrogen (TKN)**

The bacteria that play a key role in decomposing organic materials throughout the composting process may momentarily lock up all the available nitrogen in their cell structures. The microbes die off as the composting process nears completion, which releases the nitrogen and makes it again accessible to plants. According to FCO guidelines, the total nitrogen level should be between 1.61 and 1.77% (FAI 2007). The reported TKN values complied with the suggested requirements. Initially, the active reactor's total Kjeldahl nitrogen was 0.67%, whereas the passive reactor's total Kjeldahl nitrogen was 0.69%. Values of 1.03% and 0.90% were attained in the final product from the corresponding reactors as the maturation period developed. Variations in the TKN content during the course of maturation have been described in (Figure 8).

### **Potassium Content**

The minimum requirement for potassium content is 1%, while the range suggested by the Fertilizer Control Order is 0.60 to 1.14%. In an actively aerated reactor, the potassium content of the mulch ranged from 0.72 to 0.90%, whereas in a passively aerated reactor, it ranged from 0.61 to 0.72%, which fell below the 1-2% range for composts that is advised. This is explained by the fact that it drains away as leachate. The production of leachate was, however, significantly less in the actively aerated reactor than in the passively aerated reactor due to the extra air supply. Potassium loss from the compost produced might be avoided by using fibrous material wisely, such as straw or wood chips, which can absorb substantial amounts of water while retaining their structural integrity and porosity. (Figure 9) shows variations in potassium concentration over the development phase.

### **Carbon/Nitrogen Ratio (C/N Ratio)**

Carbon is the element that satisfies the energy needs of the microorganisms driving the process' evolution, but it also serves as a part of those organisms' fundamental structural framework. Proteins, nucleic acids, amino acids, and enzymes—which make about 50% of the dry mass of cells and are crucial for their microbiological growth—all contain nitrogen as an important component. The C/N ratio in the passively aerated reactor was greater than the acceptable C/N ratio, indicating that the mulch there needs an additional 2 weeks to develop. C/N ratio variations have been described in (Figures 10, 11).

## Conclusion

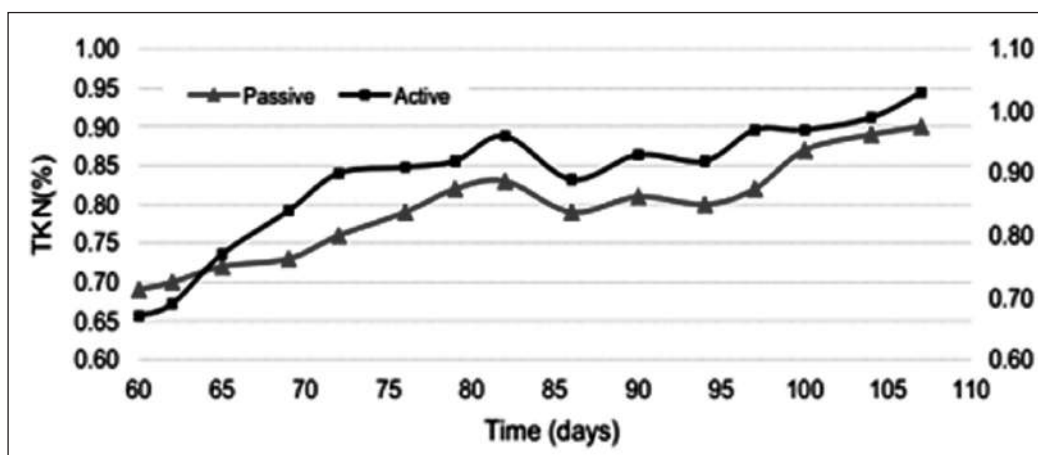


Figure 8: Variation of Total Kjeldhal Nitrogen during Maturation Period

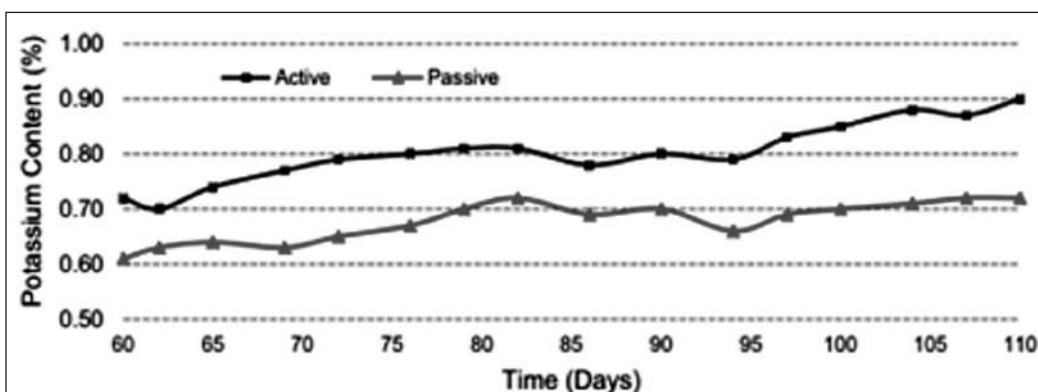


Figure 9: Variation of Potassium Content during Maturation Period

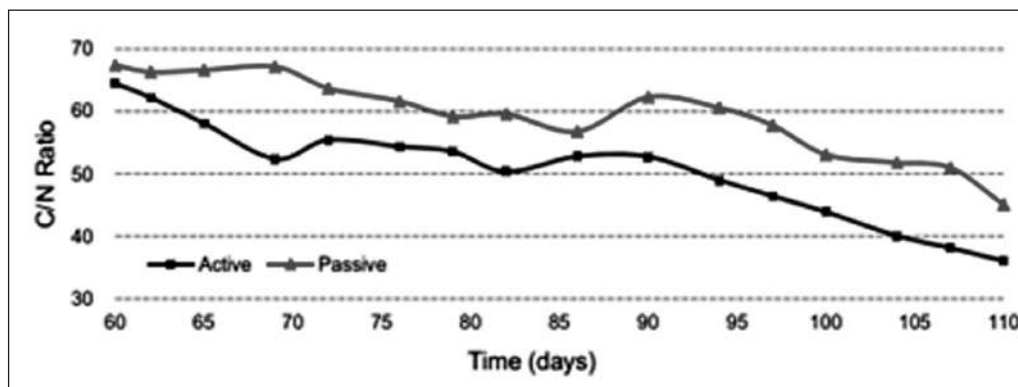


Figure 10: Variation of C/N ratio during Maturation Period

The effects of active and passive aeration on the composting of home biodegradable wastes were investigated. The mulch from the reactor that was actively aerated had a higher C/N ratio value. In order to maintain the necessary C/N ratio for high-quality compost, the results point to pre-evaluation of waste characteristics in terms of carbon and nitrogen contents and reactor design and loading. waste washing and waste shredding Prior to being loaded into the reactor, the particles should be homogeneous in size. This will enhance the final product's overall quality. Because of the low quality of the mulch, the passively aerated reactor was unable to function as a home reactor.

On metrics like the Germination Index (81.72%), Root Length Index (83.98%), N (1.02%), P (1.02%), and K (0.90%) values, it was discovered that compost from regularly aerated reactors had greater quality. Reduced by 37.30% was the active aerated reactor's maturation time (almost one-third of the maturation time). The actively aerated reactor was also shown to be appropriate for qualitative criteria including odour, fly annoyance, and simplicity of usage at the home level.

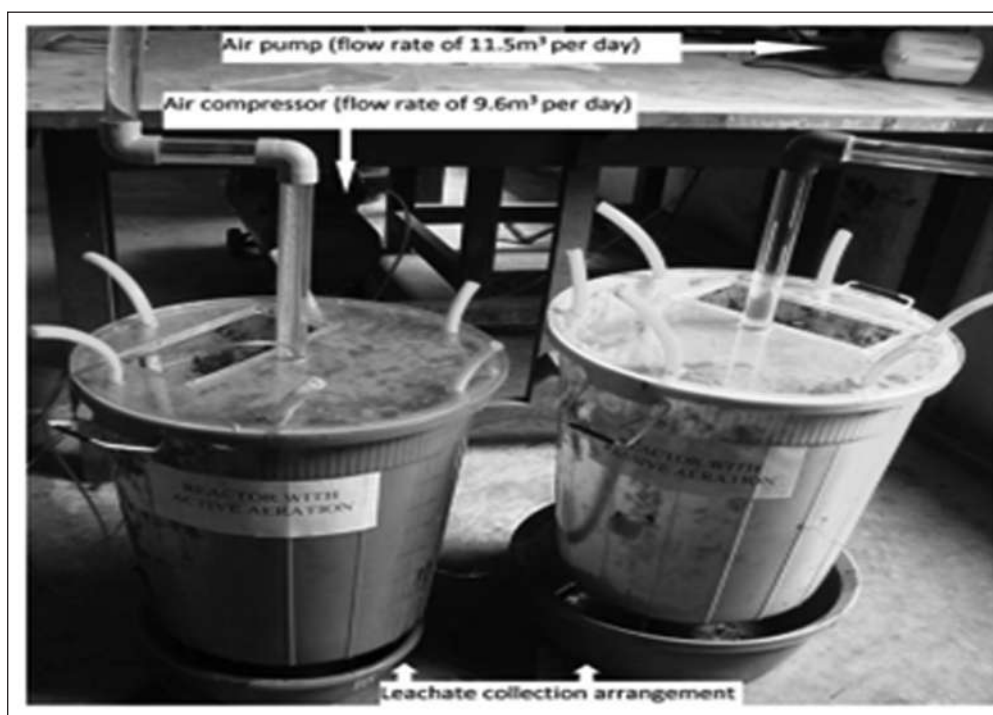


Figure 11: Arrangement of Active and Passive Reactors in the Laboratory, at V. J. Technological Institute: Mumbai, India

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**ISBN: 978-81-960940-3-4**

# **Effects of Cleanliness in Climate Exchange**

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## **Abstract**

The complicated link between CO<sub>2</sub> emissions, global warming, and climate change, as well as CO<sub>2</sub> mitigation strategies in a few industrial sectors, such as petrochemicals, power, cement, iron, and steel, were also covered.

An overview of process integration suggestions for energy reduction in environmental sustainability studies was the main topic. The current status of research in this field was studied as future potential in the use of process synthesis methodologies to decrease the high energy and material needs during CO<sub>2</sub> collecting were identified.

Last but not least, the evolution of CO<sub>2</sub> emissions from the beginning of the first industrial revolution as well as current international agreements, regulations, and predictions for greenhouse gas emissions were analyzed.

## **Research Objectives**

Among the concrete goals of this research are

- Reduce Air Pollution
- Improve Access to Clean and Safe Water
- Promote Materials Management and Waste Management and Clean Sites
- Enhance Joint Preparedness for Environmental Response
- Enhance Compliance Assurance and Environmental Stewardship

***Aathira Nandakumar & Shatakshi Arya***



## **Research Methodology**

Research methodology refers to the procedure of acquiring information and data with the intention of making business judgments. The strategy might include published research, interviews, surveys, and other methods, and it could include data from the present and the past.

This study's focus is mostly on descriptive elements. Descriptive research designs can aid in addressing the questions of who, when, and how they relate to a certain research topic, but they cannot offer definitive explanations for why. Using variables or conditions present during a situation, descriptive research is used to learn more about the phenomenon's current state and to explain "what exists."

## **Introduction**

More frequent and severe droughts, storms, heat waves, rising sea levels, melting glaciers, and warming oceans are just a few of the climate change-related factors that can directly harm animals, destroy the habitats they depend on for survival, and have a terrible effect on people's way of life and communities. As climate change worsens, dangerous weather events occur more frequently or with greater severity.

Just two examples of human actions that have a growing influence on the climate and temperature of the Earth are the clearing of rainforests and the combustion of fossil fuels. The amount of greenhouse gases in the atmosphere rises as a result, enhancing the greenhouse effect and causing global warming.

Our environment and health are interconnected in many ways. But the effects of the changing environment on our security, happiness, and health are enormous. The long-term modification of the planet's weather patterns is known as climate change. The latest changes in our climate are mostly the result of human activities. If nothing is done, our state, the country, and the rest of the globe will suffer greatly from the repercussions of the changing climate.

It is a critical issue that has implications on all levels—international, national, local, and personal. The good news is that we can all immediately take simple steps to strengthen our resistance to climate change's consequences and reduce its rate. A few of these activities will also have an impact on our health, our finances, and the environment and benefits actions.

## Literary Review

Technologies for clean energy are crucial for cutting carbon emissions and ensuring a sustainable future. As this sector continues to grow, we observe a rise in the complexity of materials used in high-tech goods, some of which are essential to the operation of the technology as well as having the ability to disrupt supply. We examine the idea of essential materials and how their price volatility may influence the capacity of these clean energy technologies to compete in a crowded market that is full of low-cost incumbent technologies throughout this essay (Brooke, A & al, 1988). Critical materials are those whose production and/or distribution involve a supply risk in some way, in addition to their importance in terms of technology.

“Technological significance” refers to applications where a material’s functionality cannot be simply replaced by a substitute, such as in renewable energy, defense, electronic, or healthcare technology. Low availability of a material through recycling streams, the substance being mined primarily as a byproduct of other resources, a small pool of suppliers, or the location of those suppliers in geopolitically unstable nations are characteristics of supply risks (Rentz, Wietschel, Ardone, Fichtner, Göbelt, M.,1998). A review article by Jin et al. is useful for condensing the results of similar investigations, while an article by Graedel and Nuss rates the criticality of 62 components quantitatively.

We do observe common trends in materials such as rare earth elements, platinum group elements, and individual elements including indium, gallium, tellurium, and cobalt, consistently being identified as more critical than most other elements for clean energy technologies, despite the fact that the methods of determining criticality vary between studies and as a result, elements are given varying quantitative or qualitative criticality “scores”.

The availability of material resources, the cost of the material, and market concentration are a few examples of more common criteria used to assess criticality. Along with the expansion of the global population, the selling of electronic goods, and the uptake of renewable energy, it is anticipated that demand for many of the elements classified as important would rise in the future. In the case of a supply chain interruption, high demand and criticality increase the danger of significant price increases or possibly material unavailability.

## Cleanliness and Climate

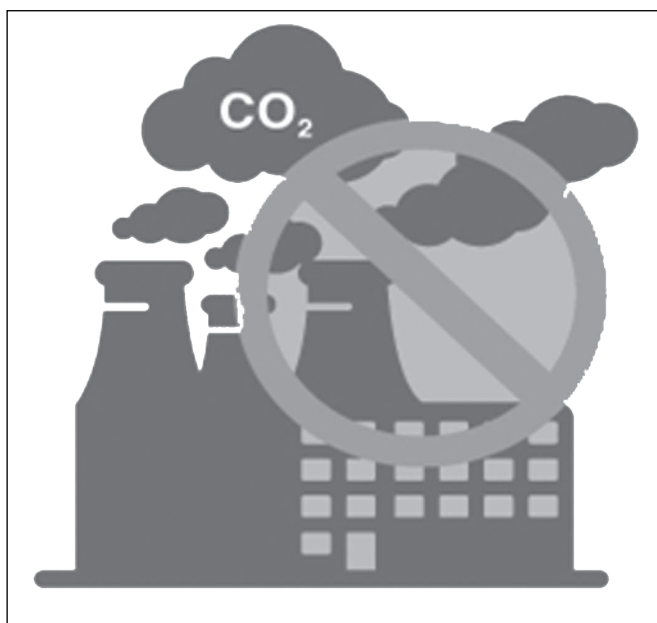
### *Reduce Air Pollution*

The U.S.-Mexico border region’s economic and demographic expansion has had a substantial influence on the air quality in both urban and rural areas. Air pollution constitutes a serious environmental danger today in certain border areas that are routinely exposed to high quantities of particulate matter PM10 and PM2.5, ozone, and hazardous air pollutants.

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Emissions from electricity generating and other industrial sources, unpaved roads, diesel vehicles, buses, and cars, particularly those that idle for lengthy periods of time at ports of entry, are significant contributors to the poor air quality near the border (Commission of the European Communities, 2001). Decisions taken in one city have an instant influence on other cities nearby or in the same nation since cities in the border region share air sheds.

The community must actively participate in the creation and application of international plans and solutions to combat air pollution along the border, as must local, state, federal, and tribal authorities.



**Figure 1: Reduce Air Pollution**

### ***Improve Access to Clean and Safe Water***

The United States and Mexico share a watershed with rivers that cross international borders or define them. To protect and enhance the watersheds and water quality in these rivers, as well as to supply appropriate drinking water and essential sanitation services, joint bi-national, multi-jurisdictional planning initiatives are required.



The border region confronts serious issues in shared watersheds as a result of fast population increase and the consequences of climate change. The Border 2020 Water Goal builds on the successes and insights gleaned from the Border 2012 Program. As part of the Water Goal, the US and Mexico will work together to solve the following problems:

- The absence of access to safe drinking water poses a major threat to the public's health in border towns.
- Poor wastewater collection and treatment, poisoning surface waterways and aquifers, harming public health and the environment.
- Floods and water pollution risks are considerably increased by insufficient storm water pollution control.
- It is more difficult for the general people to decide if a body of water is safe for recreational use when there is insufficient public access to information on water quality.
- Consequences of climate change that modify the frequency and duration of droughts, make it more difficult to find water in already dry places, and increase the risk of flooding harming wastewater infrastructure.

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***Promote Materials Management and Waste Management and Clean Sites***

Waste management services and initiatives have not been enough to meet the demands of border communities, and the present waste management system is unable to accommodate these expanding needs. Cooperation at all levels is necessary to guarantee that the scarce resources are utilized in a way that prevents contributing to the region's already-existing legacy land pollution and minimizes new threats of land contamination.

The border region's capacity to create sustainable, healthy communities has been threatened by the rising physical hurdles that have hastened population expansion in the area. Therefore, trade and manufacturing should be actively involved in coming up with solutions.

Those that transition from end-of-life waste management to a sustainable materials management strategy will decide the region's future success. Improve collaboration in environmental response preparation.

Methods for predicting and responding to oil and hazardous material incidents along the interior border between Mexico and the United States are outlined in Annex II of the La Paz Agreement from 1985. (U.S.). The Agreement also requires the use of a Joint Contingency Plan (JCP), which was developed in 1988 and accepted in 1999. A new version was finished and signed in 2008. The Mexico-U.S. JCP served as the inspiration for the 15 Sister Cities Bi-national Emergency Response Plans that were created during the previous several years.

The Emergency Preparedness and Response Policy Fora is co-chaired by Mexico's Procuraduría Federal for Protección al Ambiente (PROFEPA) and Secretaría de Gobernación, Coordinación General de Protección Civil (Mexico's Office of Civil Protection). The Joint Response Team (JRT), a requirement of the La Paz Agreement, is co-chaired by PROFEPA, Protección Civil, and OEM of the United States EPA. Other federal agencies from the United States and Mexico, as well as state, tribal, and local governments in responsibility of border region disaster response, prevention, and planning, are also JRT partners.



**Figure 3: Promote Materials Management and Waste Management and Clean Sites**

The workgroup essentially acts as the steering committee for the Joint Response Team (JRT). A notification system for the binational reporting of emergency response incidents, exercises, and threats; local Emergency Response Plans developed in collaboration by bordering sister cities; accredited training programs; and analyses of potential risks in the border region all support the JRT's efforts.

Both countries have improved coordination with their federal, state, and local partners, and as a result of their collaboration, many of the border region's millions of residents will have access to more extensive training, cutting-edge equipment, and improved emergency response capabilities for both countries.

Several Mexican and American goals, including Goal 4 of the U.S.-Mexico Border 2012, to "Enhance Joint Readiness for Environmental Response," are accomplished by these actions. EPA, PROFEPA, and Protección Civil also made the decision to work together to enhance agency communication and border notification protocols in order to strengthen the involvement of all parties in the Policy Fora and Task Forces (Commission of the European Communities, 2001).

### ***Enhance Compliance Assurance and Environmental Stewardship***

Measures to guarantee environmental stewardship compliance and to enforce such compliance must be a part of any effective environmental control framework. In a trans-boundary situation, such as the border between the United States and Mexico, where domestic enforcement authority is constrained and laws and standards may differ significantly, it is more difficult to achieve these goals. Despite these challenges, the US and Mexico are dedicated to making sure that their respective environmental laws are upheld at the border.

The Border 2020 Program therefore places a high priority on regulating the flow of waste, particularly hazardous waste, across the border. Inspectors must, for instance, be aware of the patterns of hazardous waste movement on both sides of the border and across the Border 2020 Program will make an effort to promote the sharing of this vital information on the trash that enters the country through the ports of entry and how it is ultimately disposed of or handled.



**Figure 4: Enhance Compliance Assurance and Environmental Stewardship**

The rapid industrial expansion of the maquiladoras, their suppliers, and other industries in the border region raises concerns about the effects of this expanding industrial base on the environment while also providing an opportunity to better engage business in promoting environmentally friendly business practices.

Both the United States and Mexico are committed to fostering the development of environmental stewardship recognition programs, if needed, and to spreading them beyond the border region in order to achieve this (Enzensberger, N., Fichtner, W., Rentz, O., 2000).

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In order to help people and companies understand environmental laws, comply with them, and implement more environmentally friendly practices, such as environmental self-audit programs, public education, communication, and information exchange will receive more priority.

## Conclusion

The concentrations of CO<sub>2</sub> and other greenhouse gases are increasing in the atmosphere as a result of the world's rising population using a lot of fossil fuels and simultaneously destroying a lot of forest land globally. The likelihood that this alteration in the Earth's atmosphere will cause widespread changes and perhaps severe climatic disturbances is increasing.

Already susceptible to a variety of environmental stresses, such as temperature extremes and fluctuation, are human and natural systems. Our lives will undoubtedly be disrupted in a variety of ways by global warming, which will likely increase the consequences of other pressures. Climate change is likely to have significant effects on our health, the health of forests and other natural areas, the distribution of freshwater sources, and the productivity of agriculture.

If things continue as they are, the globe will reach concentrations and levels that have not been seen for millions of years, far beyond anything that has been recorded during the history of human civilization, all within the span of one century, or a geologic "blink of an eye."

The potential for "surprises" or unplanned catastrophes will increase as the rate of climate change increases since there will be less time for biological and socioeconomic systems to adjust. Slowing the rate of change is a wise line of action given the lengthy delays between cause and effect and between effect and treatment. Our children and grandkids will be able to live in a world that is not significantly affected by an increased greenhouse effect if we make investments now to preserve Earth's climate.

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**ISBN: 978-81-960940-3-4**

# **Environment Sustainability through Best Housekeeping Practices**

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## **Abstract**

In present era hotel housekeeping is not confined to clean and maintain the various surfaces in the hotels but much more beyond that. Present article explore the current challenges, best practices and emerging trends in hotel housekeeping which if executed well, could lead to higher growth and cost-effective tool for the hotel industry. This paper has reviewed the academics and popular hotel housekeeping trends. Hotel housekeeping need to meet leading challenges, trends and best practices as eco-friendly practices, outsourcing, IT savvy housekeeping, training, retention of employees, payroll performance and Ergonomics techniques. If the hotels implement these trends in an organized manner, it can lead to hotel growth opportunities and long term profitability. This paper augments new urgency to develop new trends in hotel housekeeping domain specific for manifold benefits.

**Keywords:** Housekeeping, Trends, Hospitality industry, Hotels..

## **Introduction**

In India travel and tourism accounts for 5.9 per cent of the GDP and 9.2 per cent of the total employment. The total number of jobs (direct and indirect), in the tourism sector in 2010 was 53 million and 49.8 million in 2009, followed by 13.1 million in automotive and 10.2 million only in the IT sector, in 2009. Our sector estimates around 77.5 million jobs by 2016. Housekeeping has undergone a sea change, especially since the mid-90s. The use of technology has changed the style and functioning of the department in a large way.

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This has changed the prevalent mind set and has increased professionalism. In modern world professional housekeepers are striving to get housekeeping its due recognition in the hospitality industry.

This department is responsible for bringing in the largest share of profit to an accommodation operation, but this fact is hardly acknowledged and veterans of the industry too often must consider it a thankless job. Housekeeping operations are increasingly becoming scientific and mechanized. Efficiently managed Housekeeping departments ensure the cleanliness, safeguarding and aesthetic entreat of the hotel. The tasks performed by Housekeeping department are pivotal to the horizontal daily operation of any hotel. In the present stringent competitive scenario maintaining hotel is very tough and satisfying guest is even tougher. Foreign tourist arrivals in the country have increased substantially during the past decade motivated by both, business and leisure needs and are further expected to grow at a CAGR of around 8% during 2010-2014, as per our new research report "Indian Tourism Industry Analysis". India currently has over 200,000 hotel rooms swell across hotel categories and guest houses and still facing a short fall of over 100,000 rooms (FHRAI). For every room constructed, 3-4 jobs are created, the world Travel and Tourism council has estimated 8 percent annual escalation in jobs in India. According to a report –The Indian Hotel Industry Report 2011 Edition by CYGNUS business Consulting and Research Firm, In next two years, a total investment of INR 545.2 billion is expected that will add over 20 New international brands in the hospitality sector as the hospitality industry grows it will face lots of challenges which leads to increase in latest trends in diverse sections of hospitality. Hotels are generating optimum revenue by major operating departments like Housekeeping which deals with the schedule operations of Hotels.

The modern day hotel executive housekeeper is faced with challenges which entail a high degree of professionalism. Hotel housekeeping is shifting hastily, earlier, the responsibility of the housekeeping department was to prepare clean guestrooms on a timely basis but now enormous changes have been made in Hotel Housekeeping. This highly fuelled and fast growing industry needs new trends and technology to strengthen hotel operations. After all, housekeeping department is responsible for bringing in the largest share of profit to the hotel. So this study examines the trends of housekeeping in hotel industry. This article has its focal point on the latest trends that hotels can use to expand revenue from accommodation operations.

With the progression in time the Hotel Industry must follow the trends of the times, develop unique commodity value or service mode in order to keep the dominance in the intense competition. The main product of hotel is room sale which expected clean, comfortable and home environment for the guest. In order to compete with challenges hotel housekeeping department must adopt these latest trends in the industry.

## **Eco Practices in Housekeeping**

(HRANI, 2013) with the focus progressively on responsible tourism and green practices, there is much more to being ecologically friendly than reusing sheets and towels. Environmentally-friendly properties, whose managers are eager to institute programmers’ that save water, save energy and reduce solid waste—while saving money.” Eco practices are one of the most spectacular emerging trends in hotel housekeeping. “Going green” is a trend of the day and environment sound policies increases the monetary health of a property. There is an increasing awareness to use eco-friendly amenities, commodities and practices. Housekeepers are developing and adopting new ways to conserve water and energy. According to American Hotel and Lodging Association (AHLA) hospitality industry spends \$3.7 billion in a year on energy. AHLA estimates that reducing energy use by 10% industry would save \$ 285 million. The energy management system in the hotel helps to analyses data from major energy consuming appliances. Compact fluorescent lamps are the spinal column in high efficiency lighting. These lamps save energy waste. Ceiling motion sensors are used in meeting rooms, conference rooms and public areas to reduce energy waste. Housekeepers are looking for products and equipments that help in conserving energy.

## **IT Savvy Housekeeping**

Many hotels have invested heavily in information technology (IT) infrastructure and networking that deploy the latest technical advances in their operations. Hospitality Industry strongly invested in information technology (IT) to generate new technologies in housekeeping department. New technologies like Wi-Fi (wire less fidelity), radio frequency identification, GPS (global positioning system), VOIP (voice over internet protocol), hand held communication devices and WLAN (Wireless local area networks) are developing rapidly. Many types of software having comprehensive housekeeping applications are being used today in the hotels. With the help of technology customers involvement in service delivery has been increased.

## **Outsourcing of Services**

Present era focusing on outsourcing in hotel housekeeping and it helps in reducing manpower related issues like filling the gap due to attrition of manpower, unavailability of suitable personnel , trained manpower to fill the need and unionization. Housekeeping is a labor intensive department. Most of the hotel chains perceive outsourcing as an effective business strategy. It proves to be the best solution for many specialized tasks as it is highly cost-effective. It is a better business strategy to meet the demands of hotel standards.

## Training

Staffs are the nucleus of your business and will have a major hand in determining its success. Make sure they feel valued right from the get-go with the right recruitment and training practices. Need for improved productivity has become universally accepted and that it depends on efficient and effective training is not less ostensible. It has further become essential in view of advancement in modern world to invest in training (Singh, 2014) Lodging operations always depends significantly on the ability of managers to find and retain talented employees. Jyoti.et.al (2013) examines that In Europe, hotel management education and training involves Food and Beverages operations, but in USA priority is given to finance, marketing, computer technology and management. Jayewardene (1993) found that the best background for general manager is a mix of these two concepts education and training. Training and motivating employees is a fundamental tool in the present scenario. Increased mechanization of housekeeping operations has placed housekeeping managers in a position to train staff, an optimum usage of equipment, supplies and labor to increase efficiency in operations. Housekeeping jobs are going too mechanized gradually and training is fundamental to maintain high level of performance and productivity standards. Need have collaborate efforts required between Hotel housekeepers and hotel management institutes for theoretical knowledge and practical knowledge.

## Safety & Security Hospitality Operations

Large and small, are extremely susceptible to security hazards. The very nature of the operation which involves the presence of a wide range of people, most of whom are unknown, poses a considerable threat to the security of a property. Risks of fire are also serious; the incidence of hotel fires causing loss of life and serious damage to property has increased in recent years. Safety refers to the physical injuries in a work environment and security refers to anticipation of theft, fire and other emergencies. The Occupational, Safety & Health Act (OSHA) was enacted in 1970 to protect workers at workplace. OSHA standards covers work areas, sanitation, signs and tags, first aid and blood borne pathogens, listing hazardous chemicals, labeling all chemical containers and developing written hazard communication programmed. OSHA assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance. Security in hotels is a broad task of protecting both people and assets. (Mc Millen. & Resister, 2006) observed their study that environment, technology, human resource, operations and security are the complex set of challenges which cannot be ignored by manager for being successful.

## **Ergonomics**

Ergonomics deals with the study of body movement in relation to housekeeping profession during tasks performed which has significant impact on work fatigues. Housekeeping is a physically demanding profession and work environment has an impact on efficiency and comfort of the employees. Ergonomics is a scientific discipline which deals with interaction between employees and the elements of their work system.

## **Employee Turnover and Retention**

Employee retention or turnover of employees in hotel industry is a major challenge and it is even harder in housekeeping department. It has got long work schedule, less compensation, physically demanding tasks, high pressure environment and uncomfortable work culture which leads to high turnovers in housekeeping. Generally people say housekeeping job is thankless job which results into low morale of the employees. Housekeeping needs to focus on formulation and implementation of dynamic retention strategies to reduce the employee turnover.

## **Payroll Analysis**

Payroll analysis of number of rooms cleaned daily, VIP arrivals/ stay over's, check-outs, deep cleaning schedules, and other items that can affect labor costs are measured. Payroll analysis determines the total monthly labor costs and find out ways to cut various labor costs. This is an important practice to ensure that unnecessary labor is not being used when business does not demand it in housekeeping.

## **Findings and Observations**

- Hotel industry is running on shortage of manpower and majority of the employees are working as temporary. This may be due to hotel industry is seasonal in nature.
- Majority are working in middle level and undergone minimum level of training programmes required to work in hotel industry.
- In addition, the majority of the respondents are from three star hotels in the sample. Hence, it is concluded that, the sample is appropriate and the data revealed in the form of level of awareness, issues in adoption and implementation are real time in nature.

- High level of awareness is found on cleaning activities, recycling activities, waste control and energy, efficiency in the order of priority respectively. Based on the same, it is inferred that, hotels in the sample gives much importance to cleaning, recycling and waste control to a greater extent.
- Primary areas of concentration of green practices in the sample are commitment to environment practices, water efficiency and conservation, Landscape management, Hazardous and Toxic Substances control and elimination practices and Purchasing, recycling and disposal of waste management. This clearly shows all the hotels may not be focusing in all the areas of green management.
- The primary factors influencing the degree of adoption and implementation of green practices are Level of awareness among the top management, Lack of training and education on green practices, Poor attitude towards environment sustainability, Wrong perception of cost of green practices adoption, Lack of practice in the industry and recognition, Lack of skilled and trained employees in the adoption, Wrong perception/ attitude of the customers towards green practice hotels(costly) and Lack of training facilities and trainers/ green certifications in the sample area.
- The strongly perceived benefits from adoption and implementation of green practices in the hotel industry are Huge savings in energy, water and food and consumables wastage, Long lasting of equipment's and appliances, Improved level of building safety and durability, Protection of health and safety of guests, employees and stakeholders, Reduction in purchase cost and logistics expenses, Preservation of natural resources and Preservation of biodiversity, wildlife habitat, and social animals respectively. Hence, unless it is experienced, the response for the implementation many be meager. Hence, it is necessary to create the awareness by explaining the quantitative evidences can help in bringing the change in the current situation.

## **Suggestions to Improve Green and Sustainable Practices**

Selective measures based on the suitability and affordability green practices are adopted and practiced. Hence, there is a need to go for self-drive from the management side to adopt and practice of green practices in the hotel industry. Primary suggestions to improve the green practices among the sample hotels are Create green team for green practices adoption and follow up, Develop an incentive program to encourage staff, Install a renewable energy system onsite, Install key card master switches or occupancy sensors in hotel, Switch to Energy Star heating and cooling systems, Convert the food services into a Certified Green Restaurant model and Consider creating an organic food garden for the kitchen in the order of priority.

## Conclusion & Recommendations

The important solution is to prepare hotel housekeepers to face challenges one of the precarious success factors of hotel housekeeping and is the revolutionary trends or best housekeeping practices. To become more energetic & innovative, new trends must be implemented and incorporated in hotel housekeeping, standard operating procedure and work manual strengthened through new trends and demand of hospitality sector. Various tools are used to generate optimum output in hotels but there is a strong need of optimum utilization of resources available ,manpower, supplies and new scientific trends like Ergonomics, Eco –friendly practices(energy conservation, waste management, eco-friendly products, stationary, ozone treatment , reduce, recycle, reuse), Payroll Analysis etc. Information technology can lead to hotel growth and long term success.

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**ISBN: 978-81-960940-3-4**

# **Rethinking Hospitality & Tourism**

## **Tourism Degrowth: An Approach towards a Sustainable Development**

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### **Abstract**

This essay examines the degrowth paradigm in the context of tourism in an effort to examine alternatives to traditional forms of development. Degrowth, which is promoted as an alternative to conventional development paradigms, strives to protect people's quality of life in a society with less work, production, and consumption. Degrowth reorients the existing unsustainable and unfair route through the shift to a smaller economy with less output and consumption as a weapon against the issues amassed by capitalism.

Analysts are trying to figure out how to build economies that don't prioritize growth but nevertheless promote human flourishing.

A significant aspect of capitalism, tourism, is involved in these problems, and recent worries about "over tourism" are merely one symptom of the issue. In this article, issues of tourism degrowth are conceptually examined. It looks at the conflicts that now exist in global mobility and makes the case that a just and sustainable degrowth will necessitate paying more attention to equity.

According to this research, reinventing tourism to emphasize local communities' rights and restoring tourism's social capacities are crucial components of such an agenda. This article makes the case for a new definition of tourism that prioritizes the rights of local communities over those of vacationing visitors and profit-seeking tourism corporations

**Keywords:** Degrowth, social equity, the definition of tourism, the role of tourism as a social force, and justice and tourism.

***Barkha Kashyap & Nihil Thomas***

## Introduction

Degrowth may be a relatively new concept with certain unique characteristics. But it also forms a component of a much larger body of thoughts that share criticism of contemporary growth-oriented civilizations. Since the end of the Second World War, that criticism has arisen, grown, and entered the mainstream (Pepper, 1996). With the publication of the Limits to Growth study in 1972 for the United Nations Club of Rome by a group of US scholars, growth concerns became overt (Meadows et al., 1972). According to the paper, the sustained economic expansion would have terrible repercussions for humanity since it would accelerate the depletion of scarce resources. Although this is a widely held opinion now, it was not as prevalent in the early 1970s.

Since then, neoliberal capitalism has evolved to depend more and more on growth as a solution to the crises it invariably causes. Degrowth is becoming more popular because of these tactics' harmful effects. Degrowth analysis looks at how to build economies that reject the need for growth but nevertheless promote humans.

Recent occurrences highlight a deterioration in the situation, and these call for careful consideration and analysis of the implications they may have for establishing sustainable tourism futures; Donald Trump's ban on travel, covid 19 etc. Many think that a 'new normal' is considered the pressing priority – a 'tourism reset' that respects supposed natural limits and cultural boundaries, something they believe mass tourism has failed to do.

Tourists are simultaneously sought in the cutthroat tourism industry to fuel the never-ending growth that is the foundation of modern politics in many nations. This exemplifies how mobility in this day and age is used in a variety of ways. While tourism (for the wealthy) is frequently created without regard for its magnitude and overall impact on areas that are already having issues of overdevelopment, refugees are not welcome, natural resources are limited and many more.

While more academics are starting to look at the equality of tourism outcomes, there is still relatively little research on the wider concerns of equity, fairness, and social justice in tourism, according to "sustainable tourism" analysts and co-founders Bramwell and Lane (2008). This article addresses the issue raised by the Special Issue of the Journal of Sustainable Tourism on degrowth in the tourism industry, which stated that "to seriously pursue degrowth at both global and as well as most national levels, would likely require a drastic transformation of the tourism industry and its metabolism" (Fletcher et al., 2017). The following sections of this article review degrowth theory, show how neoliberal capitalism's pro-growth ideology underpins tourism dynamics and contributes to the problem of over

tourism, argue that viewing tourism through the lens of social justice reveals injustice in global mobilities and calls for a radical rethinking of the right to travel, and reimagine tourism as defined by the rights of the local community.

## Objectives

- The aim of this work is the ability to articulate a radical conceptual argument: tourism needs to be redefined and redesigned in order to acknowledge, prioritize, and place the rights of local communities above the rights of tourists to take vacations and the rights of tourism corporations to make profits.
- The aim is to *contribute to the exploration of the potential for degrowth to facilitate a truly sustainable tourism*

## Methodology

This research article is done on qualitative and grounded theories. Qualitative data can take the form of articles, research papers, photos, videos and audio. With the help of the secondary data collecting approach, we have collected data from historical research, various critical social theories of degrowth in the tourism sector and its ongoing stand around the world. We have also investigated the research book *Demain la décroissance* by Nicholas Georgescu-Roegen 1979-provide an overview of the emergence of degrowth.

We have also collected data from various sources and research articles, the following are:

1. Research articles and papers published by Konstantinos Andriotis, David Simpson, Timothée Duverger
2. Tourism-related data from IGNOU Tourism books
3. UNWTO website.
4. News Articles of The Times on degrowth and rethinking tourism

We could examine the Brundtland Report or the 1992 Rio Declaration for Sustainable Development, two examples of sustainable degrowth that have yet to enter the larger scholarly and political sphere. Degrowth frequently appears as a potential emerging paradigm that could significantly help turn the unsustainable course we are on. If this course of action is to be taken, its proponents must be able to define degrowth in detail and with proper research on all the fields of economy.

## **An Analysis of the “Tourism Industry”**

A rising worldwide sector, tourism is frequently considered. In 2016, tourism accounted for 10% of the global gross domestic product, employed one in ten people worldwide, and is predicted to rise at a pace of 3% to 4% until 2030, according to the United Nations World Tourism Organization (UNWTO) (UNWTO, 2017). This expansion does, however, provide some unique difficulties. The impact of tourism on ecosystem damage (Stonich, 1998), global climate change (IPCC, 1999), and the eviction of people from their customary lands and livelihoods (Sirima & Backman, 2013; Vásquez-León, 2012) have all been criticized.

Economically, the involvement of transnational corporations has often meant that money generated by tourism leaves the host nation (Honey, 2008; Robinson, 2003), while producing primarily low-wage, service-level employment (Honey, 2008). Culturally, tourists have been accused of being indifferent to local norms and oblivious to the processes and potential downsides of cultural commodification and transformation (Greenwood, 1989).

It is crucial to understand that tourism, in all of its manifestations, is not always vulnerable to the ecological, financial, and cultural criticisms leveled against the so-called tourist sector as a whole (Higgins-Desbiolles, 2006). When tourism is practiced apart from neoliberal market logics, Higgins-Desbiolles contends, it may be a “strong social force [...] harnessed to achieve human development imperatives and the wider public good” (2006, p. 1192). In light of this claim, the issue arises: Are there tourist practices that may change the industry’s emphasis from one of profit and accumulation to one that would enable it to serve as a vision of degrowth? In thinking about the diverse means by which tourism could contribute to degrowth, it is important to ensure that “degrowth” does not become another meaningless term to describe the ethics of “alternative tourism.”

## **Degrowth and Tourism**

Degrowth does not intend to condemn impoverished countries to poverty, nor does it mean zero growth, a return to the past, or a patriarchal or authoritarian social order incompatible with democracy. It seeks to move beyond a narrow economic revolution to a much broader cultural paradigm shift.

Degrowth is frequently confused with a straightforward economic downturn or recession. However, as Kallis and colleagues point out, “Countries under recession or depression are not degrowth experiments, and deliberate decreases are not degrowth in itself” (2018, p. 294). In this sense, degrowth is unrelated to times and places of crises, economic

downturns, bursting financial bubbles, natural disasters, and similar occurrences. Degrowth, on the other hand, might be thought of as “a profound political and economic rearrangement resulting to drastically reduced resource and energy throughput.

Despite claims made by supporters that tourism is a benign business that significantly aids in development (e.g., UNWTO, n.d.), new research indicates that it has significant negative effects and consequences for efforts to achieve longer-term, more comprehensive sustainable development goals. Sustainable tourism development, is defined as tourism expansion without increases in matter and energy throughput that go beyond regenerative and absorptive capacity (2009, p. 53). As a result, degrowth thinking presents a fundamental challenge to tourism operations since it calls into question the presumptions that have driven the industry’s steady growth throughout the post-war era.

Degrowth, according to Demaria, Schneider, Sekulova, and Martinez-Alier (2013), began in the twenty-first century “as a project of voluntary societal shrinking of production and consumption aimed at environmental sustainability” (p. 192), but later developed into a social movement that primarily opposed economic growth. The Ecologist claims that the first international degrowth conference, which took place in Paris 10 years ago this year, is what popularised the term “degrowth” among English-speaking academics and activists worldwide (The Ecologist, 2018).

It typically alludes to the sort of cultural and social arrangements that would be needed for a different kind of economy based on degrowth principles. The most notable contribution to answering this is that of theorist Serge Latouche, who used the term *conviviality* to describe a slower, more localised society within which interpersonal culture would be enriched at a much lower level of consumption (2009). He argued that through diminishing growth and reorienting economies away from global markets towards a more localised basis, richer and more authentic human relationships could be forged. This involves a strong critique of consumerism, and the Frankfurt school theorists are sometimes invoked as shaping this outlook (Demaria et al., 2013).

## **A Social Justice Perspective on Modern Tourism**

Over the years Tourism development, rather than being a force for justice, has resulted in social justice issues, and environmental racism, and left many communities with far too little control over their futures. As a result, it has increased the number of claims of injustice, threatening the sector’s long-term sustainability and growth. It can be argued that the unjust structures of today’s tourism system are ill-equipped to identify and address justice issues and complexity in tourism, where many of its negative impacts are ignored or downplayed. The impacts are even more evident in many of the world’s poorest communities in the Global South that were lured into tourism with the hope of gaining benefits. In many of

those destinations, such tourism development policies have negatively affected the natural ecosystems and ignored the rights and interests of local communities and non-human animals.

Tourism has the potential to contribute to more sociologically and ecologically just forms of development by promoting peace, fairly distributing benefits among communities and individuals, increasing the self-esteem and capabilities of indigenous groups, involving community and empowering women, conserving the natural environment and nonhuman animals, and securing justice to build a better future. However, so far, such ambitious aims have not translated into tourism practice. The source of injustices in tourism is the industry's narrow focus on commercial dimensions, economic growth, and pursuit of its own interests.

Although the World Tourism Organization (UNWTO) claims to be interested in the socio-cultural contributions made by tourism, economic values are emphasized most prominently in all of its documents. For instance, the "why tourism?" webpage describes the following modern trends and developments:

- 1323 million foreign visitors arrived in 2017, an increase of 7%.
- Export revenues from international tourism totaled US\$1.6 trillion in 2017.
- According to UNWTO, foreign visitor arrivals will increase by 4% to 5% in 2018.
- According to UNWTO predictions, 1.8 billion foreign visitors will arrive worldwide by 2030. (UNWTO, n.d.a).

Based on these numbers, the UNWTO works to promote "mainstreaming tourism in the development agenda" (UNWTO)

The world community is faced with a difficult equity issue as a result of the phenomenal increase in tourism consumption as more and more developing nations pursue a development trajectory meant to match western consumption levels. There isn't enough world for everyone to be the typical North American or European long-haul tourist, according to Hall (2009), who observed that this is a concern given the substantial negative environmental effects of tourism

While the expanding middle classes of populous nations like China and India offer lucrative opportunities for tourism multinationals and destination governments, little attention is paid to issues of equity, justice, and fairness in the consumption of tourism and the need to impose limits on the interests of safe futures as touring populations rise quickly in a world with dwindling resources.

We can see how tourism develops as a result of pressure from linked parties and global travel companies that push for methods of tourism development that are pro-growth. They are not constrained to observe such boundaries in the current neoliberal environments of deregulation and show little consideration for the carrying capacity restrictions that a specific destination may be subject to.

A consumerist dynamic that is never satisfied and actively seeks newer and more innovative tourist locations and experiences makes it possible for this capitalistic system of production in the tourism industry. Tourists are constantly looking for new experiences because they're restless, bored, and looking for new ways to escape reality.

Similarly even in a wider context, conceptualizing sustainability in terms of just economic repercussions on communities, regions, and countries has given rise to problems like emphasizing dominant western ideals or excluding marginalized groups (including women, indigenous people, and immigrants) and nonhuman actors. Similarly, this issue is evident in climate and environmental research and policy which has failed so far to deliver positive, just outcomes for society while affecting both humans and nonhumans.

To the devastating effects of climate-driven disasters on nonhuman animals from the 2019-20 bushfires in Australia that killed or displaced nearly 3 billion animals (WWF, 2020) to the melting Arctic Sea ice or loss of wetlands in northern America threatening natural ecosystems (NWF, 2021). Climate scientists are now warning us that we are crossing the tipping points for many of the earth's critical ecosystems. Tourism is not detached from this wider discourse as it is both affected and responsible. Due to the prevalence of conventional economic theory and humanistic frameworks that support humankind's power, questions and applications of justice have been disregarded for far too long. A current movement that recognises the unjust and unsustainable structures of tourism argues for the integration of justice not only in tourism study but also in practice to move towards a more just tourism future.

The issues of migration in relation to the environmental change brought on by climate change are also starting to receive attention from justice-oriented scholarship. Whole communities in the Arctic are already preparing to leave their homes, and even entire nations, like Tuvalu and Kiribati, are becoming environmental refugees. This is the newest and perhaps the gravest form of environmental injustice and environmental racism; it may also compound historical and colonial abuses.

These few incidents briefly addressed here invite us to think about the mobilities of tourists versus the mobilities of vulnerable others through a lens of social justice as we consider possibilities of degrowth. This begs the question of how the right to travel and



tourism are implemented. Moreover, current crises like climate change, biodiversity loss, and the COVID-19 pandemic have demonstrated “how social, economic, and ecological impacts are interwoven and justice approaches are essential for building fairer futures,” a transition in tourism is now more necessary than ever to “reset,” “rethink,” and “reorient” tourism.

### ***Does degrown tourism provide more for less?***

- According to Hall (2009), degrowth includes respect for human rights, participatory democracy, equity, and cultural diversity. A pathway to facilitate a truly sustainable tourism
- Degrowth refers to a trajectory where the ‘throughput’ (energy, materials and waste flow) of an economy decreases while welfare, or well-being, improves.

Numerous proponents of economic expansion would concur with these broad objectives. The axiom that degrowth aims to attain a version of these through a significant decrease in economic activity and production is crucial to note right away.

The *Political Ecology Network* (POLLEN) argues that Covid-19 may be an opportunity to consider the need for tourism degrowth. They argue that even if the Covid-19 crisis ends relatively soon, we cannot afford to return to levels of travel experienced previously, particularly by the wealthiest segment of the world’s population. This is not only because of the discontent over tourism understandably provoked, but also because of the industry’s environmental damages (including climate change as well as pollution and resource depletion) which were already beyond unsustainable.

Latouche emphasised ‘conviviality’ as degrowth’s alternative to consumerism (2009). Conviviality, for him, is a more authentic connection between people in a community through a slower, more localised society with much lower consumption. Put simply, he argues that a society based on economic growth and ‘consumerism’ limits our capacity to relate to one another authentically, and hence there is a need to degrow, relocate, and alter society fundamentally.

### **Redefining Tourism and Defending it**

The process through which local communities invite receive, and welcome people in their area for brief periods of time with the aim of profiting from such actions is what may be referred to as redefined tourism. These types of tourism may be promoted by for-profit companies

or nonprofit organizations, depending on the business needs of each. The assets of the local community would only be accessible to tourism operators as part of this reorganized tourism with their permission and under their supervision.

A model of such a way of re-orienting tourism can be found in the Statute on Tourism in Kuna Yala. Kuna Yala (now Guna Yala) is an Indigenous province of Panama that has historically experienced imposition of tourism by central government authorities and the tourism industry (Bennett, 1999).

**The first article of the Statute declared:**

The only tourist activities and infrastructures possible in Kuna Yala will be, strictly and solely, those that respect, conserve, value, and defend the natural resources, environment, and biodiversity of the comarca [reservation], as well as the sociocultural, political, and religious Kuna norms and customs.

The thrust of this law was to prevent outside investment in Kuna lands, assert full control over tourism projects and subject all Kuna tourism projects to an approval process of the Kuna General Congress (Bennett, 1999).

It is important to note here that the Kuna first reacted with violence against tourists imposed on their communities by the Panamanian central government and the tourism industry, before asserting their rights through the Statute (Bennett, 1999). More recent research has shown that the Kuna has been able to eliminate tourism intermediaries and thereby retain more of the benefits of tourism for themselves but even more importantly present a model of local empowerment and full sharing of the tourism opportunity and its benefit.

There is a long and impressive history of opposition to corporate agendas that seek to benefit from and grow from tourism. We are engaged in a severe war for power and control in the tourism industry, and the usurpers have thus far succeeded admirably in causing us to disregard and forget the thinkers and role models who came before us. The crises and difficulties we face today, however, are so severe that we must mount fresh opposition. Any Programme planning to slow the rise of tourism must prioritize reclaiming tourism for human needs within the broader context of autonomous sustainable resource management and distribution of wider benefits and drawbacks of development.

Serge Latouche an economic Anthropologist suggested eight “Rs” for a degrowth transition. These approaches are

1. ***Re-evaluate and shift values:*** Currently, the definition of tourism is either the business of providing goods and services to tourists or the reasons why people travel and the types of things they need. This needs to be altered. Tourism should be better described as the voluntary hosting of visitors in local communities for the benefit of the residents in the interests of equity and justice (and second, tourists)

It is crucial to move the values of tourism away from overt commodification and exploitation. It is necessary to bring back the concepts of connection and hospitality in tourism. In addition, we need to reconsider how we assess the advantages of tourism, putting a greater emphasis on local communities and moving beyond the flimsy economic advantages provided by big businesses with a tendency to leak money. Additionally, when evaluating the effects of tourism, it is necessary to take into account the fact that developed-world tourism practices have unfair environmental effects on developing-world tourism, as evidenced, for instance, by climate change effects.

2. ***Re-conceptualize entrenched capitalist concepts:*** The UNWTO Global Code of Ethics for Tourism (1999) warns businesses against making excessive profits from their operations. This is utopian rhetoric that serves as public relations spin in a system where such firms' primary goal is to maximize profits.

The growth agenda sought by tourism authorities will have to be given up for tourism to meet degrowth targets. The government's regulations for sustainability and the general welfare must be accepted by the tourism industry, and it must stop advocating for their elimination as “red tape” and a barrier to its development goals.

3. ***Restructure production:*** The ability of multinational businesses to control trade conditions through their influence in the global supply chains for tourism cannot be tolerated, especially in light of the significant authority that they have been granted by international agreements like the General Agreement on Trade in Services. One example to consider is Barkin's (2000) analysis of the function of sustainable domestic social tourism in Mexico. This explored a restructuring of tourism away from unsustainable forms of growth models based on international tourism to more sustainable and beneficial forms of tourism based on domestic tourism for sustainable livelihoods and community well-being

4. ***Redistributions at the global, regional and local scale:*** In the future, when there will be great worldwide turmoil brought on by global climate change, the right to travel will need to be reconsidered. Holiday travellers' rights must be evaluated against those of environmental and conflict refugees seeking both temporary and permanent safe shelter. This may be resolved by redistributing access to mobility based on justice and equality, as opposed to wealth and financial capability. The Office for International Migration and the UNWTO, the two organisations tasked with tackling mobility on a global scale, will need to be completely restructured under new charters for a new era.
5. ***Re-localize the economy:*** Re-localization as a strategy has previously been adopted by the tourism industry, firstly through "buy local" campaigns and then more completely through neolocalism initiatives. The latter provides an opportunity for critical analysis of the approaches that the international community may take to transition to sufficiency economies and post-carbon economies. Neolocalism focuses on the importance of local production, distribution, and consumption in creating networks of well-being, may connect people with their environment, and can deepen understanding to promote individual and societal measures to combat climate change.
6. ***Reduction, reuse and recycling of resources:*** sustainable tourism development is tourism development without growth in throughput of matter and energy beyond regenerative and absorptive capacities. We would have responded more meaningfully to this problem if tourism faced the reality that it could no longer appropriate landscapes, cultures, and peoples on a finite and strained planet. The concepts of reduction, reuse, and recycling in tourism have yet to be fully integrated into carrying capacity theories.

However, this task should be pursued on a far larger scale. One example is the "half earth" plan (Wilson, 2016), which contends that we must safeguard and conserve vast swaths of the biological environment, prohibiting human usage and access to even the most "benevolent" of sectors, tourism. We would have responded more meaningfully to this problem if tourism faced the reality that it could no longer appropriate landscapes, cultures, and peoples on a finite and strained planet. Concepts of reduction, re-use, and recycling in tourism are still to be more strongly embedded in carrying capacity theories.

How can we divert tourists from the power agendas that encourage growth dynamics is the last important issue to be addressed. There is a comprehensive research and action agenda to follow in order to achieve this. It is crucial to alter tourism education so that future planners and policymakers comprehend the importance of tourism for human well-being and as a moral endeavour.

**Barkha Kashyap & Nihil Thomas**

## Result and Discussion

Through this research, we have understood that although the degrowth agenda has been around for centuries and has received a lot of research attention from different fields (see, for instance, Alexander, 2012; Andriotis, 2013; Kallis, 2011; Kallis and Schneider, 2008; Latouche, 2010; Levallois, 2010; O'Neill, 2012; Schneider, Kallis and Martinez-Alier, 2010; Sekulova et al., 2013; Trainer, 2012; van Griethuysen, 2012; van den Berg, J As a result, it is considered a recent topic that needs further inquiry, attention, and development. Even the few studies in the tourist literature that have been published (see Bourdeau and Berthelot, undated; Canavan, 2013; Hall, 2009) have been descriptive rather than analytical in nature, therefore the topic has not been clearly studied from a different perspective.

As a result, it is considered a recent topic that needs further inquiry, attention, and development. Even the few studies that have been published in the tourist literature (see Bourdeau and Berthelot, undated; Canavan, 2013; Hall, 2009) have been descriptive in nature rather than analytical, therefore the topic hasn't been explored from the unique viewpoint of tourism. (The empirical study of Andriotis, 2013 is an exception.

This paper addresses significant basic elements of degrowth in the context of tourism, making one of the few attempts to scientifically approach the subject from the standpoint of tourism, such as:

1. To encourage a lack of industrialization
2. Aspire to increase benefits for the local population
3. To advocate for anti-materialism
4. To encourage eco-friendly transportation
5. To motivate and promote product recycling and reusing
6. To focus on striving towards a socially and ecologically sustainable society

## Conclusion

Global problems and difficulties that the tourism industry is currently facing have the potential to increase unfairness and inequality already present. In addition, unmanaged, fast tourist expansion has exacerbated numerous ecological and social inequality problems. This study showed that, despite a rise in justice discourses in tourist policy and planning papers from the 1990s, this hasn't always transferred into tourism practice. It also presented challenges and important considerations.

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The purpose of this article was to use conceptual analysis to investigate the likelihood of fair and sustainable degrowth in the tourist industry. This led to a reinterpretation of tourism that put the rights of local communities ahead of the rights of travellers to have vacations and the rights of tourism corporations to generate money. The difficulties in the tourist sector that arise when we face the limits to our planet's ability to expand are unlikely to be resolved by solutions provided by the corporate tourism sector.

Ultimately, bringing our civilization back within planetary boundaries is going to require that we liberate ourselves from our dependence on economic growth—starting with rich nations. This might sound scarier than it is. Ending growth doesn't mean shutting down economic activity—it simply means that next year we can't produce and consume more than we are doing this year. It might also mean shrinking certain sectors that are particularly damaging to our ecology and that are unnecessary for human flourishing, such as advertising, commuting, and single-use products.

To correct these inequities and put tourism on a deceleration trajectory, Redefining tourism will be important, as well as situating it within the proper framework of global mobilities, human well-being, and sustainable futures. It is time to recover tourism for human use from an industry that views it as a means of making money. A concerted effort to ensure that welcoming tourists respect the rights and interests of local populations. The problems brought on by over-tourism serve as a wake-up call, and if tourism is to have a sustainable future, adopting just and equitable degrowth methods will become increasingly important. It is suggested that more research is needed to explore the extent to which degrowth can be reconfigured to offer an enhanced tourism experience and contribute to behavioural change.

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**ISBN: 978-81-960940-3-4**

# **An Analytical Review of the Cleanliness in Beaches - Thiruvannamiyur Beach in Focus**

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## **Abstract**

Beach cleaning plays a major role as part of environmental concern and an activity for coastal recreation. This is important as coastal debris continues to pollute the coastal environment and reduce visitor satisfaction. More and more private groups, colleges, institutions, ngo's are voluntarily joining the campaign of beach cleaning for removing trash from beaches and to create an awareness regarding cleanliness. By using qualitative method, this study was able to conceptually explain beach cleaning behaviour. During the research which is done through collecting and analysing data through participatory observation and ongoing comparative analysis, we found that beach cleaning is primarily a recreational activity and environmental and recreational motivations compete. Beach cleaners live in a social world surrounded by legitimacy, identity and shared altruistic values. They exhibit focused, low-level activity and a strong sense of place. Storytelling and scavenging emerged as mechanisms to deal with persistent litter problems, hence beach cleaning is very important and the need of the hour. Beach cleaning events may provide tourism planners with an opportunity to promote inclusive family recreation and attract new visitors to local beaches. This allows environmental NGOs and policy makers to strengthen their own environmental action campaigns.

**Keywords:** Recreation, Environment, Tourism, Beach Cleaning.



## **Introduction**

**“Sky above, sand Below and peace within .”** And this is how the public connect with the beach as it makes one feel connected ,and make you to face life as surprises come your way.

Beach cleaning or clean-up is the process of removing solid debris, dense chemicals, and organic waste deposited on a beach or shoreline by tides, local visitors, or tourists. Bags, plastic straws, fishing tackle, cigarette filters, six pack rings, surgical masks and many other items often contaminate beaches and lead to environmental degradation. Every year, hundreds of thousands of volunteers comb beaches and coastlines around the world to clean up this debris. These materials are also known as ‘marine debris’ or ‘marine pollution’ and their amount is increasing day to day due to human-centred activities, and because of the irresponsibility that people to enjoy the beach without harming them. There are several major sources of beach litter, including beach users, oceans, currents, and river currents. Marine debris such as crude oil and chemicals also drift out of the oceans and accumulate the beaches. In addition, many rivers carry some urban garbage to the beach. These pollutants harm marine life and ecosystems, human health and coastal tourism. And due to all the above reasons and the presence of litter are the two strong reasons for the reduced number of visitors to the beaches over time and some completely abandon to visit beaches, as it creates a sense of ill health and threat to human life. Poor beach cleanliness also contributes to reduce beach recreational potential and affect economic and social well-being. This is because coastal populations in particular have become dependent on beach areas. Thus, cleaning is therefore one of the primary concerns of many destination beach managers and now a days considerable amounts of money are spent each year on beach cleaning to meet the demands of users for litter-free beaches.

## **Reasons for the Beach Heath to Get Affected**

### **1. Pollution**

Pollution of the coastal environment limits our ability to use beaches for economic, recreational and aesthetic purposes. It degrades and destroys the unique beach habitats that plants and animals need. Polluted beaches pose a public health risk, reduce property values and can impede economic growth in communities.

There are several other factors pollution can occur

#### ***1.A Rain or melting snow - the reason behind overflows:***

Rainwater and snowmelt can overflow certain types of sewers when the capacity of the sewer is exceeded. Runoff from combined sewage overflows (CSOs) and sewage overflows (SSOs) contain a mixture of raw sewage, industrial wastewater and stormwater, causing beach

closures, shell bed closures and aesthetic concerns. Combined sewers are designed to collect stormwater runoff, domestic wastewater, and industrial wastewater into the same pipe. In most cases, in a combined sewage system, all wastewater is taken to a treatment plant where it is treated before being discharged into the body of water. However, during periods of heavy rain and snowmelt, the amount of wastewater discharged from the combined sewer system may exceed the capacity of the sewer system or sewage treatment plant. For this reason, combined sewer systems are designed to overflow in some cases and dump excess wastewater directly into a nearby stream, river, or other body of water.

### ***1.B Discharges from ships and boats:***

Accidental or intentional discharges from ships of all kinds are sources of pollution that can affect beaches. These emissions include garbage, fishing gear, ballast water, bilge water, and water from sinks and showers.

### ***1.C Garbage improperly recycled:***

Garbage that is not recycled or properly disposed of is likely to end up on the beach as it is carried by the rain into gullies, streams and rivers, washed out of bays and estuaries into the sea and washed onto the beach. There are plastic bags, bottles, cans, cigarette filters, bottle caps and caps. Other sources include people leaving trash on the beach and fishermen losing or discarding fishing nets and lines at sea.

## **Habitat Erosion and Degradation**

Overuse of beaches can lead to habitat degradation over time. Walking over the dunes can destroy vegetation and blow away sand. Waves from boats near the shore can also erode the beach. Sand dunes are important natural features as they protect inland areas and wetlands from floods and storms and provide unique habitats for a wide variety of plant and animal species.

## **Climate Change**

Coastal and marine environments, including beaches, are particularly vulnerable to climate change. Sea level rise is a problem that is already affecting coasts and oceans. Coastal areas such as beaches, wetlands and estuarine habitats are at risk of flooding and erosion, and may become less self-sustaining when sea levels rise. As sea levels rise, physical structures (dam walls, bulkheads, and other coastal protection structures) prevent the raised coast from moving inland.

Beaches that could be submerged by sea-level rise or erosion fail to provide shelter to coastal communities and provide critical habitat for marine life, birds, and other species. The frequent occurrence of extreme weather events has also increased beach contamination from stormwater runoff and sewage discharged from damaged infrastructure.

## **Objectives**

1. To find the ecosystem impact created by the Thiruvanmiyur Beach.
2. To create awareness about the cleanliness of Beaches.
3. To highlight the various NGO's and IHM chennai's contribution in creating awareness about the cleanliness campaign in Thiruvanmiyur beach through Swachhta action plan.

## **Review of Literature**

### **Aesthetics of Beach**

Wind, waves, and sand present a feast to the onlookers and the ones who loves the beach to explore. People living in all sorts of settlements enjoy the openness of any beach aesthetics, the texture further the enjoyment. Walking such as ripple marks and other wind-generated features are beautiful to look at. During windy days transport of sand is picturesque. The scenic beauty is enhanced by the pounding of waves with thumping sounds. One can watch endlessly advancing and breaking waves. Its purity is yet another factor in deciding the degree of aesthetics. By-passing ships of- for visual delight to visitors. Wind, waves, and sand present a feast to the onlookers. People living in all sorts of settlements enjoy the openness of any beach. consolidated and texture further the enjoyment.

### **Destination Profile of Thiruvanmiyur Beach**

Thiruvanmiyur beach is located in Valmiki Nagar, in the direction towards South of Chennai. This is quiet the least sorted out as it has the less crowd comparatively from Marina and Ellito's beach .It is said to be the glowing beach as locals discovered a wonderful sight of glistening water and prominently known for the sunset .Over time and years this beach stands visible as other beaches of chennai especially Marina becoming so congested, dirty, and commercial over time, with Mahabalipuram being no different. This beach is nice and tidy with less crowd and less stores in the sand at the seashore. Outside of the beach, restaurants have all been strictly monitored and appear to be rather hygienic. This area and the location is more beautiful for strolling on the walking route and in the sand. It is said to be very safe for

families with children and youth as it is quite less in breadth of sands and steep in the shore. Above all the beach isn't government funded rather this beach roads, lamps, chairs etc., are funded by the local townsmen. The area must be searched for parking because cars are not permitted in the mornings or nights. Hence the parking being congested like many other tourist places is avoided in this beach. And that's how this destination geographic domain is unique and good which makes the public come again and again.

## **Famous Tourist Spots Near Thiruvannamiyur**

### **1. Marundeeswarar Temple**



This is a 1,300-year-old temple located near Thiruvannamiyur beach near the coast of the Bay of Bengal. The Marundeeswarar temple finds its place in the 7th and 8th century verses of his famous Nayanars namely Appar and Thirugnana Sambandar.

The famous sage Valmiki, who wrote the Ramayana, worshiped Lord Shiva in this temple, and hence the place is also called Thiruvalmikiyur and later renamed as Thiruvannamiyur. Opposite this sacred temple, a temple was built in honor of Valmiki.

Travelers will be impressed by the amazing architecture. The Rajagopuram, or Gate Tower on East Coast Road and West Tank Street, greets visitors to the sacred site. Impressive carvings on pagodas and Rajagopuram tell inspiring mythological stories. Devotees will also be delighted to see three different forms of Lord Shiva as Yagagaraja, Marundishwarar and Nataraja in the devotional temples. His consort Goddess Parvati is seen in the form of Goddess Tripura Sundari.

## Research Methodology

In this research paper, both the primary and secondary sources were used to analyze the various ecosystem impact created in the Thiruvannamiyur beach.

- This study is based on the Qualitative method. The data for the primary sources is from interviewing the NGO's and through observation method.
- The secondary source is based on is based on journals, Internet, Magazines etc.

## Analysis

### 1. Punganeri Clean Earth



In latest 12 months the intake of plastic is extended each day because of technological improvement and populace growth. The latest survey conducted during the research estimate that thirteen million metric lots of plastic grow to be in our oceans every 12 months including to the estimation one hundred fifty million metric lots presently circulating our oceans.

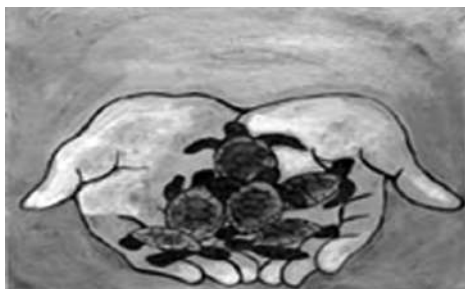
And hence one NGO organisation, which volunteered is known as the **Punganeri Clean Earth (PCA)**.

Punganeri clean Earth is a non-profit organisation formed in India, with a vision to raise awareness about cleanliness in addition to the arena from plastic pollution. They are also popular for doing campaigns, weekend workshops in the beaches. This organisation is founded by Dr. Uthman a historian, environmentalist and a social activist, with the help of the co-founder Mrs. Rajathi Uthman a software Engineer, this organisation started.

### ***History of the Punganeri Clean Earth***

Since 2012, Dr. Uthaman participating in social activities in his village of Chinnapunganeri, which is located in the Cuddalore District of Tamilnadu, India. During 2018 he went to Spain Barcelona lived in sitges with his family and met Andrea torres fellow benefactor of Unadulterated CLEAN EARTH. Along with Rajathi, Iniyazhisai, and Vetrimaran, members of his family, he participated in the beach clean-up. That's how it all started, After that, in December of 2019, he returned to India and, drawing inspiration from PCE Barcelona, established PUNGANERI CLEAN EARTH. In India, he started a beach and village cleanup. Because agriculture land and marine habitat in India are completely affected by plastic pollution.

## **2. Students Sea Turtle Conservation Network [SSTCN]**



The Students Sea Turtle Conservation Network [SSTCN] is a non-profit organisation comprised primarily of students and young adults that has been working on Chennai's beaches since 1987 to protect and raise awareness about the endangered Olive Ridley sea turtle [*Lepidochelys Olivacea*].

It is an important conservation organisation. Turtle walks are offered to anyone who are actually interested in conservation and wish to learn something about turtles and other conservation challenges. Walks are not intended to be entertaining.

### ***History of Students Sea Turtle Conservation Network (SSTCN)***

Sea turtle conservation in India began in the early 1970s with migrations of sea turtles off the east coast of Madras (now Chennai). Coincidentally, in Gahilmatha, Orissa, was one of the world's largest Olive sea turtle colonies. Started by a group of enthusiasts, turtle migration and conservation efforts on the Chennai coast have been going on for about ten years through government agencies (Central Marine Fisheries Research Institute and Forestry Department). The Student Sea Turtle Conservation Network (SSTCN) was established in 1988 and has for the past 25 years conducted conservation programs focused on sea turtle hatcheries.

***Jayitri & Michael Santhosh***

Kartik Shanker is the founder of the Madras Snake Park and the Madras Crocodile Bank Trust (MCBT). He with his team formed 'The Student' Sea Turtle Conservation Network (SSTCN) in December 1988 and the first hatchery was established. Tito Chandy and Arif Razack were the first founders, he was soon followed by Tharani Selvam, Kartik Shanker, Yohan Thiruchelvam and Tara Thiagarajan. Satish Bhaskar, one of India's pioneering sea turtle biologists, lived and supervised students in Madras from 1988 until 1991 he worked for SSTCN.

### ***Mission and Goals***

Every year, between January and April, Olive Ridley turtles lay their eggs on our beaches at night. During this season, the organisation comb the beaches every night alongside Forest Department personnel in search of their eggs, which they collect and transport to a Forest Department hatchery. Then they release the turtle hatchlings into the water safely 45 days after they hatch. On Friday and Saturday nights, lead a stroll for anyone who are interested. These walks are led by SSTCN employees in collaboration with Chennai Wildlife Division personnel.

SSTCN activities also includes beach monitoring, hatchery management, protection of nests left on beaches ("in situ nests"), and education and awareness campaigns. This program has been running since 1988 till present. Each season, the group sets up a hatchery at Neelangalai and patrols the same 7 km beach nightly from late December until mid-March. Depending on the year, if there are enough volunteers, the patrol will be extended 5-10 km further north beyond Neelangalai till Thiruvannamiyur. Most nests in the area are highly vulnerable due to stray dogs and human grabbing of the eggs.

### ***Details of the Walk***

Volunteers walk seven kilometres from Besant Nagar to Thiruvannamiyur beach till Neelangarai Beach. Around 11.30 p.m., they gathered at Neelangarai beach. The trek begins following a lecture on turtles and other environmental challenges. The stroll might last until 4 or 5 a.m., depending on whether or not we discover any nests and how many.



### 3. Swachh Bharat Abhiyan -Awareness Campaign on Sanitation and Cleanliness By IHM Students



As part of Swachh Bharat Abhiyan students of IHM Chennai visited Thiruvannamiyur beach and did cleanliness campaign

#### ***Mission of the Campaign***

The mission is all about spreading awareness about cleanliness and sanitation.

#### ***Details of the Campaign***

Firstly, the students and the staff coordinators reported near the reception of IHM Chennai with the required cleaning equipment's. Then divided the total members of 30 to 2 teams and the first set of 15 students were sent for cleaning drive near the beach. The second team of 15 students were carrying banners and creating awareness for the beach visitors and the public in general. This awareness campaign happens takes place once in two months to create the responsibility and the knowledge about environment, cleanliness in beaches among the students community as well as to the public in general.

This campaign went on from Afternoon 2 P.M till Evening 5.30 P.M.



## **Findings and Suggestions**

1. Recently more and more NGO's are coming rapidly with the social motive to create awareness and instill responsiveness among youth about Beach Cleanliness.
2. Care of turtle walks are in the recent trend to protect and conserve the endangered species, the Olive Ridley Sea Turtle.
3. The awareness and knowledge about eco system and environment should be instilled in the young minds from their childhood.
4. Fish, seabirds, sea turtles and marine mammals can become entangled in or ingest plastic waste, leading to suffocation, starvation and drowning. And it's high time we have to protect fauna and flora for the upcoming generation.
5. Beaches are the source of high potential tourism revenue to the government but sustained tourism programme are never being implemented with continuity.
6. The water quality of beaches is the biggest disadvantage and untreated domestic sewage should be avoided.

## **Conclusion**

The need for beach cleaning is very important as beaches provide shelter to residents who live near the sea by acting as a buffer against strong storms and the strong winds and waves of rough seas. It prevents debris from flowing back into the sea and marine life from being killed by debris. Marine life often suffers from the ill effects of pollution as mistakenly food waste are consumed for food and gets suffocated. Hence beach clean ups are very important to reduce the problems caused by marine debris and the danger plastic pollution poses to marine life. Above all beaches are a diverse and beautiful natural treasure for all of us to explore and enjoy together. They make us feel connected, joyful and relaxed. But it is so unfortunate, that litter on our beaches is endangering the natural treasures.

Beach gives us so many goodnesses, but is it preserved divine clean. The answer to this statement is a Big Nooo! Everybody should know the value of the environment and Sustainability. So instead of blaming or criticizing one other's duty and responsibilities it's high time that each individual should take responsibility and that is the sole aim of this research.

**Individually, we are one drop. Together, we are an ocean.”**

Just like the above quote says - Let’s all work together as a team to lead the way to A Cleaner Nation!

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**ISBN: 978-81-960940-3-4**

## **Solid Waste Management System – A Case Study on Shimla**

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### **Abstract**

Solid Waste Management Practice is an important function of any Local Body Government in order to ensure proper development of that particular local body. In order to build sustainable and liveable city, solid waste management is a great challenge for the local government. Solid Waste can create significant health problems and very unpleasant living conditions if not disposed in appropriate manner. Hence, management of this waste was the need of the hour. An attempt was made by the Shimla Urban Local Body to assess the existing solid waste management system, environmental concerns and its future implications. Successful implications of Door-to-Door Garbage Collection Practice in the challenging terrains of hills as well as the user charge model of Shimla Municipal Corporation proved to be a historic step in the city's history. This paper enlists and studies the stringent enforcement of the Solid Waste Management initiative by the Shimla Urban Local Body. Still Shimla Municipal Corporation has a long way to achieve cent percent proper Solid Waste Management.

## Introduction

The former summer capital of British India, and the present capital of Himachal Pradesh, Shimla is spread across an area of 5131 sq. km. The topography of Shimla is characterised by rugged mountains, steep slopes and deep valleys. Shimla is situated at an altitude of 2276 m above mean sea level. It experiences cold winters during December to February, with temperature ranging from 0-13°C. It receives snowfall around Christmas of last week of December. The summers (May to June) are mild with temperatures ranging between 20-30°C. The monsoon period is from June to September experiencing moderate rainfall. As per the Census (2011), Shimla is the only Class I city in the state of Himachal Pradesh with total population of 1,69,758 people. In 2000, the Ministry of Environment and Forest, Government of India notified the Municipal Solid Waste Management Rules {MSW (M&H Rules, 2000)} for all Indian Cities. The rules direct various Urban Local Bodies to have a proper Waste Management System. Following were the directives provided to the ULB's:

1. Prohibit littering on streets by ensuring storage of waste at source in two bins; one for biodegradable waste and other for non-biodegradable waste.
2. Primary collection of (segregated) biodegradable and non-biodegradable waste from the doorstep, (including slums and squatter areas) at pre-informed timings on a day-to-day basis using containerized tri cycle/handcarts/pick-up vans.
3. Street Sweeping covering all the residential and commercial areas on all the days of the year irrespective of Sundays and public holidays.
4. Abolition of open waste storage depots and provision of covered containers or closed body waste storage depots.
5. Transportation of waste in covered vehicles on day-to-day basis.
6. Treatment of biodegradable waste using composting or waste to energy technologies meeting the standards laid down.
7. Minimize the waste going to scientifically engineered landfills (SLF's) and dispose of only rejects from the treatment plants and inert material at the landfills as per the standards laid down.

As a result, Shimla Municipal Corporation with the help of NGO's started a DOOR-TO-DOOR GARBAGE COLLECTION SCHEME. A user charge of Rs. 20 per house / month was fixed as the user charges by the SMC. Same amount was charged by the NGO to the Shimla Municipal Corporation for its services. But soon the area started to expand and no.

of households started increasing. Hence, Municipal Corporation faced financial issues. Later Shimla Municipal Corporation started charging as per fixed kg of waste in order to sustain this scheme financially. But again, this charging method failed and thus Shimla Municipal Corporation abolished this method and resumed the previous technique with revised user charges of Rs. 30. But this entire scheme proved to be a failure since neither the Municipal Corporation nor the NGO could attain profits. Moreover, charging the same amount to all the establishments of the city whether residential or commercial proved to be big pit in the mile.

This research shall enlist the stringent techniques which followed this failure of SMC and also study their effectiveness till date. This research shall also uncover various improvements which can be brought in the current Solid Waste Management System followed by the Shimla Municipal Corporation.



**Figure 1: Garbage Dumps in the Natural Forests of Shimla**

*(Source: Google Images)*

## **Review of Literature**

Shimla city has witnessed large scale urbanisation in last one decade. The municipal limits have also expanded tremendously exerting an extra load over the existing infrastructure. The city has gradually improved Solid Waste Management infrastructure as a result of various schemes of Ministry of Housing and Urban Affairs. In last three years technical expertise has been brought in by private sector, development organisations and capacity building. Regular High Court interventions, stringent bye laws and public participation resulted in improved aesthetic value and environmental health of the city. The technical capabilities of human resource MC Shimla are low in this regard and needs immediate capacitating measures. Sanitation being a state subject, it is pertinent that the state government needs to take a holistic view towards solid waste management. Capacity building measures, state specific technological options, up scaling of the best practices to the other ULBs will be helpful for attaining desired outcomes. A state level solid waste management strategy is recommended to strengthen and empower ULBs for providing sustainable solid waste management services in efficient way. Information exchange workshops and communication plan targeting behavioural change should be steered at state and ULB level in coordination.

## **Research Methodology**

Explorative research was carried out to find out the minute details about the current Solid Waste Management System Shimla Municipal Corporation. A questionnaire was prepared to figure out the perception of the residents of the city.

### **Primary Data**

Primary Data was collected from a sample of residents of Shimla. The data was collected using following techniques.

1. **Personal Interviews:** A sample size was interviewed about their perception over the effectiveness of Solid Waste Management Plan of Shimla Municipal Corporation using a set of pre-set structured questions.
2. **Schedule:** Following the reviews received and additional inputs, a schedule was prepared and was circulated among a different sample which included the service provider as well as the service beneficiary.

## Secondary Data –

Secondary Data was collected from various journals, publications, newspapers, official websites etc.

## Limitations of the Study –

1. The study was purely based on the information received through the limited scope and purview of the study.
2. The predictions and the responses of the respondents may differ accordingly with time, geographical zones.

## Data Analysis and Interpretation

In compliance to Himachal Pradesh Municipal Corporation Act, 1994 Shimla Municipal Corporation once again enacted Door-to-Door Garbage Collection Bye-Laws in 2006. It was made a legal binding for the general public to comply with these bye-laws else there was a provision of withdrawal/ disconnection of the basic amenities such as water, sewage and electricity. The enforcement to these bye-laws was ensured by Shimla Environment, Heritage Conservation and Beautification (SEHB) Society. Waste Processing and Treatment facility is operated on Public Private Partnership (PPP) Model by Hanjer Biotech Energies Pvt. Ltd. and a secured landfill facility developed on PPP Model. The overall monitoring and supervision are carried by MC Shimla and the Himachal Pradesh State Environment and Pollution Control Board (HPSPCB) in a regulatory role.

**Table 1: Various Stakeholders and their Roles in Solid Waste Management**

S.No.	Functional Element of SWM	Role/ Responsibility	Monitoring Authority
1.	Collection	SEHB Society	MC Shimla / SEHB Society
2.	Transportation	Health Department MC Shimla	MC Shimla / HPSPCB
3.	Processing and Treatment	M/S Hanjer Biotech Energies Pvt. Ltd.	MC Shimla / HPSPCB



4.	Cost Recovery and Recycling	SEHB Society and M/s Hanjer Biotech Energies Pvt. Ltd.	MC Shimla / HPSPCB
5.	Disposal	Current disposal is at a single designated site for MCS Sanitary Landfill - DPR has been approved, implementation will start soon.	MC Shimla / HPSPCB

Shimla City has successfully banned usage of plastic in the form of plastic carry bags with thickness less than 75 microns consequent to the HP Non-biodegradable Garbage (Control) Act, 1995 and latest notification on Plastic Waste (Management and Handling) rules, 2011. MC Shimla through Himachal Pradesh Non-Biodegradable Garbage (Control) Act, 1995 has also made a provision of fine ranging from Rs. 500 to Rs. 5000 for creating nuisance by littering of garbage.

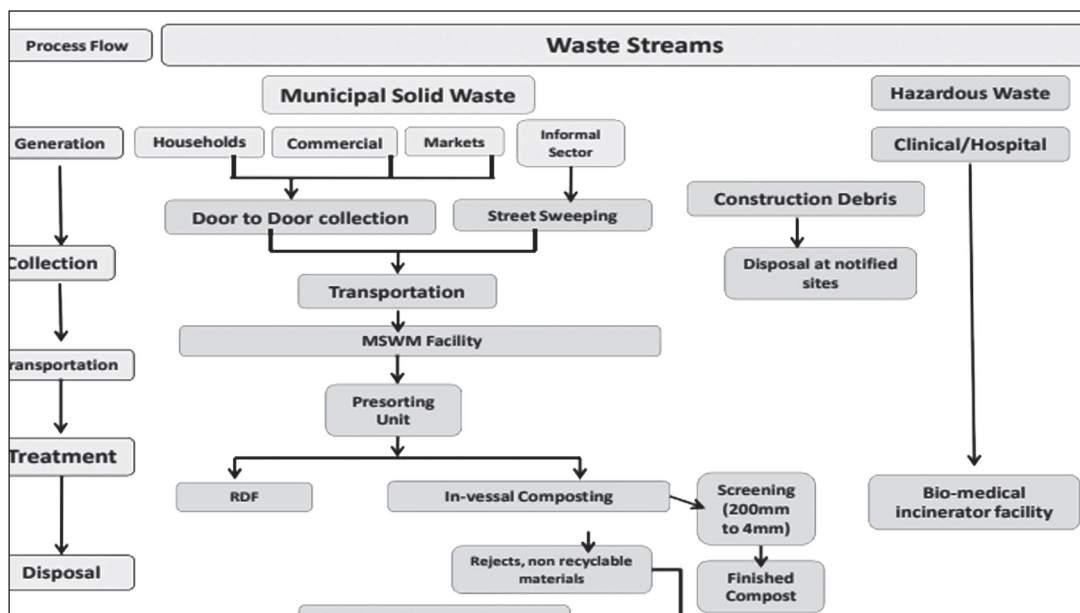


Figure 2: Flow Chart of Current SWM Practices Followed by Shimla Municipal Corporation

An approximate value of daily waste generation of Shimla City is approximately 93 MT. This refers that waste generation per capita per day is 350 Gm/Capita/day in the city. Table 2 presents the population projection with the approximate Solid Waste Generation from City Sanitation Plan of Shimla, 2011.

**Table 2: Projection made in City Sanitation Plan of Shimla, 2011**  
(Figures from Census 2011)

Head/ Years	2011	2021	2031	2041
Residents	1,69,758	2,56,883	3,49,361	4,18,296
Floating Population	76,000	1,00,000	1,25,000	1,50,000
Solid Waste Generation (MT)	86.01	124.91	166.03	198.90

According to officials at Shimla Municipal Corporation approximately 88% of residential population is covered under Door-to-Door Garbage Collection system, followed by 12% population which is dependent on the community bins for their waste disposal. The workers from SEHB Society collect waste from the entire city but due to shortage of manpower and difficult terrain. For example, Large commercial establishments (Hotels, offices etc.) have their own system of waste collection and thus, do not give their waste to SEHB workers. They directly put their waste in the community bins set up by Shimla Municipal Corporation.

SEHB Society has provided dual tone bins i.e., Yellow and Green Bins to all residential and commercial establishments of the city for proper collection and segregation of waste. The yellow bin is for non-biodegradable waste and green bin is for biodegradable waste collections within the establishments.



**Figure 3: Distribution of Dual Tone Segregation Bins to Residents**

*Sanket Gupta & Neetika Gupta*

This segregated waste is then handed over to the sanitary workers of SEHB Society. SEHB Workers and the Municipal Staff work hard to ensure that the segregated wastes do not meet before reaching the processing site. The community bins system comprising of 20 Concrete dust bins and 93 small dust bins each of 1 cubic meter capacity are placed for disposal of waste by the residents in Shimla. Aside from these, there are 148 dumper containers of 4.5 cubic meter capacity each and 54 dumper containers of 3.0 cubic meter capacity. The frequency of clearing these bins varies from daily, alternate day, twice a week or even once a week depending on the area. These concrete bins and dumper containers are placed at convenient locations for the residents to access and dispose their waste appropriately and conveniently. Transportation of waste from the secondary collection points to the treatment plant and landfill is the responsibility of MC Shimla. The entire city's waste is collected and transported through 75 different vehicles with varying capacities procured under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) project of the Government of India. These vehicles are fitted with RFID and GPS Technologies for better administration.

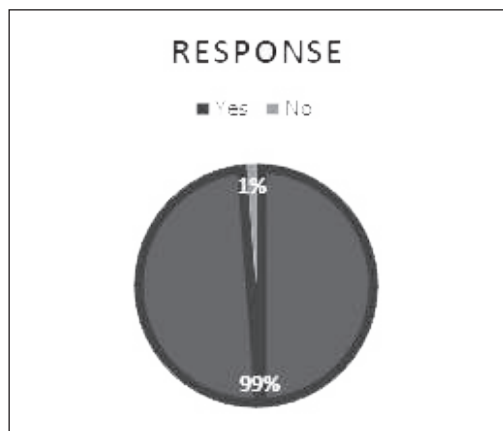


**Figure 4: Garbage Collection Vehicle Used by Shimla MC**

Municipal Corporation Shimla established its first scientific waste processing and treatment unit with Norwegian assistance in 2001 at the Darni-Ka-Bagicha, Shimla which later created nuisance for the residents and tourists. After intervention of the HP High Court, the Government decided to set up a new treatment and disposal facility outside the municipal limits on Public Private Partnership (PPP) model. The proposal faced acute resistance from the nearby villages and the matter was finally put up to the National Green Tribunal which gave clearance later for setting up the facility in 2012. The new waste treatment facility was commissioned in June, 2013 after successful trial run. Private operator M/s Hanjer Biotech Energies Pvt. Ltd charged a tipping fee of Rs. 150/- per MT of solid waste processed with a hike of 8% every year. The scope of work under the project at Bhariyal Plant includes design, development, construction, operation and maintenance of municipal solid waste processing facility with aerobic in-vessel compost unit along with material recovery facility and leachate management system. The plant is equipped with weighbridge and mechanized separation of the MSW fraction. The financial viability of the project is ensured by sale of the compost, RDF material to the nearby cement manufacturing units and payment of processing charges. Planning for a treatment facility for disposal of inert material is underway. Rejects of the processing unit and the other non-biodegradable waste is currently being landfilled in a valley near the compost plant at Darni-Ka-Bagicha. The scientific disposal of the municipal waste will mitigate the environmental hazards associated with open dumping.

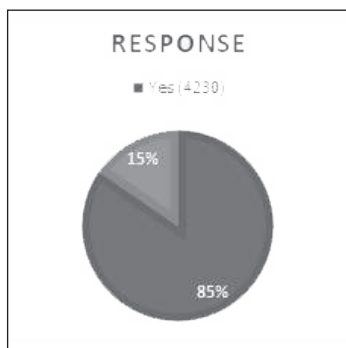
Now let us uncover the resident’s perception regarding the Solid Waste Management System. Among the sample studied people had varied choices and preferences. The sample size studied was 5000 local residents of Shimla Municipal Corporation. Following were the implications made from the study.

1. Are you a beneficiary of D2D Garbage Collection Scheme of Shimla MC?

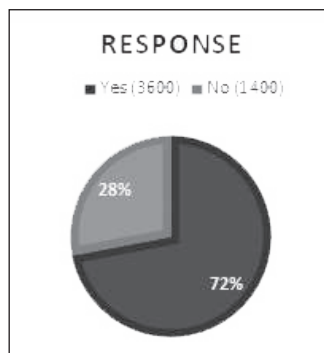


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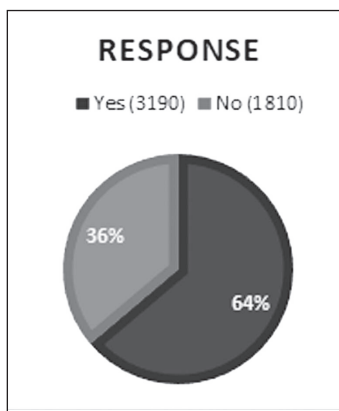
2. Are you satisfied with the work of SEHB Workers as well as the MC Staff?



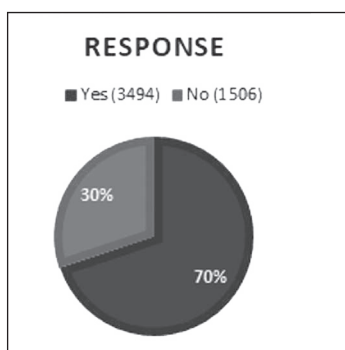
3. Do you find the user charges paid to MC Shimla justifiable?



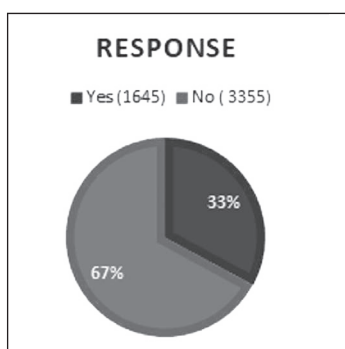
4. Do you really follow the garbage segregation rules issued by MC Shimla?



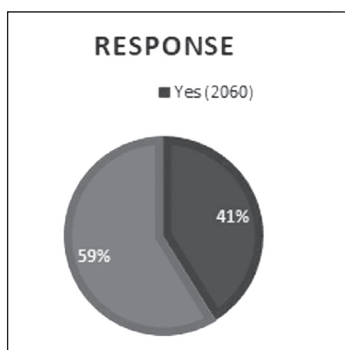
5. Do you really think that the D2D Garbage Collection Scheme as well as efforts of SEHB workers have truly brought a change in the conservation of Shimla’s Nature?



6. Do you feel that same level of seriousness is shown by people using the community bins as shown by the people handling over waste to SEHB Safai Karamcharis?

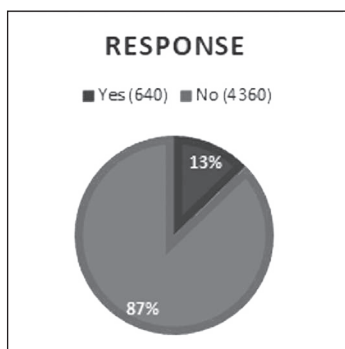


7. Do you find that D2D Garbage Collection really focuses on garbage segregation?

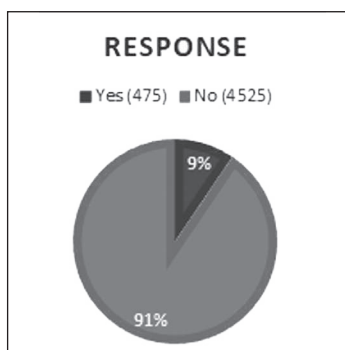


**378** 'PRAKRITI AUR SWACHHTA' - Environmental Sustainability through Cleanliness

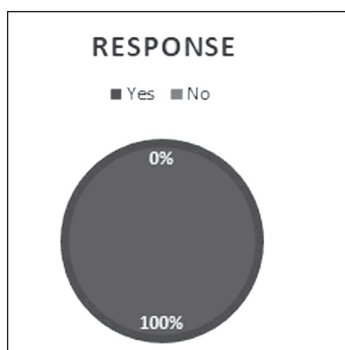
8. Do you find any change in people's mentality regarding littering in public?



9. Are you aware about the garbage disposal process post collection?



10. Do you see further improvements and more transparency in the Municipal Solid Waste Management Process?



It is very clear from the above data that though people are following the Solid Waste Management Schemes issued by the Urban Local Bodies but are not completely satisfied with the current performance of the schemes. According to the officials at the Municipal

**Sanket Gupta & Neetika Gupta**

Corporation Shimla, “There are numerous people who either do not avail the service of D2D Garbage Collection or they do not pay for the same. There is a considerable percentage of people who still do not segregate the waste and thus, produce it in the mixed manner to our Safai Karamcharis.” On asked about corrective measures being taken by the authorities, official clarifies, “we do take strict action against the defaulters but there is always a big list ready. Pointing out one defaulter brings in numerous others from the same locality, thus, our supervisors return empty hands.”

It is very clear that though the local body in Shimla has taken a baby step for proper Municipal Solid Waste Management but still lacks on various parameters. These parameters also include spreading proper awareness about the scheme. The body also has to take stringent actions on the defaulters regardless of numbers in order to set an example for other in the society.

## **Conclusion and Recommendations**

Shimla has developed manifolds in last one decade. The city has been growing in terms of area, population and amenities in past years. But with development comes great responsibilities to manage the utilities and amenities in a proper balance. Extensive development has laid an extra load over the existing infrastructure. Hence it has become a challenge for the Urban Local Body to manage this extra load over them. After looking over the data analysed, it can be concluded that Shimla Municipal Corporation has taken a remarkable step in Solid Waste Management System but still has a long path to cover. The body has stringently worked on the planning phase of the system but has to work on concreting the plan now. Though the system has a full proof structure but there is a need of following the plan strictly. Still, dumping of waste in landfills and slopes of hills is a common practice followed in the Himalayan City. Thus, I shall recommend following measures which can be undertaken to make the existing structure better:

- The body shall work on increasing the coverage to cent percent in the limits of municipal boundaries in the immediate phase.
- Completion and Expansion of new waste processing unit at Bhariyal and put into operation at the earliest.
- Establishing a dedicated Solid Waste Management Cell in compliance with the state authorities in the same principle.
- Municipal Corporation Shimla shall look into the non-usable assets and immediately initiate the process for procurement of new equipment's and tools.
- Stringent rules shall be made against those dumping waste openly and resulting choking of drains shall be maintained.



- Sub-optimal segregation of waste at the processing unit shall be undertaken in a proper manner to check the arrival of mixed waste.
- Though plastic bags are banned in the city limits but still packaging materials contribute significantly in waste generation.
- Proper transportation of waste shall be ensured in place of open transportation causing extra menace.
- Proper maintenance of dumpers and waste containers shall be undertaken. Open containers lead to spread of various diseases as well as promotes monkey menace.
- People lack awareness on managing solid waste. Proper instructions on segregation should be given. For this Resident Welfare Associations (RWAs) and schools can be involved.
- MC Shimla staff lack training in management of solid waste and are not adequately monitored.
- Safai karmacharis to ensure non-littering and burning of waste in their respective work areas. The activity of street sweeping and waste collection should be integrated.

These were some of the recommendations which I feel can help in proper Solid Waste Management in Shimla.

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**ISBN: 978-81-960940-3-4**

# **Cleanliness, Hygiene & Sanitation Practices of Professional Kitchens in Different Institute**

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## **Abstract**

When we talk about cleaning, hygiene & sanitation practices our first thought that it is the most important priority of any place where we going or living. For that matter we always encourage to keep our surrounding neat & clean, the food we are eating should be safe & cook in full hygiene standard maintain area & kept in secure & healthy environment in which it does not spoil by external impact of pest, climate & temperature. It is very important for food handlers to maintain that decorum in kitchen so that the food which they preparing should be in clean & control environment. it is arguable & accepted fact that kitchen needs more organising skills this is also related to keeping the area neat & tidy. It is the duty of any institution that serves food to a sizable number of people to maintain the food's wholesomeness and safety to prevent outbreaks of food-borne illness. Cross contamination, a filthy work environment, and inadequate sanitation were the most noted contributing factors of food borne disease in mass catering operations. The purpose of the study is to identify disastrous effect of not clean kitchen, organizing skills are considered as best practice, to identify number of things which are required to focus on maintain kitchen cleaning, ensure that there is a supervision of health inspection, encouraging to develop excellent work habit & how it will result in increasing client base. To fulfil its purpose the methodology is based on the survey where questionnaire is given to kitchen management people & the finding includes different practices like deep cleaning, different type of cleaning agent used in kitchen, cleaning schedule as per weeks, months & year & waste management in the area.

**Keywords:** Sanitation, Professional kitchen, Food handlers, cleaning schedule, contamination.

**Sonal Shrivastava & Jagan**

## **Introduction**

Cleaning a kitchen itself is a task that to when it is professional kitchen it is very hard & full focus job which required eye detail practices, because any practise happen in kitchen that to professional one is always either for profit & for welfare of the people. In both the case kitchen standard should be in more astonishing manner because that part shows that what quality of food & beverage organisation is providing to their target people. In this current era not only kitchen standard but the person who oversees that kitchen area should be qualified with specific graduation or diploma so that all scheduling & work can be done in optimum & efficient manner. The skills for cooking but also for maintain the area should be known by the chef or person who is doing work over there.

Contrary to popular belief, deadly food-poisoning bacteria may spread through our hands as well as from the direct eating of food. If you wash your hands properly and frequently, you may easily eliminate the danger of this happening since doing so greatly minimises the transmission of hazardous germs including salmonella, E. coli, and other forms of bacteria.

Especially when handling raw meat, fish, or eggs, you should wash your hands before and after handling food. You should ALWAYS wash your hands after using the restroom. We should all be accustomed to “proper” hand washing by this point, courtesy to Corona, which calls for the use of hot, soapy water and at least 20 seconds of vigorous scrubbing.

When working in a catering kitchen, food handlers should avoid wearing jewellery such as rings, watches, and bracelets since they serve as a breeding ground for germs that can be transmitted to food. It's also strongly encouraged to stay away from additional external dangers like heavy cosmetics, potent aftershaves or scents, and nail polish, etc. After that, hands should be dried hygienically using a paper towel or an air dryer.

It is said that you cannot learn skill in one single day that is why it is very important for us to understand that cleanliness and maintaining sanitation is requires consistency which happens in every single day. When a person join kitchen as trainees his /her first task is to check the sanitation of that area because of its need to work in an environment that does not consist of contamination of any kind.

When it comes to properly and thoroughly cleaning commercial kitchens, we frequently discover that the same things we employ to maintain the kitchen sanitary and healthy cleaning tools are also the things that transmit disease. There are various issues with maintaining these instruments clean and hygienic for usage in a commercial kitchen. For instance, until they are properly prepared, raw meats, fish, and poultry, as well as the liquids they create, can hold a lot of germs. During the cleaning process, these fluids frequently make their way onto cleaning equipment.

Similar to other foods, until thoroughly cleaned or cooked, fruits and vegetables can contaminate surfaces and tools.

Every food business operator (FBO) seeking for an FSSAI licence is required under the Food Safety and Standards Licensing & Registration Regulations 2011 to have a documented FSMS strategy and to adhere to Schedule 4 of this regulation. This regulation deals with the Particular Hygienic and Sanitary Practices to be Followed by Food Business Operators Engaged in Catering / Food Service Establishments in addition to the General Requirements. This covers places where the public is allowed to relax or consume any food or drink, as well as any establishment's where cooked food is sold or prepared for sale.

A significant contributor to foodborne disease is poor food handling cleanliness. Research on the adoption of exhibited cleanliness behaviour was undertaken under controlled, experimental circumstances to see if hygiene practises depicted in television cooking shows have an impact on viewers' kitchen hygiene. Participants (n = 65) in research apparently about cooking from recipes were randomised at random to one of three conditions in which they saw cooking videos that varied only in the chef's cleanliness behaviour. Condition 1 involved the chef using subpar hygiene techniques while preparing the meal, Condition 2 involved the chef acting excellent, and Condition 3 involved the chef's lack of apparent cleanliness standards (control condition).

Following the movie, participants were given instructions to prepare the recipe on their own in the fully functional lab kitchen. Cooking sessions were recorded on camera, and experimenters who were blind to the condition coded participant hygiene mistakes. Participants who cooked the food were considerably more hygienic after seeing the cooking video than before. Participants who watched the cooking video using good hygiene habits made noticeably fewer hygiene mistakes than those who viewed it using bad hygiene habits. TV culinary programmes are in a good position to inform a large audience about important sanitary precautions during food preparation from the standpoint of risk communication. Visibly demonstrating good hygiene habits in culinary programmes is a viable tactic to encourage viewers to adopt safer food handling habits.

Kitchen hygiene goes beyond simply wiping down the countertops and washing your hands after handling raw chicken. Focus on these three key areas and abide by these guidelines if you want to maintain your household clean, healthy, and safe (and we believe you do).

**Storage:** Keep your refrigerator at or below 40 degrees Fahrenheit, and your freezer at or below 0 degrees (check the temperature every three months). Once a week, go through the refrigerator and throw anything away that has gone bad. Never leave raw meat, poultry, eggs, cooked food, or cut produce out for more than two hours. Never defrost food on the counter; instead, place it overnight in the refrigerator or under cold running water.

Cleaning, separating, cooking, and chilling should be your motto while making meals. Along with keeping cleaned fruits and vegetables apart from unwashed produce, you should also store raw meats away from other foods and use distinct cutting boards for meats and produce.

**Cleaning:** Chemical cleansers are not necessary in the kitchen (and you shouldn't use them in the refrigerator either). For kitchen cleaning, lemon juice and distilled white vinegar can become your best friends: Lemon juice eliminates smells, vinegar is a fantastic sanitizer and disinfectant, and both are excellent degreasers. A handy-dandy multitasker is a spray bottle of undiluted white vinegar, and a little bleach and water also works wonders. Additionally, remember to clean yourself: Wash your hands repeatedly, including after touching raw chicken, sneezing, blowing your nose, using the restroom, caressing your dog, and a long list of other activities. Always scrub for at least 20 seconds while using warm water and soap.

Of course, these are just the fundamentals; peruse the links on the next page for further information on kitchen cleanliness.

## Objective

- To identify the practices of cleanliness, hygiene & sanitation which is applied in professional kitchen in different institute.
- To promote & spread awareness among the upcoming generation for kitchen management, its basic practices & standard followed by professionals in current era.

## Purpose

- A dirty or unclean kitchen can have disastrous effects, including the ability to make customers and clients sick and the potential to damage the company's brand. Food preparation environments are usually exposed with pathogens that are easily transmitted to food, which is subsequently consumed by consumers. In order to reduce this effects how kitchen official is dedicated to maintain its reputation and follow various practices.
- Cutting boards, bench tops, equipment, and utensils are just a few of the areas in a commercial kitchen where bacteria can be hiding. To maintain the greatest degree of cleanliness requirements, commercial kitchens need the number of things include cleaning schedule, uses of various cleaning and hygiene practices & cleaning agent?

- How frequently health inspection takes place in kitchen.
- If kitchen maintains its hygiene & sanitation with spotless cleaning and above all food is delicious then that leads to increase number of clients.
- Encourage workers to develop excellent work habits by offering a clean and sanitary environment. This will motivate your team to work hard and to abide by a strict routine for cleanliness and sanitation.

## **Review of Literature**

- As mentioned in article of ISSA advancing clean article best practices for commercial kitchen cleaning (Walt 2018).

Some recommended practises that managers and other supervisors may share with staff members can prevent microbial contamination from making its way into the instruments used to maintain the hygienic and secure conditions in food service areas.

Use a dilution-control system that is wall-mounted or portable. Chemicals that have been improperly diluted might be wasteful or useless.

After cleaning, disinfect. To start, properly wash the instruments to get rid of dirt, grease, oil, and food stains. After letting them dry, clean them using a disinfectant that has been registered with the US Environmental Protection Agency (EPA), making care to give it enough dwell time.

Do not disregard heavy machinery. Use a floor machine only after cleaning and sterilising the housing, shroud, wheels, squeegee, hand-control area, and cable. This also holds true for automated scrubbers. To assist clean the internal walls of the vacuum hose itself, it is recommended practise to flow diluted disinfectant through the hose.

Before storage, dry. Clean up the cleaning supplies with a fresh cloth, then let them air dry completely before putting them away. Hoses used to spray paint, water, and other materials are included. Wet surfaces draw dust, dirt, and other impurities, while damp environments are ideal for bacteria to flourish.

Remove safety gear in a safe manner. For instance, to stop pollutants from getting on fingers and hands when taking off gloves, pull on the corners and fold the outside of the glove over the hand. Once the gloves are off, wash your hands once again.

Put equipment away from the ground.

This enables them to dry in the air more fully and avoids coming into touch with the moisture or soil on the floor.

Store tools away from locations where food is prepared. Keep cleaning supplies apart from food preparation and storage areas, preferably in a closet with a door.

Carefully maintain the cleaning trolleys. If a janitorial cart is being used, the cart must also be cleaned and sanitised. Remove all items, paying special attention to areas where soil and pollutants might collect, such as joints, crevices, and the cart's wheels.

Put chemicals on rack-supported shelves. Wire-rack shelves aid in preventing merchandise from dropping, which might result in chemicals splashing into surfaces, food, or into onlookers' eyes and hands.

code in colour. Create a color-coding scheme for any possible linguistic barriers.

To prevent employees from utilising the incorrect product for the incorrect purpose, these indicated colours should also be on the storage shelves.

Chemicals should be kept in their original, unopened containers. This avoids inadvertent spills and the contamination of the solution by airborne germs.

Never refill a container with more chemicals. Once the solution is taken out of its container, contamination can occur fast.

Make use of techniques and certified floor cleaners. Use a multipurpose, anti-slip floor cleaner made especially for cleaning commercial kitchen floors to mop the flooring. It is too late to wait to change the mop head once it seems dirty; instead, replace the mop head often and wash it after each usage. Additionally, the housing and mop pole need to be cleaned and sanitised.

Utilize fresh rags. When used by kitchen personnel or for cleaning, dish towels and rags rapidly get quite dirty. After regular replacement, wash them. In a commercial kitchen, sponges should not be used since they can get quite contaminated and cover up soiling.

Always have two wash bags on hand. Keep one with clean rags and towels and one with used ones.

Watch out for tiny tools. Dust pans, little brooms, and hand pads, for instance, can all be a source of infection.

Create a routine for maintaining cleaning equipment. This has to put in writing and visibly visible in the location where food is served. Make sure the people in charge of maintaining the cleanliness of the instruments are well informed of their duties.

- As mention in article on the website of **cleaning edge solutions** which provide consultancy for commercial kitchen. While there are numerous factors to consider while cleaning a kitchen, the following jobs should be done frequently:
  - a) removing and gathering trash from trash cans
  - b) sweeping, vacuuming, and wiping the floor
  - c) Sinks, countertops, and workstations should all be well cleaned and disinfected
  - d) equipment, including burners, broilers, fryers, and ovens, is thoroughly cleaned, cleaning of tiny objects and utensils, cleaning all mats properly, cleaning the walls, window washing, cleaning exhaust hoods and fans of grease.

It is important to engage a cleaning company that has all the required licences and insurances and has extensive experience cleaning commercial kitchens if you want to make sure the fore mentioned duties are carried out on a regular basis and to the highest standard.

This research will give u the glimpse and insight of kitchen management, cleaning & sanitation of the area. Which we need to observe & study so than an effective knowlge can be gathered.

## Limitation

- Due to current situation where we have no.of catering establishment. Some are commercial& some are welfare so it's not possible to get data from every kitchen that is why the survey is conducted in the form of questionnaire. & distributed to different chef & catering professional.
- Questionnaire are made in such manner in which it can give both quantitative & qualitative data that is not in elaborated way.
- The majority of survey is conducted in Chennai only where we have quite a number of professional kitchen. Which gives us the idea of how to keep a professional kitchen in more hygiene & clean manner.

To overcome the challenges we take the support of secondary data for the of the research.



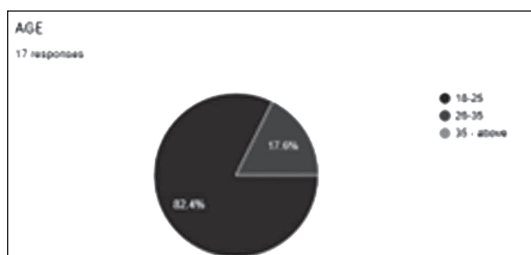
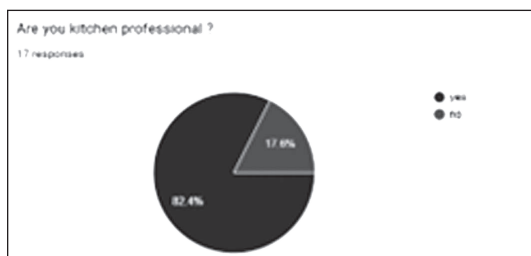
## Research Design

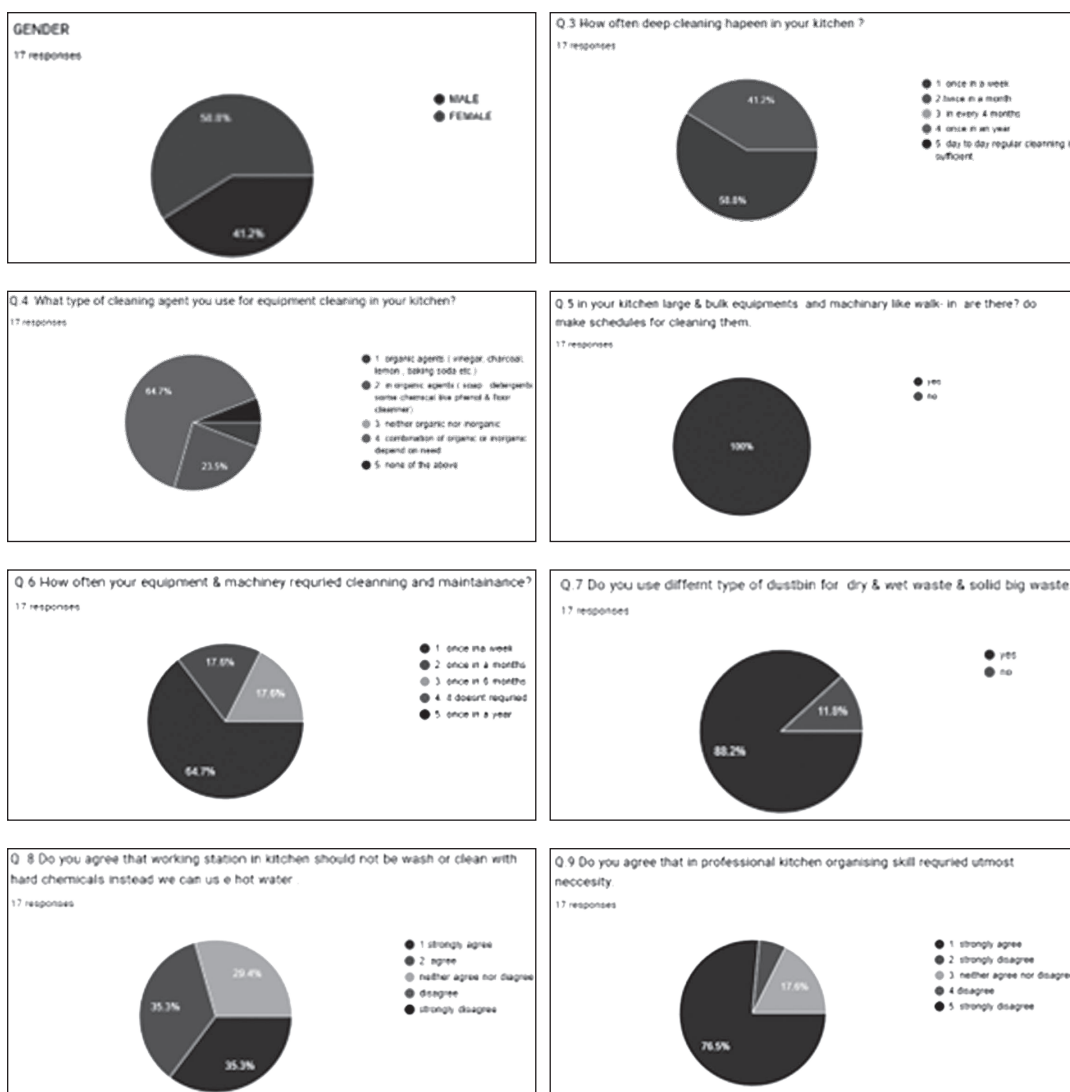
It is a type of descriptive research in which data is collected through interview questionnaire method where question close ended structure form in which finding is based on the practices of cleanliness & sanitation which usually happen in professional kitchen. In this researcher is finding that whether kitchen is following the SOP's while maintaining and practising the kitchen cleaning & hygiene standard.

## Research Methodology

In this research primary data is collected through questionnaire & interview based on structure closed questionnaire some question are based on short answer type where we got to know about respondent's opinion related to the practices which usually happen in the kitchen, their cleaning schedules their way doing the work etc. it also suggest what are the other things we need to keep mind while performing any cleaning task which happened in kitchen. And the duties & responsibilities which comes under the cleaning staff. . Secondary data is collected through various article, journals, books & internet. This data is completely related to kitchen management, behaviour and operations in order to support objectives of the research

Below data is telling the statistic which we gather from our questionnaire for collecting primary data.





These are some suggestions which we got from our respondent.

1. Maintaining a clean work environment is critical in preventing foodborne illness. Bacteria can grow on unsanitary surfaces and then contaminate food. Just because a work surface looks clean does not mean that it is sanitary. Always ensure that you clean and sanitize a work area before starting to prepare food.

2. Washing hands frequently.
3. Use separate boards for meat and vegetables.
4. Cleaning the internal parts of the equipment's once in a week, such as oven, etc.
5. Tasks cleaning
6. Before and after using an area, it should be sanitized properly
7. Work station should be cleaned every day, store should be arranged properly
8. Regular cleaning of the large equipment in used in the kitchen, posters of hygiene and cleanliness protocol in the kitchen
9. Skilled labour requirement and proper sanitation
10. At starting stage every chef should learn under KST how to wash dishes in kitchen which helps them to learn the proper use of equipment and utensils in more proper and efficient way.
11. Regularly wash your hands for hygiene practises.
12. Try to clean waste or unnecessary thing instantaneously
13. We should use different types of dustbins for dry & wet waste & solid big waste.
14. Once a week deep cleaning should be done
15. Mopping and brooming of the kitchen every day
16. Follow regular cleaning schedules
17. Arrangements should be done FIFO and LIFO method.

The steps involve in cleaning kitchen are as follows:

- ***Counter***

Clean the countertops of anything unneeded, including cookbooks, stray mail, and permission sheets that need signatures.

- ***Sink***

Dish soap and hot water should be added to the sink. Drop in any objects that require soaking, such as the microwave turntable, dish rack, and crisper drawer.

- ***Refrigerator***

Clean out the fridge and throw away anything that has gone bad. To clean them, place used food containers in the sink. With a paper towel or cloth spritzed with a nontoxic all-purpose cleanser, clean the shelves from top to bottom.

- ***High Areas***

Dust the upper areas, kicking up dirt and debris that will later be vacuumed up from the floor. Start at the top of the sink and move your way around the room using a telescopic duster.

- ***Upper Cupboards***

Clean everything on the walls, including a hung microwave, and the top cabinets. Spray an all-purpose cleanser inside the microwave and leave it there for two minutes. Clean the outside with a moist, soapy cloth. (If it's stainless steel, use diluted white vinegar on a towel to remove any fingerprints rather than soapy water.) As you round the room, clean the upper cabinet doors, handles, and any other surfaces you come across (frames, hooks, vent grates). If there is a backsplash, clean it with a clean, moist, soapy cloth.

- ***Microwave***

Re-enter the microwave. Your time limit has expired. Using a dry towel, wipe the solution from the inside out. Crumbs that land on the floor or the stove are OK.

- ***Stovetop***

Spray an all-purpose cleanser on the cooktop and let it set for a few minutes. Add a non-scratching powdered scrub for tough stains. Bar Keepers Friend is good.

Again, just let crumbs fall to the floor as you wipe the cooktop with a clean, dry towel. It is more effective to obtain them last. Change the towel once you're done to prevent oil from spreading to other surfaces.

- ***Dishwasher***

Put the objects that are soaking in the sink in the dishwasher or hand wash them. Do not immediately drain the sink.

Is Dishwasher Use or Hand Washing Your Dishes Better?

- ***Countertops***

Use a cleanser designed for your surface to scrub the countertops in tiny, circular strokes. Handles and Doors for Appliances

With a towel soaking in clean, sudsy water, clean the fridge doors, the front of the dishwasher, and the oven (or diluted white vinegar if the door is stainless steel). Be mindful of the edges and handles. To remove filth from small crevices, such as the folds of a refrigerator seal, use a soft toothbrush or a spatula that has been cloth-wrapped.

- ***Reduced Cabinets***

Use a moist, soapy cloth to clean the lower cabinets and drawers.

Trash Empty the trash, then use a cleaning wipe to wipe off the inside of the can and the top before re-tying the bag.

- ***Floor***

Use an electrostatic dry duster, such as a Swiffer Sweeper, to sweep the floor. To find crumbs that may be hiding, go up up to the baseboards and below the cabinets. To access the areas close to the walls, pull out appliances. Starting in the corner furthest from the room's entry, use a mop to follow (or a steam cleaner, if you have one). (Using a mop that has been dipped in the sink might contaminate objects that you eventually put in your mouth.) Put the contaminated water in the toilet or outdoors.

## **Conclusion**

- Maintaining cleanliness in professional kitchen is important task it required constant supervision, proper scheduling of monthly & weekly cleaning.
- It required skill & efforts in order to maintain hygiene in kitchen. It include personnel hygiene of kitchen staff.
- It also suggests that one should all have knowledge of all cleaning agent & equipment which required to maintain the standard of the kitchen.

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**ISBN: 978-81-960940-3-4**

# **Integrated Approach to Manage Solid Waste in Adyar**

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## **Abstract**

Due to the rising urban population and per capita trash generation rate, insufficient public participation, and the appalling organisational and financial capacities of urban local authorities, managing municipal solid waste is a significant issue for the majority of Indian cities. This article examines the trash generation, collection, and disposal scenario of Adyar together with the institutional and regulatory framework in order to emphasise the interventions needed for sustainable solid waste management. It promotes a staged, integrated strategy that takes into account practical difficulties and builds local government competence with the aid of educational institutions. To research the properties of the solid waste produced in the Adyar Area. To analyse different segregation and disposal methods used to control their solid waste. To examine the difficulties Adyar residents have in handling their solid waste.

**Keywords:** Integrated waste management, Policy intervention, Indian scenario, Construction waste, Biodegradable waste, Household hazardous waste, non-biodegradable waste.

## Introduction

The formal and informal sectors of India's solid waste management system operate side by side. Municipalities, local government, and private entities make up the formal sector. The informal sector is made up of garbage merchants and waste collectors (rag pickers), who are primarily urban poor people who rely on waste for their livelihood. Communities being directly involved in a voluntary effort in waste collection, removal, recycling and applied concepts such as the 3Rs (Reduce, Reuse and Recycle), Waste to Wealth and Zero Waste Management.

The 400+ Class I Urban Local Bodies (ULBs) in India face a challenge when it comes to the storage, collection, transport, processing, and disposal of residential and commercial solid wastes, such as household garbage and trash, street sweepings, construction, and demolition debris, and drain silt generated in municipal areas, by the best principles of public health, economics, engineering, conservation, aesthetics, and environmental considerations. Although Adyar is initially recorded as a Madras suburb only in a map from the year 1740 when the British purchased the village and incorporated it with the Madras Presidency, adyar and the neighbouring Guindy had been utilised as hunting grounds by British officers of Fort George from the 1680s onward.

According to the Central Pollution Control Board (CPCB) the average per capita generation of MSW in these cities varies from 200 to 600 g per day depending on the socio-economic status and cultural habits, climate, location, urban structure, density of population and extent of non-residential activities. The annual generation of MSW from these cities is expected to increase by about 4.5 % due to increasing per capita waste generation at a rate of about 1.3 % per year, and growth of urban population between 3 and 3.5 % per annum. The large percentage of biodegradable garbage and the tropical climate call for regular waste collection and removal from the place of generation (households, markets, etc.) and the recent occurrences of dengue fever in numerous sites, are thought to have been caused by vector multiplication as a result of poor MSW management.

**To prevent:** Integrated solid waste management (ISWM) is necessary.

- public health problems due to breeding of rats and flies that spread pathogens
- air pollution due to dust, smoke and even dioxin emissions from open burning of wastes
- ground and surface water pollution caused by leachate
- contribution to Global Warming by the methane gas emitting from dumps/landfills

- aesthetic nuisance due to odour, windblown dust and littering of disposable plastics
- occupational hazards to workers, scavengers and stray animals

## Research Objectives

The aim of this paper is

- To study the characteristics of solid waste which is generated in Adyar area.
- To analyse the solid waste management practices followed by the people of Adyar.
- To analyse challenges faced by the people of Adyar for managing solid waste.

## Introduction

### Solid Waste Management

In Chennai, 68% of the garbage produced is from residential sources, 16% comes from businesses, 14% comes from educational institutions, and 2% comes from industry. Hospitals and clinics are responsible for producing the remaining garbage, which is disposed of separately. The city's solid trash collection efficiency is 97%, just shy of the target of 100% efficiency set by the Ministry of Urban Development.

Staff from the Greater Chennai Corporation pick up trash generated by residences and companies from community waste storage facilities and deposit it in two open landfills in Kodungaiyur and Perungudi, located at the southern and northern ends of the city, respectively. The Chennai Metropolitan Development Authority claims that diverse waste categories, each of which requires a unique method of handling and treatment, are disposed of simultaneously. Both locations have excessive rubbish buildup, which poses a major health risk to locals. One study found that over the course of three years, the leachate from the waste at the Perungudi dumpsite increased soil and groundwater contamination by a factor of two to three. To stop and undo the environmental harm brought on by the careless dumping of rubbish, Greater Chennai Corporation is preparing to remediate some of the current dump sites (Tipping point for Trash in Chennai, 2013).

A sizable neighborhood of Chennai, Tamil Nadu, India, is called Adyar. It is situated along the Adyar River's southern banks. Tharamani to the west, Thiruvanmiyur to the south, Besant Nagar to the east, Kotturpuram to the north, and Raja Annamalai Puram to the



north past the Adyar River surround it. One of Chennai's most expensive neighbourhoods is Adyar, where the prices of comparable houses in the northern portion of Chennai are four times higher.

## **Solid Waste Management Department**

The department, which is overseen by a Superintending Engineer, is in charge of managing and clearing the Corporation's primary solid waste duty. Around 5400 MT of rubbish from the city is collected each day. All bus route roadways, markets, and commercial parts of the city are also being kept in the dark. Garbage collection is done door to door in all zones.

**Primary Collection:** Completely Manpower The Conservancy is open from 6:30 am to 1:30 pm and from 9:00 pm to 2:00 am at night. Each employee has a set work schedule that they must adhere to. Night sweeping is also performed using a mechanical sweeper on bus route roads and major roadways.

**Equipments Used:** Coco brooms, aluminium baskets, brushes, iron plates (penku), containerized push carts, tricycles with bins, and wheeled waste containers are only a few examples.

### ***Primary Collection***

#### **Door-to-door garbage collection**

- Sweeping, gathering, and storing the waste in the designated bins
- Collecting the source-separated waste from households with tricycles or light motor vehicles and sending biodegradable waste to decentralised waste processing facilities and dry waste to be collected every Wednesday for recycling purposes and the remaining waste to transfer stations/dump sites

### ***Secondary Collection: (Transportation)***

- Street pickup to dumping location.
- Collecting source-separated waste from households using tricycles or light motor vehicles, sending biodegradable waste to decentralised waste processing facilities, collecting dry waste every Wednesday for recycling, and transporting the residual refuse to transfer stations or dump sites.

## **Waste Disposal**

Construction and demolition trash is currently used to cover each layer of garbage in the two dump sites where Chennai's garbage is currently dumped.

The Transaction Advisory Consultant has prepared a DFR and sent it for the competent Authority's approval in order to remediate the existing landfill or scientifically close it down, and to have integrated waste processing facilities with a waste to energy plant as a component at the current Kodungaiyur and Perungudi dump sites. At the same time, the RFP documents are being prepared. There are two disposal sites (Kodungaiyur and Perungudi)

## **Methodology**

Data is the base of any research. In order to collect data pertaining to my topic, quantitative descriptive type data collected from various primary and secondary resources. It provided a better and a clear understanding about the concept of Integrated approach of community and its relation with solid waste management which was very useful to figure out on where the strengthening of efforts is required. The data mainly depends on following resources:

- a) Books, official reports, surveys by experts in the field of management of solid waste etc.
- b) Photos and videos related to the topic.

The study has been conducted using primary and secondary sources of data. As a primary data source, a set of well-structured questionnaires was distributed to 150 Public who are keen users of social networking services and also frequent users of hospitality services pan India. Among them, responses were received from 100 of them. The responses were further analysed to conclude. Different literature reviews about similar research areas were considered and analysed as secondary data sources. The data analysis has been done with the help of pie charts and linear bar graphs. The study was carried out on the public who residing Adyar.

## Review of Literature

### Introduction

An astounding 2.12 billion tonnes of garbage are dumped globally each year. The fact that humans discard almost 99% of everything they buy within six months is one of the main causes of this incredible amount of garbage. Waste has been a major global environmental issue since the industrial revolution. As you may imagine, managing the waste that is constantly produced is a difficult task. However, failing to properly dispose of waste might have detrimental effects. To study the characteristics of solid waste which is generated in Adyar area. We go over the many sorts of waste and how to properly dispose of them in this extensive tutorial. Read on to discover more. The things we throw away because we don't need them are referred to as waste. There is a lot of waste that is garbage or trash. Trash, then, is solid waste like paper, cardboard cartons, and so forth. On the other hand, waste from your kitchen or bathroom is referred to as garbage. Waste is produced by a variety of entities, including people, houses, workplaces, hospitals, and businesses. It also comes in an unlimited range of sizes, from small to enormous, like the body of an old truck or a rusted razor blade.

### Types of Waste

All waste on earth falls into five categories.

#### 1. *Liquid Waste*

Organic liquids, waste detergents, unclean water, wash water, and occasionally rainwater are examples of liquid waste. Usually, businesses, residences, and industries produce this trash. Liquid waste can be categorised as either point source waste or non-point source waste, depending on its source. All manufactured liquid waste is referred to as point source waste water. On the other hand, non-point source waste is defined as natural liquid waste.

#### 2. *Solid Garbage*

Solid waste consists of a wide variety of items that can be found in households or companies. Bags, jars, containers, and bottles all contain plastic garbage. Newspapers, cardboard, and other packaging materials are all included in paper/card waste. Broken cups, plates, and other tableware are included in the ceramics and glass category.

### 3. *Organic Waste*

The majority of families produce a lot of organic garbage. Food scraps, garden debris, and other waste are included in this waste. Even while microorganisms gradually break down this waste, it still needs to be properly disposed of when it is produced.

### 4. *Recyclable Waste*

Recyclable trash, as the term implies, is any garbage that can be turned into useable goods.

Recycling is an option for a sizeable portion of the trash produced by building, including stone, metal, paper, and furniture.

### 5. *Hazardous Waste*

An unwise waste Hazardous waste is any garbage that is toxic, flammable, corrosive, or reactive. This garbage might hurt both you and the environment. Electrical trash and toxic substances are examples of hazardous waste. Waste management is one of the most significant concerns facing our country right now. India produces 62 million tonnes of waste annually. Segregating garbage lowers the amount of waste that is exposed to the air and water, which not only reduces the reduces the quantity of waste dumped in landfills while also reducing pollution. Waste management is essential because it reduces the effects of pollution on the environment and natural world. Additionally, it can help with recycling or reducing garbage that is

#### **Dry Waste**

Waste that does not decompose is referred to as dry waste It is also referred to as waste that cannot decompose biologically. Dry trash can be further recycled into new products and includes items like paper, glass, thermocol, Styrofoam, rubber, metal, cloth, empty bottles, and stationery. Sharp objects, such as glass and other metals, must be kept in a separate bag or container before segregation. The type of garbage that cannot biodegrade is dry waste. Therefore, moist waste can be transformed into new goods, recycled, and utilised again.

#### **Wet Waste**

All of the kitchen waste we generate is wet waste. For instance, vegetable peels, used tea bags, fruits, leftovers, coconut shells, flowers, leaves, meat or other ingredients, perishable foods, bread, biscuits, etc. This is organic trash that can be composted and recycled. The kitchen generates the most of the wet trash. Wet waste management systems must be effective in restaurants, buildings, and factories.

***Why is waste segregation necessary?***

**WET WASTE:** *It is simpler to recycle dry trash into new goods by separating it from moist waste, such as plastic, glass, metals, paper, etc. While wet waste, such as fruit, spent tea bags, leftover vegetables, and leftover fruits, can be utilised to make gas. Proper waste management is necessary because, it will help in reducing Greenhouse gas emission, Toxic gas explosions, Waste Landfill, Air, soil and water pollution, etc.*

***Waste segregation at home:***

Dry waste and wet waste can be separated at home his behaviour will ease the burden of garbage segregation on local agencies. You simply need some awareness and the desire to take action in this direction to get started Before separating garbage at home, you should bear the following in mind: Do not combine wet and dry trash. Keep the plastic from the kitchen dry and separate in the dry bin. Keep the dry waste washed of any food content before tossing in the dry bin. Place the sanitary waste in a separate paper bag. It is essential for everyone to separate their dry and wet waste since doing so will keep the environment clean and free from contamination. These separate wastes can be recycled into new products and plastic granules, with plastic waste being especially useful for this.

## **To Analyse the Solid Waste Management Practices Followed by the People of Adyar and by the Council**

### **Disposal of Waste**

Different communities around the world adopt different types of waste management. In this section, we discuss five effective types of waste disposal.

#### ***Hygienic Landfill***

We generate a lot of non-recyclable waste. One of the most efficient ways to get rid of The waste hierarchy aims to maximise goods' usable benefits while producing the least amount of waste possible. A variety of objectives can be successfully attained by utilising the waste hierarchy. It can help with job creation, environmental improvement, lowering energy and other resource costs, reducing greenhouse gas emissions, and advancing environmentally friendly technologies. These waste materials are disposed of in landfills. A area with impermeable soil and little groundwater is chosen for excavation. In order to prevent toxic elements from reaching the water zone below, a shield is constructed after excavation. The rubbish is strewn out over the base before layers of earth are poured over it and compacted.

While the trash below them decomposes, landfill sites around the world are planted to serve as parks. That might take twenty to thirty years. In the landfill area, construction is not allowed at this time.

### ***Recycling and Reusing***

Recycling and reuse are likely the most effective methods of waste management. It's interesting to note that just 16% of the rubbish we generate is recycled. Given that a sizable portion of the waste we produce may be recycled, this is a terrible reality. Recycling products like scrap metal has a number of advantages, including generating income and preserving natural resources. Instead of tossing away things like paper bags and plastic bottles, you can choose to reuse them. These procedures can aid in cost savings while lowering the current level of waste.

### ***Vermicomposting***

Vermicomposting is a method of waste disposal that entails utilising a particular species of worm to aid in the breakdown of wastes. The method of garbage disposal is effective when dealing with organic waste. Vermicomposting has many advantages, one of which is that in addition to eliminating waste, it also enhances soil nutrition. The excretion that the worms create when they break down the garbage considerably raises the soil's quality in the area.

### ***Disposal by Incineration***

When it comes to disposing of highly poisonous and hazardous trash, incineration is a very effective technique. Medical facility waste is one type of this trash. Up to 95% of garbage is reduced through incineration. Because it is very economical, incineration is preferred. Additionally useful are the by-products of this trash disposal technique. Ashes, for instance, can be utilised for hydroponics, and the heat generated can be used to produce energy.

### ***Disposal in Water Bodies***

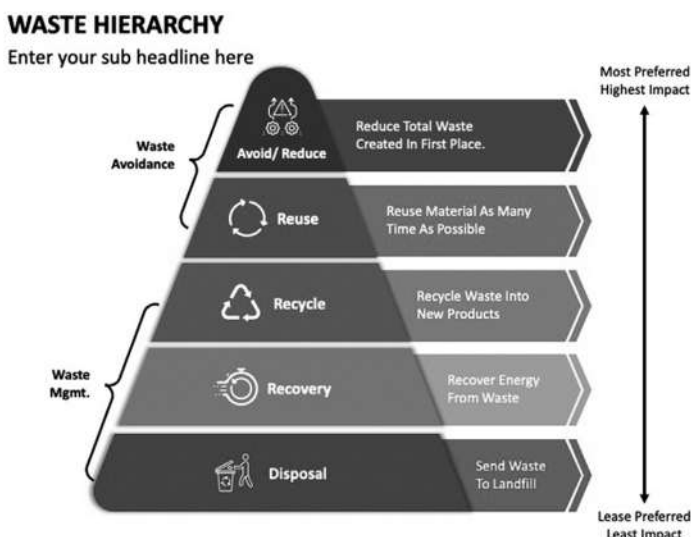
Some waste kinds must be disposed of as far away from people as is practical because they are so dangerous. When disposing of radioactive waste, for instance, it is preferable to dump it into a huge body of water like an ocean or sea. So that no human will ever come into contact with the compounds, they can securely sink deep into the water body.

### ***Proper Waste Disposal is Essential***

It can seem difficult to properly manage the waste we produce every day, but it doesn't have to be. Understanding the various trash kinds we are working with will allow us to choose the best disposal strategy.

## Waste Hierarchy

Waste hierarchy is a method used to rank environmental protection processes from most to least effective in terms of resource and energy usage. Based on sustainability, the hierarchy determines desired programme priorities. A comprehensive strategy is required for waste management to be sustainable and cannot be achieved solely by technical end-of-pipe solutions.



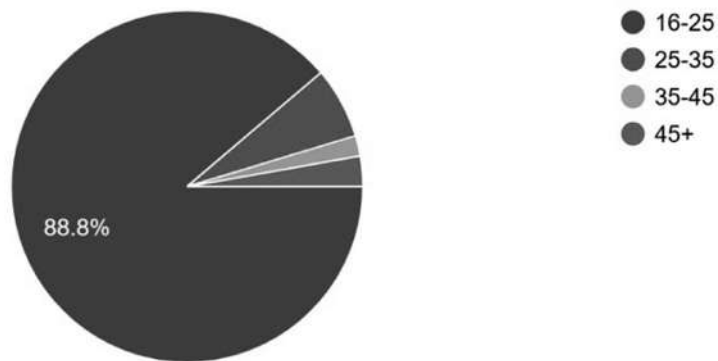
## Challenges Faced by the People of Adyar for Managing Solid Waste

The remaining 6% of the total municipal garbage collected is composted, leaving about 94% of it to be dumped in public places. Lack of skilled workers and technical know-how for waste treatment and disposal. Waste management is not given enough respect as a profession. A waste management strategy must be established. Large amounts of solid garbage can be found, including items from both houses and businesses. Bottles, jars, containers, and bags all contain plastic garbage. Newspapers, cardboard, and packaging materials are all included in the category of paper and cardboard waste. Broken cups, plates, and other tableware are included in the ceramics and glass category. Large amounts of solid garbage can be found, including items from both houses and businesses. The national, regional, and

local governments, as well as other potential stakeholders like businesses, residences, and the private sector, may be in charge of implementing the waste hierarchy in waste management practises within a country. Despite the lack of resources, knowledge, and technological know-how, the policies for waste management must be implemented and successful. When local and regional organisations employ the waste hierarchy structure, the following problems could occur. The three R's stand for the "Waste Hierarchy," which lists the best waste management techniques in order of least to most desired. Many of the things we currently throw away may be reused with a little bit of work and imagination.

#### Age group

107 responses

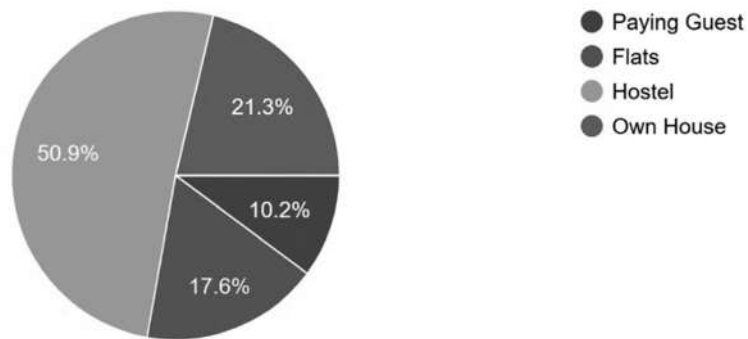


To understand the integrated approach of people of Adyar for segregation of solid waste, a survey was conducted among different age groups. The response received between the age group of 16 – 25 is 88.8 percent. The response received between the other age group of 25 – 35, 35 – 45 and above 45 years all together combines 11.2 percentage of people. Hence, we conclude that a large number of youth are our approach towards integrated solid waste management.



### Where do you live?

108 responses

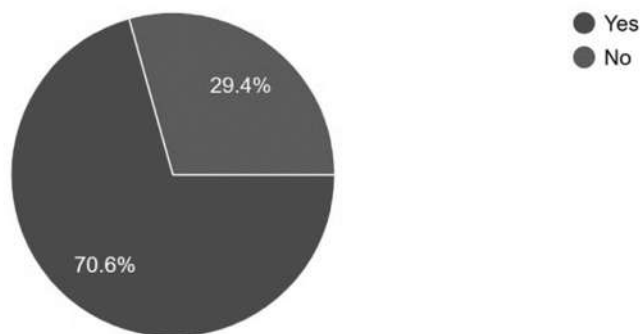


To know the integrated approach of people of Adyar for segregation of solid waste, it was compulsory to know about the type of accomadation where they stay

The pie chart clearly shows that around 50.9 percent of people live in hostel in Adyar, 21.3 percent of people live in own house. The graph also made it clear that around 17.6 percent of people live in flats, 10.2 per cent of people live in paying guest in Adyar. Hence it shows that the majority of people live in hostel in Adyar.

### Do you know any biological method for biodegradable waste management?

109 responses

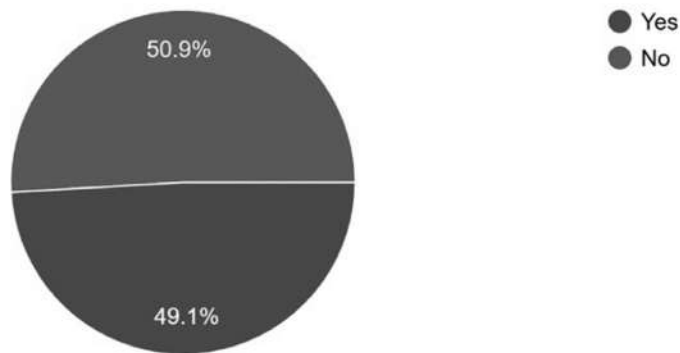


To know the integrated approach of people of Adyar for segregation of solid waste, it was compulsory to know about their knowledge on biological method of managing biodegradable waste.

The pie chart clearly shows that around 70.6 percent of people know about biodegradable waste management in Adyar, 29.4 percent of people don't have known about biodegradable waste management in Adyar. Hence it shows that the majority of people know about biological method for biodegradable waste management in Adyar.

**Have you ever been educated on proper waste disposal by the council?**

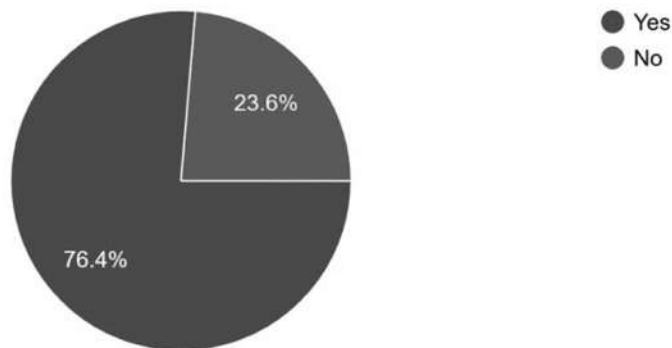
110 responses



According to the response, the pie chart clearly shows that around 50.9 percent of people are not educated by the council on waste disposal, and 49.1 percent of people are educated by the council on waste management.

**Did you even hear of health problems due to solid waste?**

110 responses

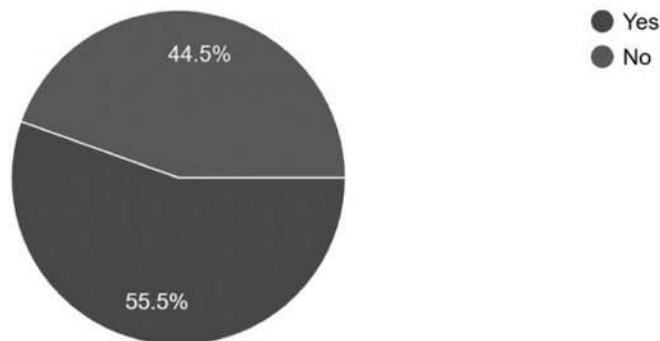


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According to the responses, the pie chart clearly shows that the 76.4 percent of people know about the health problems due to solid waste and 23.6 percent of people don't know about the health problems due to solid waste found. Hence it is very evident that majority of people known about the health problems due to solid waste.

**Does the waste disposal method is a problem in your neighborhood ?**

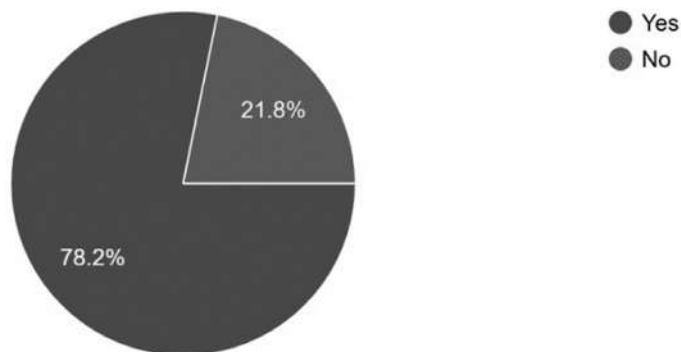
110 responses



According to the responses, the pie chart clearly shows that 55.5 percent of people feel waste disposal method is a problem in Adyar and 44.5 percent of people feel waste disposal is not a problem in Adyar.

**Do you find any type of solid waste in public area (roads) in Adyar?**

110 responses



The survey for integrated approach for segregation of solid waste management in Adyar.

According to the responses, 78.2 percent of people find solid waste in public area and Around 21.8 percent of people don't find solid waste in public area.

***Shweta Verma & Prathamesh Kalyankar***

## Conclusion

The main causes of Adyar's growing waste problem, which requires better management involving higher levels of expenditure on manpower and equipment in accordance with an integrated waste management approach that takes into account economic, social, institutional, and environmental aspects, are changing lifestyles and an increase in urban population. Open dumping remains the most common method of waste disposal despite strict laws in place, notwithstanding some admirable efforts by sporadic ULBs, private citizens, and NGOs. The understanding that a strategy that ignores source reduction, segregation, and implementation at the community level is unsustainable is growing. Systems for collecting and processing garbage must be effective and efficient.

It is crucial that sufficient land be set aside from the planning stage onward for the processing and disposal of solid waste. It is crucial to increase source reduction and separation, ban some materials from landfills, prohibit some chemicals from products, use economic tools to punish the unneeded release of hazardous materials into the environment, and implement closed-loop systems for some harmful but unavoidable elements. In particular where there is a lack of political support, administrative and technical capacity, or financial resources, radical reforms are frequently challenging to implement. By examining the trash generation, collection, and disposal scenario, this article has provided some of the ongoing progressive improvements and recommended solutions for sustainable solid waste management in Adyar Chennai, the fourth largest metropolis in India.

The adoption of an integrated strategy supported by ULBs with the necessary manpower and political will to transform the situation will undoubtedly increase the efficacy of SWM, alter public opinion, and foster community involvement in sustainable waste management.

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**ISBN: 978-81-960940-3-4**

# **Protecting the Environment and Intangible Cultural Heritage Key in India's Tourism - A Case Study of Yog City of India (Rishikesh)**

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*Author*

**Ms. Sumi Semwal**

*Co-Author*

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## **Abstract**

For any nation's economy, the tourism sector is crucial. It offers a wide scope for a nation like India. India is represented by a total of 14 items on the UNESCO list of Intangible Cultural Heritage and Humanity. These components include storytelling, festivals, rituals, dancing, and theatre. Travelers can experience a variety of cultural heritage places in different. This study article aims to emphasize the significance of protecting the natural environment in order to improve the tourism experience at cultural heritage sites. By synthesizing the most recent research through a systematic analysis, this study aims to analyses the present tourism trends in Rishikesh while protecting the environment and preserving Rishikesh as a yoga destination. Due to its serene natural beauty, which offers a perfect atmosphere for practicing yoga, tourism is proving beneficial to the local economy of Rishikesh. It is obvious to search for the patterns and trends of tourism, tourist types, purpose of tourism, and associated phenomena, so that the plans can be created and carried out properly, in order to establish a friendly relationship between man and environment for sustainable tourism growth. This study examines yoga tourism from the standpoint of sustainable tourism, looking for sociocultural problems in domestic destinations in Rishikesh. The study use qualitative technique to investigate the subject from a socio-cultural perspective that has been overlooked by the scant prior research on yoga tourism.

**Keywords:** Intangible Cultural Heritage, Yoga, Sustainable Tourism, Environment.

## Introduction

Tourism is a social, cultural, and economic phenomenon that involves people travelling to locations outside of their normal environments for leisure, business, or professional reasons. The term “visitors” refers to these individuals, who may be either tourists or excursionists and either inhabitants or non-residents. Tourism is related to their activities, some of which imply tourism expenditure (United Nations World Tourism Organization, 2008). Tourism is the comprehensive collection of activities, services, and associated industries that together provide the distinctive visitor experience. It is not only the movement of people for various objectives (whether for business or pleasure). Tourism is a practice created by travelers. Tourism geography is a subfield of geography that looks at the spatiotemporal aspects of tourist, its patterns and trends, development methodologies, and planning strategies for sustainable tourism growth in any location or region (Bajpa, YADAV, & Pandey, 2015). India is a beautiful choice of travelers for tourism activities due to availability of various types of tourism in India. Adventure tourism has recently become more popular in India as a form of travel. In India, travelers who seek adventure often go trekking in the Himalayas, Sikkim, and Ladakh. The skiing facilities in Himachal Pradesh and Jammu & Kashmir are well-known. India boasts a diverse range of unusual and attractive wildlife species, some of which are particularly rare and in risk of extinction. India's wildlife tourism has increased as a result. The Sariska Wildlife Sanctuary, Keoladeo Ghana National Park, and Corbett National Park are the locations in India where an international traveller can go for wildlife tourism. Travelers from all over the world have been pouring into India to take advantage of the country's low-cost but high-quality surgical and general medical services. Because of India's fame for its temples, pilgrimage tourism is growing at a much faster rate than other types of travel there. Vaishno Devi, the Golden Temple, Char Dham, and Mathura Vrindavan are some of the pilgrimage sites that tourists can visit in India. Cultural travel India is the main source of the country's recent meteoric increase in the tourist sector because it has long been regarded as the home of ancient history, legacy, and culture. One of the categories of domestic and international tourism that is expanding the fastest is wellness tourism. When someone travels to a new location to engage in activities that maintain or improve their own health and wellness, they are also looking for one-of-a-kind, authentic, or location-based experiences. India is renowned for its secularism, spirituality, and tolerance of many religions. The ancient healing techniques of India include yoga and meditation. As a result, tourists prefer to travel to India for advice on leading a healthier and more fulfilling life. This industry is also known as wellness tourism and is often referred to as medical tourism. Yoga, meditation, and Ayurveda are available in Indian marketplaces. (Upadhyay & Sathe)

Rishikesh is well known for yoga and is referred to as the world’s yoga capital. On the Ganga River, it is situated. Every year, many pilgrims travel from India and other countries to this place. Numerous ashrams in Rishikesh offer yoga and meditation therapies, which are well-known in the city.

## **Sustainable Tourism Development**

The demands of current visitors and host regions are met through sustainable tourism development, which also safeguards and expands prospects for the future. It is anticipated that this will result in the management of all resources in a way that satisfies economic, social, and aesthetic needs while preserving cultural integrity, crucial ecological processes, biological diversity, and life support systems. (Liu, 2003)

Sustainable tourism refers to sustainable methods used in and by the travel and tourism sector. It is a goal to acknowledge both positive and negative effects of tourism. The goal is to increase good effects while minimizing negative ones. Economic leakage, environmental harm, and overcrowding are just a few detrimental effects on a location. The development of jobs, the preservation and interpretation of cultural heritage, the preservation of wildlife, landscape restoration, and other benefits are all positive effects on a destination.

### ***Rishikesh City Air Action Plan***

The proposed clean air action plan’s goal is to have Rishikesh reach the required annual average ambient air quality standards within a set amount of time.

### ***Seed Bombing Activity in Uttarakhand***

In the Uttarakhand region, the RISE Foundation team used seed bombs in the Rishikesh and Dehradun areas. Rishikesh and the surrounding surroundings have experienced significant deforestation as a result of the new rail link between Rishikesh and Karnaprayag in order to construct a new railway station and railway track. Making and distributing seed balls is one of many projects to increase green cover and is a quicker and more affordable way to restore the lost greenery of our environment. Hence, it is an emergent afforestation technique embraced worldwide, most typically employed for ecological restoration.

### ***Sustainable Development Goals***

The Sustainable Development Goals (SDG), in particular SDG 6 Clean Water and Sanitation and SDG 13 Climate Action, are priorities for Rishikesh Upstream.NL. Its main objective is to accomplish these close to the Ganges River’s source in the Indian town of Rishikesh. We



believe that the SDGs SDG 11 (Sustainable Cities and Communities), SDG 7, and SDG 17 will all be indirectly impacted by our initiatives (Partnerships to achieve the Goal).

### ***'Zero Waste Eco-Tourism' project in Rishikesh***

Through educational initiatives, this project hopes to increase awareness among residents and visitors alike. Zero Waste Eco-Tourism: Our focus is on promoting eco-friendly tourism in Uttarakhand, where we have taken the Zero Waste Pledge to foster sustainable tourism. As a result, it is to assist tourists in creating zero waste adventures that include vacations like meditation, trekking, hiking, homestays, yoga teacher training courses, day village tours, photography tours, and walking tours.

### **Role of Cultural Sustainability and Community Sustainability in Rishikesh**

Oftentimes, maintaining intangible cultural heritage is crucial to maintaining the way of life for groups and communities. For a wide range of groups and individuals, including the impoverished and disadvantaged, intangible cultural property can produce income and respectable employment. To amplify people's ability to make decisions that are in line with their culture and beliefs. Curriculum and training systems should be designed to develop and maintain heritage and natural resources of Rishikesh. Tourism can be launched with the help of extensive community knowledge. In order to promote a fair and accurate portrayal of indigenous peoples and societies, it is important to value the rights of native settlers to land and property. Cultural sustainability Enhance, cultivate, and promote society's ability to create and apply conventional skills. Local community and culture of Yoga can help local community to promote their skills and to create their own value in tourism component of Rishikesh.

### **Methodology**

The data used in this study came from secondary sources. The information was gathered from various government sources, including the District Statistical Abstract, the Ministry of Tourism Annual Report, the Uttarakhand Tourism Policy (2018), and a number of journal articles, research papers, published, and unpublished works.

## Conclusion

This paper presents some of the main aspects of sustainable tourism in Rishikesh in relation with intangible cultural heritage. Yoga as a Intangible cultural heritage of India is attracting lot of domestic and foreign tourists to Rishikesh. The increasing number of tourist also increase the exploitation of environment. This paper shows the relationship of intangible cultural heritage Yoga as tourism attraction to Rishikesh and its effect on environment. Sustainable tourism has established how tourism will contribute and continue to deliver good quality, low impact experiences to the global sustainable development sector. Although the expansion of yoga tourism may be more environmentally benign for the area than the building of factories, sewage will still be a concern in the absence of investment in waste treatment infrastructure. Rishikesh, India, a popular yoga tourism destination ended up with a massive raw sewage problem because they didn't have the sanitation infrastructure in place to deal with thousands of yogis descending on their tiny town for a yoga festival. Because of the actions and expectations of visitors, the retreats' adherence to more conventional types of yoga practice may also be undermined. criticizes travelers who visit India for yoga training programmes Examining the behaviors of travelling yogis, a small but rising segment of international tourists whose lifestyle (including travel) choices have been inherently sustainable as part of their belief system for a long time, can help us identify what sustainable and mindful travel might look like. Yoga practitioners who take their practice and philosophy seriously will be encouraged to think critically about the carbon footprint and other unintentional negative effects of international travel because sustainable living is strongly rooted in the yoga teachings. To reap the rewards, Indian tourism should make use of the Internet as well as other cutting-edge interactive technologies. The tourist industry requires early elimination of roadblocks that have hampered its development in the past, as well as a national consensus on the function and place of tourism in national development. The creation of a tourism component plan can lead to the creation of an integrated inter-sectorial investment plan that supports tourism infrastructure needs through the Ministries of Railways, Surface Transport, Shipping, Civil Aviation, Urban Development, Rural Development, Environment and Forests, etc.

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**ISBN: 978-81-960940-3-4**

## **Equitable Waste Management Practices in Inspiring Indore: An Overview**

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### **Abstract**

Municipal solid waste management has developed into a significant activity in urban regions as a result of the rapid population growth. The efficient reduction of solid waste is one of the municipal corporations' and urban local bodies' mandatory responsibilities. Municipal Corporation faces significant issues due to the high rate of municipal solid waste generation and the complexity of trash generation. The commercial hub of the state of Madhya Pradesh is Indore. There are currently more than 19 Lacks people living in Indore. Municipal solid waste should be given comparable significance to infrastructure development. Municipal solid waste must be managed according to a well-planned system. The current study's goal is to assess the city of Indore's current trash generation, collection, transportation, and disposal status. The paper also covers numerous government initiatives put forth to efficiently manage waste. This study will give readers a realistic understanding of the municipal waste management system's current state in the city of Indore.

**Keywords::** Swatch Bharth abhiyan, Waste management, Municipal corporation roles.

## **Introduction**

We strongly believe that, in accordance with Article 21, every citizen has a fundamental right to a clean environment, and that both local and state authorities are responsible for using all reasonable efforts to maintain public health. As a result, the National Green Tribunal (NGT) issued an order in 2019 to address the financial difficulty.

According to information from a Lok Sabha answer from July 18, 2019, cities with a population of more than 100,000 produce 67,000 tons of garbage every day, or 44% of the nation's total waste production. The Solid Waste Management Rules of 2016 must be implemented according to rules created by the national and state governments, per the NGT. In 2017, Indore was ranked first, moving up from position 25 in 2016, a position it has held for more than a year.

The city's model is also extraordinarily cost-concentrated, according to Sambyal of CSE. Indore invested 180 crore rupees in the programmed as capital, and in the fiscal years 2017–2018, it spent 155 crore rupees on operations.

Many metropolitan areas lack the funding necessary for strong waste management and sanitation. But Indore also has “strong user fee collection, substantial punitive penalties, and collects money from the sale of fertilizer and dry trash,” which makes it a win-win situation.

The programme generated 27 crore in user charges, with the remaining financing coming from property taxes. Depending on how much waste they generate, household units pay between ₹ 60 and ₹ 150 per month, while commercial buildings pay ₹ 3 for every kilogram of waste.

For instance, in the roadside vegetable and food market, Indore wants to decentralize waste processing. As a result, user fees would be reduced, the end user would benefit from the waste treatment process, and the IMC would spend less on transportation and preparation. Through such initiatives, the IMC aims to constantly reduce costs by 10%. Different urban areas, including Mysore, Karnataka, and Panaji, Goa, practice decentralized garbage processing.

## **Swatch Bharat Mission (Clean India Mission): The Story of Indore**

On October 2, 2014, the nation's founding father Mahatma Gandhi's birthday, the Indian government launched the “Swatch Bharat Mission” (SBM). The mission was split into an urban and a rural portion. Building Open Defecation Free (ODF) communities through the development of private, network, and public restrooms as well as solid waste management was prioritized in metropolitan areas.

Today, Indore generates more than 1,115 MT of trash every day, all of which is gathered at the family or business foundation where it originated. Door-to-door collection started in January 2016 as a pilot programme that expanded to two of the city’s 84 wards. To complete a 100% door-to-door trash collection, it took close to a year. Through its great community-focused initiatives, Indore has managed to separate garbage at the source in 100% of its residential and commercial spaces.



**Figure1: Indore has Been Ranked the Cleanest City in India  
for the Fifth Consecutive Year**

The Indore community was instrumental in keeping the city tidy and clean. Indore’s population’s improved habits changed the city’s sanitation situation. The Municipal Corporation was effective in raising awareness of segregation at the source and the need to avoid disposing of trash in public spaces in just one year. The Swachhata narrative of Indore shows how community involvement can genuinely improve a city.

Municipal solid waste management has developed into a significant activity in urban regions as a result of the rapid population growth. The efficient reduction of solid waste is one of the municipal corporations’ and urban local bodies’ mandatory responsibilities. Municipal Corporation faces significant issues due to the high rate of municipal solid waste generation and the complexity of trash generation. The commercial hub of the state of Madhya Pradesh is Indore.

## **Objectives**

- To identify the Waste Management practices used to manage waste by Municipal Corporation in Indore.
- Barriers faced by Indore Municipal Corporation.

## **418 'PRAKRITI AUR SWACHHTA' - Environmental Sustainability through Cleanliness**

- What strategies Indore make better as cleanest city?
- To explore tourism potential in Indore.

### **Review of Literature**

**Md. Sohrab Hossain<sup>a</sup> Amutha Santhanam<sup>b</sup> N.A. Nik Norulaini A.K. Mohdomar**

The previous sections have provided an overview of how MSW management models have changed throughout the years. The initial models for solid waste management were optimization models that addressed particular parts of the issue. More recent models are compromise models that are centered on integrated waste management and have made the idea of sustainable waste management a key component. There are three primary types of models: cost-benefit analysis models, life cycle.

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The systems for managing garbage often take into account a variety of technological, climatic, environmental, demographic, socioeconomic, and statutory factors. It is difficult to study, predict, and optimize such intricate nonlinear processes using traditional techniques. Solid waste management (SWM) issues can now be solved using alternative computational methods thanks to artificial intelligence (AI) capabilities. AI has shown effective in handling ambiguity and missing or partial data, learning from experience, and taking on complex challenges.

### **Methodology**

The study is conducted using **qualitative research**.

**Primary source:** Publication by government authorities government orders, parliament debates.

**Secondary source:** Journal, newspapers, books, articles, records, videos .

### **Indore My City**

The largest and most populated city in Madhya Pradesh is Indore. In addition to being well-known for its cuisine, Indore is also well-known for its native vocabulary. The state's commercial capital is there. IIT and IIM are located in the developed city of Indore. As many students from many states travel to Indore to study, it is also a centre for young people. Living in this city is really simple and convenient, and it is also a very welcoming location to live. The people of Indore are kind and cooperative.

***Parul Chouhan & Eugene***



In accordance with Swachh Survekshan, it has been named India’s cleanest city six years in a row for the years 2017, 2018, 2019, 2020, 2021, and 2022. Under Swachh Survekshan 2021, Indore has also been recognized as the nation’s first “water plus” city. Only one Indian city, Indore, was chosen for the International Clean Air Catalyst Program. The initiative will be run for five years to purify the city’s air with the help of the Indore Municipal Corporation and the Madhya Pradesh Pollution Control Board.

## **Collection Plan**

### **Door to Door Collection**

There are 85 wards and 19 zones in Indore. On average, there are 6,000 residents and 600 commercial establishments per ward. The door-to-door collection system covers the residences or apartment buildings, whereas the bulk collection system handles semi- and bulk generators. Through its door-to-door collection method, Indore makes sure that all wards are completely covered. In Indore, trash is collected in a segregated way, i.e., the generators separate the waste at the source. The city of Indore produces 1115 MTPD of trash in total. Wet or organic garbage makes up 58.25% of the total waste, dry waste makes up 41.75 %, and domestic hazardous and sanitary garbage makes up 5%. Total wet waste generation is approximately 650 MTPD, and dry waste generation is approximately 465 MTPD)



**Figure 2: Door to Door Collection**

Earlier, household waste collection system prior to 2016 was not so good. Solid waste management was carried out in three stages as explained below

***Parul Chouhan & Eugene***



### **Primary Collection**

Municipal employees collected household garbage in some areas, while housing colonies gathered it in other areas under private contracts.

“Jagirdars” were the name given to private garbage collectors. They provided very low-quality services and frequently deposited trash on public property or vacant lots, endangering the health of the populace.

The gathered garbage was typically placed in dustbins located near major streets. The city has 1380 dustbins, some of which were in terrible condition. These dustbins frequently overflowed, giving the city a drab appearance. Dogs, pigs, and other stray animals would eat this waste for food. The Jagirdars took care of some of these animals, including cows and pigs, so they could milk the cows or sell the animals for meat and supplement their income. So that the animals could eat them and lower their upkeep expense on these creatures, they had a vested interest in not keeping the neighborhoods clean.

### **Secondary collection**

A2Z Infrastructure Limited, a private contractor, transferred waste from the central dustbins to an open dump in Devguradia. A2Z was going through a terrible financial crisis, which had a negative impact on the transportation of secondary waste. Their financial difficulties were evident in the poor upkeep of the vehicles they controlled and the inconsistent service that caused dustbins to build up and overflow

The city appeared dirty as a result of the inadequate collection and transportation of residential waste. Additionally, there was a lot of open defecation in slum neighbourhoods because there weren't enough public restrooms available for those residents to use. Even in urban regions, public restrooms had poor sanitation, which encouraged other residents to urinate in public.

The contract was terminated in August 2015, a few months after Mr. Manish Singh became the Municipal Commissioner of Indore, as a result of the Mayor's voiced concerns about cleanliness and trepidations about sticking with A2Z..

### **Implementation of D2D Collection System**

A recognised study investigation must be finished to help with making the amount of garbage produced at each ward and the number of residents in each ward in order to execute an effective approach for the door to door collection system. A thorough training schedule

covering all wards was created based on that concept. To address the collection needs of each ward, a specific vehicle and staff organization plan was carried out in accordance with the lesson plan.

Door-to-door collecting is done with the aid of partitioned trucks. For the collecting of wet, dry, and domestic hazardous garbage, each tipper has three separate bins. These tippers transport garbage from homes to the transfer station, where it is then transferred to the trenching field by hook loaders. Every vehicle used in the collecting and transportation operation is tracked by a GPS-enabled tracking system. The GPS system is closely monitored by the monitoring cell. Any route deviation performed by a particular driver results in fines, and several deviations are grounds for termination.

The Door to Door Collection System is used to collect the moist waste produced by household generators. IMC has implemented a door-to-door collection system to collect garbage from household generators and commercial sectors in Indore. Tippers, partitioned vehicles that gather waste, are used to move it to garbage transfer stations for secondary collection.

**The waste generators have been classified as:**

Domestic generators: the garbage producers who produce less than 25 kg of waste each day. The waste is produced in three different categories: wet waste, dry waste, and household hazardous waste.

Semi-bulk generator-Semi-bulk generators are those that produce between 25 and 100 kg of waste each day.

Bulk generator Bulk generators are those that produce more than 50 kg of garbage per day. The trash is divided into wet waste and dry waste by the bulkgenerators.

According to SWM Rules 2016, these large-scale waste producers have constructed onsite composting facilities to handle wet waste produced by their institutions. Waste is regularly collected from door to door. As a result, the city is cleaner, more hygienic, and dustbin-free.



**Figure 3: Wet Waste Collector (Dumper)**

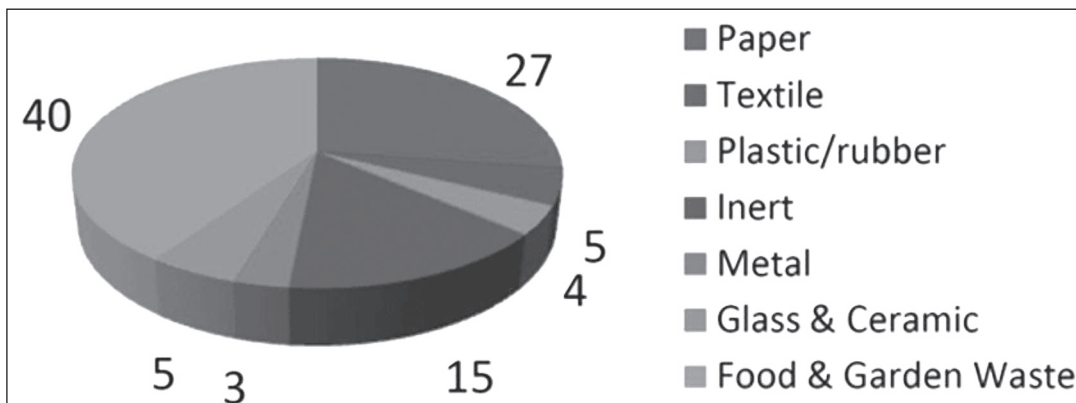
The tippers transport the wet waste gathered by the door-to-door pickup vehicles to one of the eight transfer stations. The tippers unload the wet garbage at the GTS into specialized compactors, which then compress it and load it onto specialized hook loaders. The GTS log books contain information about each incoming waste collection vehicle. Following completion of their individual collecting routes, the bulk collection vehicles proceed directly to the processing plant rather than the GTS.

Two main methods are used to process wet waste: central processing plants and decentralised waste processing units. The mass generators prepare all of their wet garbage (50 kg or more) on site; the central facility does not manage this waste. The central wet waste handling plant receives the wet waste from the GTS (D2D Collection) and semi bulk assortment (25 to 100 kg), where it is processed into fertilizer.

## Domestic Hazardous Waste

*Table 1: Types of Waste and their Sources*

Type	Source
Organic	Food scraps, yard (leaves, grass, and brush) waste, wood, and also process residues.
Paper	Cardboard, newspaper, magazine, bags, boxes, wrapping paper, phone books, shredded paper, and paper cups for beverages are all examples of paper waste. Papering, strictly speaking  Paper is not considered organic unless it is guarded by food residue.
Plastic	Bottles, packing, containers, bags, lids, and cups.
Glass	Bottles, broken glassware, light bulbs, also colored glass.
Metal	Cans, foil, tins, non-hazardous aerosol cans, appliances (white goods), and railing.
Other	Textiles, leather, rubber, multi-laminates, e-waste, appliances, ash, and other inert materials



**Figure 4: Composition of Municipal Solid Waste**

The materials that make up domestic hazardous waste include things like sanitary pads, lead acid batteries, etc. This waste is gathered in a different bin that is attached to the waste collection vehicle's back. Table 1 and Figure 4 classify the content of waste in Indore.

## Waste Generation and Segregation

In a separate facility, trash is created in Indore. The garbage producers are classified as household, semi-bulk, and bulk producers. Local generators are those who generate less than 25 kg of garbage every day. Semi-bulk generators are groups of generators that each create between 25 and 100 kg of waste each day. Bulk generators are those generators that produce more garbage than 50 kg.

Domestic generators produce the waste in separate structures as wet waste, dry waste, and domestic hazardous waste. The garbage is divided into wet waste and dry waste by the mass/bulk producers.

## Waste Collection and Transportation

Partitioned tippers collect the garbage in a separate structure for household generators. The distribution of these tippers is either 50/50, 60/40, or 85/15. These vehicles collect the dry and wet garbage in different chambers. Domestic hazardous garbage is collected in a separate container that is attached to the tipper's back. The command centre controls the tippers' predetermined collection paths, which are depicted in their organisation plan. The tippers move to their designated GTS after finishing their routes and deposit their garbage in the designated compactor.

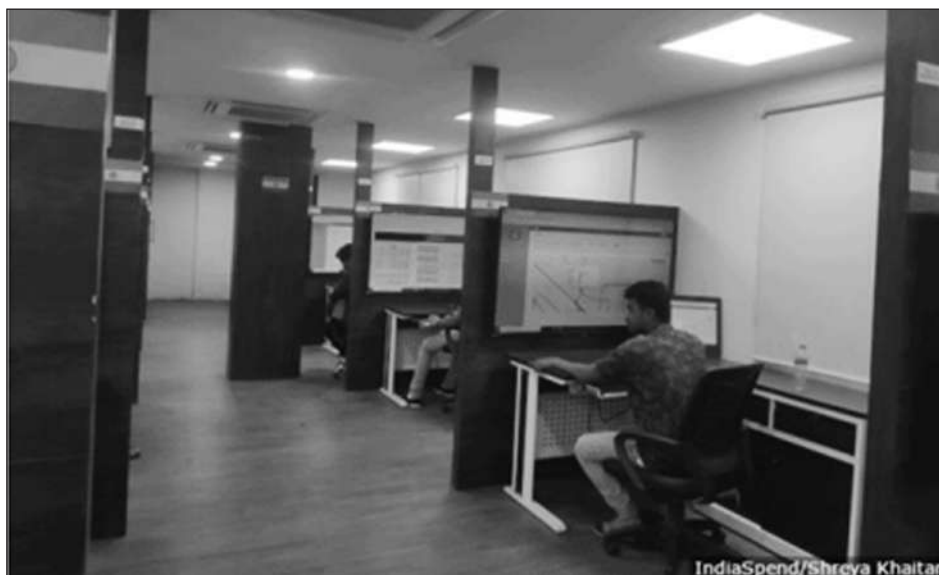


Figure 5: The Indore Municipal Corporation has set up a 'command centre' to track garbage vans around the city. GPS tracking enables the team to track all routes and every stop these vans make and provide assistance in case of breakdowns

## **Garbage Transfer Station**

One of Madhya Pradesh more economically developed cities; Indore serves as the state’s financial hub. India’s 9th city, Indore, with a population of about 25 lakh people. The operational region for solid waste management has been divided into 85 Wards and 19 Zones (SWM). In Indore, trash is collected separately, i.e., the generators separate the waste at the source. The city of Indore produces 1115 MTPD of trash in total. Wet or organic trash makes up 58.25% of the total waste, dry waste makes up 41.75%, and domestic hazardous and sanitary garbage makes up 5%. About 650 MTPD of wet trash are generated overall, and 465 MTPD of dry garbage (Approximately).

The tri-partitioned garbage tippers deployed in all 85 wards move the collected material to the specified garbage transfer facility (GTS). The garbage was formerly carried to the centralized processing facility, which is located around 20–23 kilometers from the city. IMC has built eight cutting-edge transfer stations in three different variants, including portable compactor-based GTS, semi-portable compactor-based GTS, and ramp-based static GTS, which were erected by Hyva and TPS at various places throughout the city. These locations include:-

- Star Square
- Kabitkhedi
- F-sector, Sanwer Road
- Sangam Nagar
- Sirpur, Dhar Road
- Lalbagh
- Crystal IT Park
- Rajshahi, DakkanwalaKua



**Figure 6: The Transfer Stations**

All of the aforementioned types provide the capability of collecting separate garbage and transporting it by hook loaders to the disposal location. There are two hoppers: one is used to collect dry garbage (blue), the other is used to collect wet waste (Green colour). In two steps, the MSW from door-to-door rubbish tippers is collected. The wet garbage is discharged into the green hopper after the dry waste is discharged into the blue hopper first. The blue and green containers, respectively, are attached to these hoppers.

According to the regulations outlined in the Biomedical Waste Rules 2016 only, the bucket for sanitary waste and domestic hazardous waste is off loaded into designated drums and transferred to the Common Biomedical Waste Facility (CBWTF).

## **Road Cleaning**

Every night, 800 km of major highways are mechanically swept, and water mist is used to wash sidewalks and road divider. Every night, 400 litres of water are used for this, the most of it recycled water from the three sewage treatment plants the IMC established, according to Warsi. The remaining 2,200 km of internal roads are cleaned, and waste is gathered in gunny bags, picked up by vehicles, and transported to the waste processing facility.

Between 20,000 and 30,000 metric tonnes of dust were removed from the roads in the first six months of road cleaning, according to Warsi, the consultant.



Figure 7: Road Cleaning at Night in Indore

There are some of the features of road cleaning service were

- With ultra-modern road sweeping machines (USA make, Elgin machines), roads are swept for 450–500 km per day at night between 10:00 pm and 6:00 am. Twelve of these machines were in use in May 2017. Their equipment has powerful brushes and a strong vacuum suction.
- On both sides of the road, up to 10 metres, litter is picked up.
- Road sweeping on 1710 km of roads with a width of less than 24 m is carried out manually by IMC sanitation staff.
- Daytime hours are 8 am and 4 pm approximately. TPS Company road sweeping equipment operated by the Municipal Corporation clean up 20 km of roads and pick up litter.

## Converting Waste to Fuel

A bio-methanation facility transforms organic waste into methane for the decentralised treatment of waste from the vegetable, fruit, and flower industry.



Mahindra Garbage to Energy Solutions Ltd. reported that each day, about 20 tonnes of waste are collected and converted into 750-800 kg of bio-compressed natural gas (bio-CNG). The organization and the IMC have a contract in place for the plant's long-term operation.

The gas produced is used to power city transportation and is financed for use as cooking fuel by hotels and the Indian Institute of Management. Compost is created by mixing waste from the flower industry, which is maintained separately (between one and two tonnes per day), with slurry.



**Figure 8: The Biomethanation Facility Opposite the Vegetable and Fruit Market. Organic Waste is Converted to Fuel used by City Buses and as Cooking Fuel**

## **Biomethanation**

It is a novel initiative by the Indore Municipal Corporation to create and use bio-CNG that is made from municipal solid waste. In Choithram Mandi, which is essentially a whole sale fruit and vegetable market and generates a significant amount of wet waste, Indore has put up a biomethanation facility with a 20 TPD capacity. One such initiative is the current biogas project, which satisfies all of the mission's thrust areas by offering cleaner transportation fuel, processing wastewater and wet solid waste with zero discharge, and raising the amenity value by lowering pollution.



**Figure 9: Choithram Mandi, Indore.**

The installed biogas plant in Choithram Mandi has a digestion capacity of 20 tonnes per day. The factory produces about 6 tonnes of organic manure every day. The facility generates about 2000m<sup>3</sup> of raw biogas per day. To achieve gas quality that is similar to the BIS criteria, the raw biogas is further enriched (IS: 16087 2016). Currently, 15 buses in Indore run on Bio-CNG and travel more than 2000 km per day while using less than 500 kg of gas per day.

### **Common Bio-medical Waste Treatment Facility (CBWTF)**

Common Bio-Medical Waste Treatment Facility (CBWTF), the first and largest facility of its kind in MP, is located in Indore and provides the essential treatment for bio-medical waste produced by numerous healthcare facilities. For appropriate operation and maintenance of treatment systems, the installation of independent treatment facilities by small healthcare units necessitates a comparatively significant capital investment, distinct labour, and infrastructure development. In addition to addressing these issues, the CBWTF concept also stops a city's treatment equipment from proliferating. Additionally, it eases the burden regulatory bodies are under to monitor. The cost of treatment per bed of garbage is greatly decreased by using all of the treatment equipment at CBWTF. The permitted facility for Indore is located on Sanwer Road and is called Hoswin Incinerator Pvt. Ltd.

### **Decentralized Processing of Waste**

At Nandlalpura Vegetable and Fruit Market, Rajkumar Mill Vegetable Market, and Khajrana Ganesh Mandir, aerobic pit composting method and organic waste converter System have been created for decentralised processing of wet waste. Swaaha has deployed mobile composting vans on a contract basis for the on-site treatment of organic waste produced by

fast food establishments and restaurants. Composters of various varieties have been put in schools, parks, zoos, etc. Through on-site treatment of organic waste, Indore has also set a 150 TPD reduction in garbage collection and transportation goal.

IMC also handled the waste produced by the tea vendors. In all 85 wards, they got rid of the trash that street food and tea merchants utilized. Additionally, bottle crushing equipment is used at Chappan Dukhan, railroad stations, etc.

### **Challenges faced by Municipal Cooperation**

The reason India is poor is that the best and most suitable ways for collecting and disposing of waste are not being used. SWM training is lacking, and there aren't enough trained waste management specialists to choose from. Additionally, there is a dearth of accountability in India's current SWM systems [46]. In India, municipal administrations are in charge of handling MSW, but their budgets are insufficient to pay for creating proper garbage collection, storage, treatment, and disposal methods. Major obstacles to implementing effective SWM in India include a lack of strategic MSW plans, waste collection/segregation, and a government financial regulatory framework.

Low motivation and a lack of creativity have prevented the adoption of new technology that could revolutionize garbage management in India. Another significant obstacle to enhancing SWM in India is public attitudes toward waste.

Indore has been named the cleanest city in the nation. The united efforts of the residents of Indore, its public authorities, and its representatives are the single biggest factor in the city earning this designation. Many cities in India and around the world are now imitating Indore's actions as a result of its inspiring path..

There were numerous difficulties to overcome when Indore began working toward this in 2016. Infrastructure was minimal, and there were no established protocols or procedures for municipal trash management. There were no processing units, transfer stations, or material recovery facilities. Facilities for composting were not in use.

The unorganized trenching grounds had more than 13 lakh tonnes of legacy trash, which attracted disease-carrying insects and caused methane-induced fires and foul odours. Door-to-door waste collection without source segregation was only available to roughly 5% of the city's residents. Faecal sludge was frequently collected, transported, and dumped without proper organization.

In order for the city to get out of this bad condition, neighborhoods and individuals have to support and work with it. The municipal and sanitation staff lacked the structure and motivation to work to their full potential. This was brought about by a dearth of monitoring measures and a weak system for handling citizen complaints.

Other than this, there was little political understanding of the need for cleanliness. Additionally, there was a lack of knowledge regarding solid waste management practices among the local government, local media, and resident welfare organizations.

Indore’s Municipal Corporation had even received an order from the High Court and notices from the Central Pollution Control Board to create a time-bound program to correct the pathetic situation.



**Figure 10: Notice for IMC Over Solid Management**

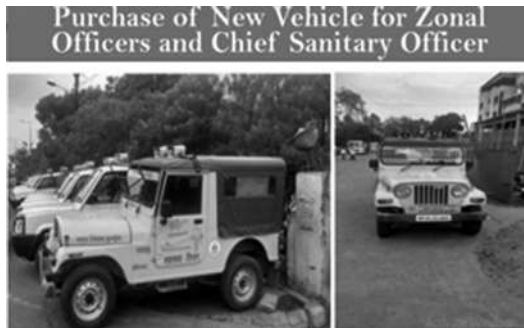
## **Indore Achieve 6<sup>th</sup> Rank in a Row of Cleanliness City of Country India**

The city holds the position of the first rank in the list of cleanest cities in India in Indore. Indore is a populous city of Madhya Pradesh that has shown praiseworthy cooperation of its people. The state government established door to door garbage collection service that has contributed significantly to making the city clean. It has lessened the problem of littering everywhere and has made people use dustbins for garbage.

- Also, many well aware families in Indore carry a dustbin even in their Car while traveling outside so that the road must be left clean. Garbage composting has trended rapidly in Madhya Pradesh, and its effect can be seen in Indore. Even the benefits of cleanliness and the harmfulness of littering and garbage are taught to children in schools. The students should be lead promoters of cleanliness in Madhya Pradesh
1. Municipal corporations collaborated with NGOs, private businesses, and IAS officers to set an example for citizens and encourage change.
  2. There have been 400+ specialized vehicles made with separate chambers for disposal of dry and moist garbage, better hydraulics, and higher capacity. In the morning, these GPS-linked vehicles drove through the streets, and the enormous open dustbins outside colonies that attracted stray animals were fully taken away.
  3. Waste was carried to a transfer station to ensure appropriate segregation after being collected twice a day by garbage vehicles from business zones. It was then transported to a facility for processing waste..
  4. As NGO workers separated the waste at the processing facility, recyclable waste was sold to businesses and organic matter was sold to farmers as compost (or given for free). Roads were built using the non-recyclable garbage that was supplied to cement facilities.
  5. After segregation, food waste from food stalls like Chappan Dukaans (56 stores) was transported to processing facilities, and the 56 shops paid for the garbage to be processed. This aids in better planning so they may spend less and avoid wasting food..
  6. Biomethanation plants convert organic waste to gas to provide CNG for the decentralised processing of waste from flowers, fruits, and other items. Buses run on CNG, which is also sold to hotels for use in their kitchens (and to IIM too).
  7. Every night between 10.30 and 11 pm, water mist from reclaimed water provided by sewage treatment plants sweeps major roads.
  8. They suspended and fired karmacharis who resisted change when regular hand-holding, monitoring, and respect did not work. Regular attendance required biometric identification.



## New things adopted by Indore to keep no.1 in India (old to new)



#### 434 'PRAKRITI AUR SWACHHTA' - Environmental Sustainability through Cleanliness

- Construction of 2 ½ ft high central divider for greenery & dust prevention/ security.
- Road square improvement & widening of left turn.
- Kaan/ Saraswati river cleaning & cleaning of major nala.
- Back lane/ concreting of lane & effective sewer system.
- Littering by Marriage Processions and Marriage Pandalas
- Dustbins in all city bus transport
- Improvement of foot path to reduce dust and also help pedestrian movement.
- Removal of Stray cattle/ Pig removal
- Removal of illegal and dangerous hoardings
- Removal of Encroachments on footpath/ Roads such as Gumtis and Thelas
- Cleaning around wine shops



Figure 11: Effective Spot on Passenger If Caught Littering Otherwise on Bus Owner

### Awareness Campaign for Behavioral Change

The initial stage of implementation was raising awareness among the populace and the community through leaflets, loud speakers, community rallies, meetings, and engagement from the general public. They were educated on the advantages and negative effects of wet and dry waste separation on the environment and human health. The foundation of the Swachh Bharat Mission's success is behavior change, which is facilitated by information, education,

and communication (IEC). IMC adopted and engaged in a variety of IEC activities, including print, audiovisual, social/digital media, and electronic media. The following is a summary of some of the unique IEC measures implemented by IMC for behavioral change in Indore.

Street plays, wall paintings, and FM radio were examples of grassroots innovations that continuously updated their content by incorporating new thematic themes to be communicated and doing so in inventive ways. The swachhata message was promoted through the use of cultural holidays like Gandhi Jayanti, Dussehra, and the Ganesh festival. It was a significant IEC component that it was included into monitoring activities. These actions monitored and oversaw the provision of services.







Verification was conducted using several techniques. These included a) using the 311 app to conduct services, b) performing surprise site visits online, and c) tracking employee attendance using biometrics. The 311 app has become a crucial tool for logging concerns coming from various residential regions. The complaints are handled in a timely manner. The Municipal Commissioner keeps track of how complaints are progressing.

The NGOs explained not only how garbage may be recycled but also how to make compost and how these might be helpful to other stakeholders through IEC. A cross-partnership was built as a result, and the garbage was transformed into a valuable product that met the requirements of others.

## The Indore Travel Bucket List

Indore has been declared the country's cleanest city in Swachh Survekshan 2017 survey. One of the upcoming smart cities, Indore also has a history of resounding culture and art.

### Indore proved why it's worth a visit

Indore has the best street cuisine, but this is not the only reason to travel there. Indore has won numerous awards over the years and has emerged as one of India's most advanced and sustainable cities. Here are some reasons to travel to Indore once and how the city managed to lead the way for the other states.

**Sarafa Bazar**- Famous for sweets and Indori delicacies such as Maal Pua and Mawa Bhati.

**Chappan Bazar**- This market, which translates as 56 shops in English, is studded with renowned restaurants, each of which specialises on a single food. There is coverage of many different cuisines, including South Indian, Continental, Chinese, and many others.



Figure 12: Chappan Bazar

**Rajwada**- Historical importance at primarily the center of the city, Rajwada is a place to shop for trinkets while you sip on some freshly squeezed juices. Known for selling durable footwear, and do try shopping from the street vendors; they tend to have pretty cool stuff.

**Mandav**- A supposed haunted picnic spot in Indore, Mandav is home to an age-old fort and gardens surrounding it. It is a cheerful picnic spot by the day and a spooky tourist attraction after dawn.

**Gardens in the city**- Megdoodh Garden, Nehru Park and Kamla Nehru Park are some of the many gardens where you can go for an evening stroll. They are very well maintained, adding to the charm and feel-good vibe of the city. These gardens add all the more value to Indore tourism for varied travellers and tourists.



**Figure 13: Rajwada**

The jalebi, samosas, poha with sev, bhutte ki kees, khopra patties, garadu and batla kachori are some of the most famous delicacies here in Indore. And surprisingly, everything comes with a hint of sweetness- even the savoury items. Every second street vendor has something unique for your taste buds and I bet you'd want to try it all.

Indore, the cleanest city in India, is also the smartest city in the nation. It shares the top spot for best performance among the 100 smartest cities with Surat. Based on performance under the India Smart Cities Awards Contest (ISAC) 2020 of the Smart Cities Mission, the Union Ministry of Housing and Urban Affairs granted the same to states, cities, and Union Territories.

### **Smartest City in the Country**

The sixth year in a row, Indore has been named the cleanest city in India. Since Indore's roads are cleaned at night rather than in the morning, the city is spotless when people first enter the streets. Children participate in clean-up campaigns here to raise awareness.

### **Indore is India's First Water Plus City**

India's first "water plus" city, Indore, has been recognised by Swachh Survekshan 2021. This honour was given to the commercial centre of Madhya Pradesh for keeping its waterways and drains clean. based on the requirements for awards. Thirty percent of sewer water needs to be reused and recycled, and dirty water shouldn't go down the drain or into the river. Additionally, the government must completely clean and connect public restrooms to sewer pipes.

## **It introduced the concept of dustbin on wheels**

In Indore, an unique idea known as “dustbins on wheels” was introduced. Instead of disposing of their waste in the streets, residents began to transport little dustbins in their cars. The same kind of containers were spotted being carried around by those who chew gutka and paan.

## **Conclusion**

The collection, disposal, and management strategy for municipal solid waste for the Indian city of Indore is presented in this document. The development of the plan involves careful observation of variables such as population density, road connectivity, trash creation and disposal capacity, and waste transit from collecting sites to disposal sites. For more effective management, the strength of the transfer stations might be increased. This concept is used by the Indore Municipal Corporation to assist effective solid waste management and employee schedules. Public awareness should be created among the masses to inculcate the health hazards of the wastes. Littering of MSW should be prohibited in cities, towns and urban areas notified by the state government. Moreover, house-to-house collection of MSW should be organized in Indore.

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**ISBN: 978-81-960940-3-4**

# **Spruceness and Sustainable Tourism Development at Sultanganj, Bihar - An Overview**

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## **Abstract**

*“Sustainability is meeting our own needs without compromising the ability of future generations to meet their own needs.”*

Sustainability is a goal which connects to the potentiality and capabilities of human beings to safely co-exist on the globe over a long period of time. The discussion around sustainability has changed significantly after the pandemic, with more and more people talking about it now. This study focuses on the factors to find-out the environment friendly practices being adapted by the tourist and local residents at the site with special reference to the spruceness and the challenges faced by them.

Interactions, observations and face to face interview method of data collection has been adapted to complete this study wherein the qualitative data has been collected and studied for the purpose. The literature revenue of this research revolved around the buzz word Sustainability. The findings of this study has evaluated that the destination is marching forward towards sustainability in recent days. As every destination has got further scope of improvement, this study forms an opinion that although plenty of work has been done in the recent time to develop and maintain the destination, a lot of wastage and exploitation of our natural resources is reported during the Shravan Month / Sawan Maas (month of July-August). We can always contribute towards protecting our nature by going for sustainable options, hence challenges in sustainable development has also been highlighted in this work.

**Keywords:** Hospitality, Tourism, Spruceness, Sultanganj and Sustainability.

*Jitendra Das*

## Introduction

The success of a tourism site is measured not only by bottom-line financial success but also by tangible impact on local people and the environment at large. Since India is hosting the G20 Presidency from December 1, 2022, it is high time now that hospitality and tourism industry focus on being sustainable to the core.

Ministry of Tourism, Government of India has strategically outlined in its policy, the Centre principle of “Atithi Devo Bhava” (Guest is God) and is committed to ensure that every tourist in India is Physically Invigorated, Mentally Rejuvenated, Culturally Enriched and Spiritually Elevated (Code of conduct for Safe & honorable Tourism Guidelines, Ministry of Tourism, Government of India, 2010)

At the start of the new millennium, tourism is firmly established as the number one industry in many countries and the fastest-growing economic sector in terms of foreign exchange earnings and job creation. Although Covid-19 interrupted in the growth and development of tourism between the year 2019 to 2021 but post pandemic the industry revived itself. In present scenario a paradigm shift has been observed in the tourists and tourism industry.

The general concept in tourism is that good services can fulfil a customer's basic needs, a good experience goes beyond that and involves creating emotional connections, memorable moments, and a sense of personalization. A good experience can lead to customer loyalty, repeat business, and positive word-of-mouth recommendations. However, Days are not far when tourist will try checking about the environmental practices of tourist destinations and tourism service provider. Considering the above point Sultanganj has been selected as destination for this study.

Sultanganj is located in the lap of nature in the Bhagalpur district of Bihar, India. It is situated on the south bank of Ganga river, 25 km west of Bhagalpur city. It is famous for two huge granite rocks in the river one of which is crowned by a Lord Siva temple popularly called 'Ajgabinath Temple' and the other by a mosque (Bihar Pdf, Ministry of Tourism Government of India, 2003).





<https://www.apnisanskriti.com/temple/ajgaivinath-temple-sultanganj-bhagalpur-bihar-1887>

Ajgaibinath temple is one of the three famous Lord Shiva temples in this region. It is located in Bihar whereas, the two other being Basukinath and Baidyanath Dham temples which is situated in Deoghar, Jharkhand.

A clear understanding and thorough knowledge of local residents' perceptions about tourism is essential for pursuing sustainable tourism at any site. The research study is based on this thought of common interest to the tourist, local community, society, tourism stake holders and sustainability. The period of this study is last 10 years, however secondary sources has been reviewed prior to this period as well.

## Objectives

- To study the Cultural and Archaeological significance of the place
- To discover the existing environment friendly practices being adapted and challenges faced by the tourist and local residents at the site
- To analyse the role of spruceness towards sustainable development of the location



## Methodology

This study is descriptive, narrative and analytical in nature. The research methodology used in this study included observations, interactions and face-to-face interviews. Focus groups were consulted for understanding the exact situation of the site and framing the questionnaire. The questionnaire was used to elicit information from the respondents. For the secondary data various books, journals, magazine, newspaper, internet, etc. were referred.

The information obtained in this manner was analysed. This document provides an overview of the status of the destination in relation to cleanliness, hygiene, sanitation and its role in sustainability. Respondents for this qualitative study were the Tourist/Excursionist and Local residents.

## Review of Literature

**Vasudhaiva Kutumbakam** 'The World is a Family'- this verse of the *Maha Upanishad* is engraved at the entrance hall of the Parliament of India. Our ancestors had this foresight almost 5000 years ago, to be mindful and to take care of all the elements of nature (Niranjan Khatri, 2023).

We should remember the famous saying, ***"Humankind has not woven the web of life. We are but one thread within it. Whatever we do to the web, we do to ourselves. All things are bound together. All things connected"*** (Chief Seattle, 1854)

Sustainability developed as a notion in 1960 during the environmental movement to deal with the rapid loss of non-renewable resources (Pisani, 2006). Later, this concept was divided into three pillars known as environmental, economic, and social (Purvis et al., 2018). This is also known as the triple bottom approach.

Sustainability has been important, albeit more through lip service, and the evidence can be seen from the broader angle of the Rio Earth Summit since 1992, when great statements were made without any formal binding agreements, and as recently as the 2015 United Nation Paris agreement to help developing nations by giving them US\$100 billion per annum for loss and damage, which has not materialized till date (Niranjan Khatri, 2023).

International organizations and governments from all over the world have recognized the crisis and are working together to reduce the impact and safeguard the environment for future generations at the COP 26 UN Climate Change Conference (COP26) in 2021.

“With our bottomless appetite for unchecked and unequal economic growth, humanity has become a weapon of mass extinction. We are treating nature like a toilet. And ultimately, we are committing suicide by proxy”, said the UN Secretary General, (Antonia Guterres) while addressing the participants at the opening of the 15th session of the UN Biodiversity Conference (COP15) in Montreal, Canada. (Times of India, 7<sup>th</sup> December, 2022)

“Sustainability” has evolved beyond a trendy buzzword in recent years, tourists are becoming more conscious and involved in playing their part in preserving the planet for future generations. India has pledged to achieve carbon neutrality by 2070 (Mandeep S. Lamba, 2023).

Wherever there is a footprint of human beings, the need for facility management services comes into the picture to maintain the cleanliness, hygiene and sanitation. The market size of the global cleaning services was \$55,715.0 million in 2020, and it is expected to reach \$111,498.8 million by 2030, with a compound annual growth rate of 6.5% from the year 2021- 2030 (Allied market research.com).

We have lived through the period of the industry adopting clinically clean standards to brace the pandemic in 2020. Now, it’s time to seriously wake up to the call of sustainability goals (Smritee Raghubalan, 2023).

According to Booking.com 2022 Sustainable Travel Research Report, 91% of Indian travellers want to travel more sustainably over the next twelve months.

In the research work titled ‘*Sultanganj Re-Visited: Encountering the Past Through Living Traditions*’, author explored that the local community are concerned about their cultural and they also feel that the ancient heritage in India in general and at Sultanjganj in particular should be protected (Ruma Bose, 2022).

“The ‘onion’ (as one goes on peeling onion, the layers keeps coming one after another, till the end) is the best description of our sustainability journey over these past 25 years. Every time we feel that we have cracked the code and achieved all that we can. However, we always realize that there are more challenges and opportunities ahead.” (Sonu Shivdasani, 2023)

## Data Analysis & Findings:

*“Be the change you want to see and leave the world better than you found it”,*

Hemant Khurana, 2023

Sultanganj is a Town and Block in Bhagalpur district of Bihar state in India. It is located at 25°14'23"N 86°43'48"E. Total number of villages in this Block is 133. In Sultanganj, river Ganga is uttarvahini (North-flowing) for almost half kilometers, where the holy Ajgavinath Temple is situated. North-flowing rivers are considered to be very auspicious in Hindu religion. (Bihar Pdf, Ministry of Tourism Government of India, 2003).

During the rule of the Mauryas, Guptas and Palas many works of art and architecture were raised at Sultanganj. The area has yielded ancient relics like stupas, seals, coins, terracotta and Hindu and Buddha images.

Many carvings can still be seen in the Sultanganj hills. A number of small images along with a copper image of Lord Buddha about seven feet high were excavated here which is now in Birmingham Museum (Christopher Marshall ed., 2011). A large number of antiquities have been preserved in Patna Museum as well.

They indicate a very high standard of Hindu religiosity and culture. The fact that some of the images and other antiquities are Buddhistic, reiterates that the area was very important from Buddhistic point of view as well. Most of the antiquities excavated here have been identified with the medieval period (Wikipedia-Sultanganjt, 10<sup>th</sup> Dec 2022).



**Figure 1: Excavated Carvings and Statues**

- Nowadays, travellers not only want to go to an eco-friendly destination, but they also want to know how ecologically responsible the place is, hence, the more climate-friendly a destination is, the more attractive it becomes. Following are the opinion of respondents about the destination for making Sultanganj a better sustainable place:
- Culture and Heritage tourism acts as a medium to reconstruct and communicate the national solidarity. Although residents view tourism as a form of socio-economic development positively, they do not appreciate and support all the practices followed by the tourist.
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- Solid Waste Management needs immediate attention of the local authorities especially during the Shravan Month / Sawan Maas (month of July-August), when the kanwarias (hindu devoties who collects water in two earthen pot from holy rive Ganga at the site- Sultanganj, Bihar and walk on foot for approximately 100 kms. to reach Deoghar in Jharkhand and offer this holy water to lord Shiva in the Baidyanath Dham temple) flock to the destination in masses continuously for a month.
- Some of the tourist and local residents felt the necessity for construction of advanced drainage system and installation of Sewage Treatment Plant to collect all the drainage water, filter it for reusing it and also to reduce water pollution of the holy river Ganga. Some localised respondents also opined that the local authorities can make necessary arrangement to collect the bio gas which is generated during the process of water treatment and can be distributed to the needy people.
- Interviewee were also having belief that during the summers season the ground water levels are getting depleted hence rainwater harvesting systems should be featured in and around the destination.
- Responders view point was that even now the single use plastics are being utilised by some of the vendors at the site hence awareness programme for reducing single-use plastic is the demand of the day to implement the environment sustainability practices at the site in particular and in the town and other villages of the block in general.
- Some of the respondents also proposed other strategies which should be adopted by local authorities such as smart meters and motion-activated lights and faucets to save water and energy.

- Certain numbers of respondent also propound to advise the local authorities to set a target for reduction in waste to landfills and also reduction in food waste.
- A few repliers were confident that the Sustainability has become a key focus in the hospitality sector in recent years, and it is proved through certain case studies that if one utilises local resources, it reduces the carbon foot print, in relation to this a good number of participants proposed to be vocal for the local.
- A good few respondents advocated to Maximize/optimize the role of renewable energy in the region. They were of the of the opinion that the place gets very sharp and bright Sun-light in summer and consumption of electricity also goes up in the season, hence Solar power could be a brilliant option to produce the green renewable energy locally and utilise it in and around Sultanganj. The respondents also added two beneficial points while the interactions, first, these green energies enhance resource efficiency and provide cost savings, and second, these policies serve as a marketing tool, attracting today's eco-conscious tourists to the site.
- A feeling for the need to estimate the carrying capacity and regulate the mass tourism especially in the month of July-August was also reflected by the participants during the investigation.
- Five respondents also focused on giving awareness to the school students through education as it plays a vital role in understanding the sustainable tourism. They stressed on the fact that school students of the area must be educated about sustainable practices which could be adapted at Sultanganj.
- Some informant also revealed that while travelling on roads people throw out bottles and garbage on the roads. Awareness programme and required arrangements of dustbins etc., is expected from the local authorities.
- Most of the respondents voiced that the destination is still in developing stage. Although the site attracts lots of pilgrimage domestic tourist from Bihar and neighbouring states, its potentiality to bring in domestic tourist from remaining states and International Tourist at the site should be utilised in planned manner jointly by the local authorities, Bihar tourism, India Tourism, Archaeological Survey of India and other stake holders of hospitality and tourism industry in a sustainable manner.

## Conclusion

*Tourists are the green agents of future.*

The study revealed the following points as an overview towards a way forward in propelling the destination even more closer to sustainable development: a) Involve local community as tourist wants to support local community. b) Tourist wants to avoid crowded destinations especially those wishing to make more environmentally and socially conscious travel decisions. c) Tourist also are looking forward for the travel agents, tour operators and other stake holders of the industry for providing them with options and inspiration on: how to visit more local attractions and communities at their travel destinations and, how to better avoid overcrowded destinations. d) Many tourists prefer to use the sustainable transportation, if available. e) Eliminating or reducing single-use plastic. f) Water conservation / Rain water harvesting / Recycling water at the site. g) using renewable energy. h) Energy conservation. i) Recycling waste. j) Reducing food wastage, etc.

Most of the focus has been on the operational aspects at the destination both by the tourist and the local people. ***“Many services in hospitality and Tourism may be satisfying but not a memorable experience.”*** Some services may be excellent but experience of tourist is based on over all services provided at a destination or site. Hence there is a need for better coordination, cooperation and understanding between the stakeholders of tourism and hospitality. Special effort is required to have a triangular model of win-win situation between the Government agencies, non-governmental organisations and the private players, keeping the local community in mind.

It is concluded that the sustainable tourism is catching up very fast in India. Awareness level of tourists and local residents still needs to be done for making the place more sustainable. Most of the tourist wants negligible or no negative impact on tourism due to their visit.

## Suggestion

1. It is suggested that government need to focus more on awareness programme through the print and electronic media
2. Public Private Partnership (PPP) in this regard must be encouraged
3. Awareness programme about tourism may be organised at the school levels

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