

TO INTRODUCE AND EXPLAIN ZERO WASTE LIFESTYLE IN INDIA TO REDUCE THE PLASTIC AND PACKAGING WASTE

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INTRODUCTION

To some of us here, waste management means reducing the waste we create, to the others, it means the management and proper disposal of the waste we already have created.

According to Wikipedia, “Waste management (or waste disposal) are the activities and actions required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process.”

AIM & OBJECTIVE

Aim:- To introduce and explain zero waste lifestyle in India to reduce the plastic and packaging waste.

Objective:- To help and improve our environment and help in reducing packaging waste and adapting a zero waste lifestyle.

Review of Literature

Waste can be solid, liquid, or gaseous and each type has different methods of disposal and management. Waste management deals with all types of waste, including industrial, biological, and household. In some cases, waste can pose a threat to human health. Waste is produced by human activity, for example, the extraction and processing of raw materials. Waste management is intended to reduce adverse effects of waste on human health, the environment or aesthetics.

Waste management practices are not uniform among countries (developed and developing nations); regions (urban and rural areas), and residential and industrial sectors can all take different approaches.

A large portion of waste management practices deals with municipal solid waste (MSW) which is the bulk of the waste that is created by household, industrial, and commercial activity.

India produces 62 million tonnes of waste in 2014 and USA produces 254 million tonnes of waste in 2013, even though India has 4 times the population of USA.

Principles of Waste Management:

Waste Hierarchy:-

The waste hierarchy refers to the "3 Rs" reduce, reuse and recycle, which classifies waste management strategies according to their desirability in terms of waste minimization. The waste hierarchy is the cornerstone of most waste minimization strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of end waste

The waste hierarchy is represented as a pyramid because the basic premise is that policies should promote measures to prevent the generation of waste. The next step or preferred action is to seek alternative uses for the waste that has been generated i.e. by re-use. The next is recycling which includes composting. Following this step is material recovery and waste-to-energy. The final action is disposal, in landfills or through incineration without energy recovery. This last step is the final resort for waste which has not been prevented, diverted or recovered. The waste hierarchy represents the progression of a product or material through the sequential stages of the pyramid of waste management. The hierarchy represents the latter parts of the life-cycle for each product.

Life-Cycle of a Product:-

The life-cycle begins with design, then proceeds through manufacture, distribution, and primary use and then follows through the waste hierarchy's stages of reducing, reuse and recycle. Each stage in the life-cycle offers opportunities for policy intervention, to rethink the need for the product, to redesign to minimize waste potential, to extend its use and to reduce its packaging.

Resource Efficiency:-

Resource efficiency reflects the understanding that global economic growth and development can not be sustained at current production and consumption patterns. Globally, humanity extracts more resources to produce goods than the planet can replenish. Resource efficiency is the reduction of the environmental impact from the production and consumption of these goods, from final raw material extraction to last use and disposal. This process of resource efficiency can address sustainability.

Polluter-pays principle:-

The polluter-pays principle mandates that the polluting party pays for the impact on the environment. With respect to waste management, this generally refers to the requirement for a waste generator to pay for appropriate disposal of the unrecoverable material.

History Of Waste Management:-

Throughout most of history, the amount of waste generated by humans was insignificant due to the low population density and low societal levels of the exploitation of natural resources. Common waste produced during pre-modern times was mainly ashes and human biodegradable waste, and these were released back into the ground locally, with minimum environmental impact. Tools made out of wood or metal were generally reused or passed down through the generations.

However, some civilizations do seem to have been more profligate in their waste output than others. In particular, the Maya of Central America had a fixed monthly ritual, in which the people of the village would gather together and burn their rubbish in large dumps

Waste Handling and Transport:-

Waste collection methods vary widely among different countries and regions. Domestic waste collection services are often provided by local government authorities, or by private companies for industrial and commercial waste. Some areas, especially those in less developed countries, do not have formal waste-collection systems.

Research Methodology

What is the concept of “Zero Waste”?

Zero Waste is a philosophy that encourages the redesign of resource life cycles so that all products are reused. The goal is for no trash to be sent to landfills, incinerators, or the ocean. The process recommended is one similar to the way that resources are reused in nature.

Cradle-to-Cradle, Cradle-to-Grave:

Cradle-to-grave is a term used to describe a linear model for materials that begins with resource extraction, moves to product manufacturing, and, ends by a ‘grave’, where the product is disposed of in a landfill. Cradle-to-grave is in direct contrast to cradle-to-cradle. Cradle-to-cradle is a term used in life-cycle analysis to describe a material or product that is recycled into a new product at the end of its life so that ultimately there is no waste.

Cradle-to-cradle focuses on designing industrial systems so that materials flow in closed-loop cycles which mean that waste is minimized, and waste products can be recycled and reused. Cradle-to-cradle simply goes beyond dealing with issues of waste after it has been created, by addressing problems at the source and by re-defining problems by focusing on design. The cradle-to-cradle model is sustainable and considerate of life and future generations.

The cradle-to-cradle framework has evolved steadily from theory to practice. In the industrial sector, it is creating a new notion of materials and material flows. Just as in the natural world, in which one organism’s ‘waste’, cycles through an ecosystem to provide nourishment for other living things, cradle-to-cradle materials circulate in closed-loop cycles, providing nutrients for nature or industry

An example of a closed loop, cradle-to-cradle product design is DesignTex Fabric. It has designed an upholstery fabric, Climatex Lifecycle, which is a blend of pesticide- and residue-free wool and organically grown ramie, dyed and processed entirely with non-toxic chemicals.

Socio-Economic and Health Problems solved by Zero Waste:

The spread of industrialization worldwide has been accompanied by a large increase in waste production. In 2012 the World Bank stated that 1.3 billion tonnes of municipal waste was produced by urban populations and estimates that that number will reach 2.2 billion tonnes by 2025 (Global Solid Waste Management Market - Analysis and Forecast). The increase in solid waste production increases the need for landfills. With the increase in urbanization, these landfills are being placed closer to communities. These landfills are disproportionately located in areas of low socioeconomic status with primarily non-white populations. Findings indicated these areas are often targeted as waste sites because permits are more easily acquired and there was generally less community resistance. Additionally, within the last five years, more than 400 hazardous waste facilities have received formal enforcement actions for unspecified violations that were considered to be a risk to human health.

There is a growing global population that is faced with limited resources from the environment. To relieve the pressures placed on the finite resources available it has become more important to prevent waste. To achieve zero waste, waste management has to move from a linear system to be more cyclical so that materials, products, and substances are used as efficiently as possible. Materials must be chosen so that it may either return safely to a cycle within the environment or remain viable in the industrial cycle.

Zero waste promotes not only reuse and recycling but, more importantly, it promotes prevention and product designs that consider the entire product life cycle. Zero waste designs strive for reduced materials use, use of recycled materials, use of more benign materials, longer product lives, reparability, and ease of disassembly at end of life. Zero waste strongly supports sustainability by protecting the environment, reducing costs and producing additional jobs in the management and handling of wastes back into the industrial cycle. A Zero waste strategy may be applied to businesses, communities, industrial sectors, schools, and homes.

Benefits proposed by advocates include:

Saving money. Since waste is a sign of inefficiency, the reduction of waste can reduce costs. Faster Progress. A zero waste strategy improves upon production processes and improving environmental prevention strategies which can lead to taking larger, more innovative steps. Supports sustainability. A zero waste strategy supports all three of the generally accepted goals of sustainability - economic well-being, environmental protection, and social well-being.

Improved material flows. A zero waste strategy would use far fewer new raw materials and send no waste materials to landfills. Any material waste would either return as reusable or recycled materials or would be suitable for use as compost.

A major issue with landfills is hydrogen sulfide, which is released during the natural decay of waste. Studies have shown a positive association between increased lung cancer mortality rates and increased morbidity and mortality related to respiratory disease and hydrogen sulfide exposure. These studies also showed that the hydrogen sulfide exposure increased with proximity to the landfill.

Household chemicals and prescription drugs are increasingly being found in large quantities in the leachate from landfills. This is causing concern about the ability of landfills to contain these materials and the possibility of these chemicals and drugs making their way into the groundwater and the surrounding environment.

Zero waste promotes a circular material flow that allows materials to be used over and over, reducing the need for landfill space. Through zero waste the number of toxins released into the air and water would be decreased and products examined to determine what chemicals are used in the production process.

Health Issues related to landfills:

- Birth Defects and Low birth weight: Associated with close proximity to landfills, exposure to particle matter and Nitrogen dioxide.
- Respiratory disease and Lung Cancer: Related to the release of Hydrogen Sulfide
- Zero waste's promotion of a cyclical product life can help reduce the need to create and fill landfills. This can help reduce incidences of respiratory diseases and birth defects that are associated with the toxins released from landfills. Zero waste also can help preserve local environments and drinking water sources by preventing pollutants from entering the ecosystem.

History:-

The movement gained publicity and reached a peak in 1998–2002, and since then has been moving from "theory into action" by focusing on how a "zero waste community" is structured and behaves. The website of the Zero Waste International Alliance has a listing of communities across the globe that have created public policy to promote zero-waste practices. See also the Eco-Cycle website for examples of how this large nonprofit is leading Boulder County, Colorado on a Zero-Waste path and watch a 6-minute video about the zero-waste big picture. Finally, there is a USA zero-waste organization named the GrassRoots Recycling Network that puts on workshops and conferences about zero-waste activities. The California Integrated Waste Management Board established a zero waste goal in 2001. The City and County of San Francisco's Department of the Environment established a goal of zero waste in 2002, which led to the City's Mandatory Recycling and Composting Ordinance in 2009. With its ambitious goal of zero waste and policies, San Francisco reached a record-breaking 80% diversion rate in 2010, the highest diversion rate in any North American city. San Francisco received a perfect score in the waste category in the Siemens US and Canada Green City Index, which named San Francisco the greenest city in North America.

The tension between zero waste viewed as post-discard total recycling of materials only, and zero waste as the reuse of all high-level function remains a serious one today. It is probably the defining difference between established recyclers and emerging zero-wasters. A signature example is a difference between smashing a glass bottle (recovering cheap glass) and refilling the bottle (recovering the entire function of the container).

Biodegradable plastic is the most prominent example. One side argues that the biodegradation of plastic is wasteful because plastic is expensive and environmentally damaging to make. Whether made of starch or petroleum, the manufacturing process expends all the same materials and energy costs. Factories are built, raw materials are procured, investments are made, machinery is built and used, humans labor and make use of all normal human inputs for education, housing, food etc. Even if the plastic is biodegraded after a single use, all of those costs are lost so it is much more important to design plastic parts for multiple reuse or perpetual lives. The other side argues that keeping plastic out of a dump or the sea is the sole benefit of interest. Companies moving towards "zero landfills" plants include Subaru, Xerox, and Anheuser-Busch. The movement continues to grow among the youth around the world under the organization Zero Waste Youth, which originated in Brazil and has spread to Argentina, Puerto Rico, Mexico, the United States, and Russia. The organization multiplies with local volunteer ambassadors who lead zero waste gatherings and events to spread the zero waste message.

Example: Milk can be shipped in many forms. One of the traditional forms was reusable returnable glass milk bottles, often home delivered by a milkman. While some of this continues, other options have recently been more common: one-way gable-top paperboard cartons, one-way aseptic cartons, one-way recyclable glass bottles, one-way milk bags, and others. Each system claims some advantages and also has possible disadvantages. From the zero waste standpoint, the reuse of bottles is beneficial because the material usage per trip can be less than other systems. The primary input (or resource) is silica-sand, which is formed into glass and then into a bottle. The bottle is filled with milk and distributed to the consumer. A reverse logistics system returns the bottles for cleaning, inspection, sanitization, and reuse. Eventually, the heavy-duty bottle would not be suited for further use and would be recycled. Waste and landfill usage would be minimized. The material waste is primarily the wash water, detergent, transportation, heat, bottle caps, etc. While true zero waste is never achieved, a life cycle assessment can be used to calculate the waste at each phase of each cycle.

Market-Based Campaigns

Market-based, legislation-mediated campaigns like Extended Producer Responsibility (EPR) and the Precautionary Principle are among numerous campaigns that have a Zero Waste slogan hung on them by means of claims they will ineluctably lead to policies of Zero Waste. At the moment, there is no evidence that EPR will increase reuse, rather than merely moving discard and disposal into private-sector dumping contracts. The Precautionary Principle is put forward to shift liability for proving new chemicals are safe from the public (acting as a guinea pig) to the company introducing them. As such, its relation to Zero Waste is dubious. Likewise, many organizations, cities, and counties have embraced a Zero Waste slogan while pressing for none of the key Zero Waste changes. In fact, it is common for many such to simply state that recycling is their entire goal. Many commercial or industrial companies claim to embrace Zero Waste but usually mean no more than a major materials recycling effort, having no bearing on product redesign. Examples include Staples, Home Depot, Toyota, General Motors and computer take-back campaigns. Earlier social justice campaigns have successfully pressured McDonald's to change their meat purchasing practices and Nike to change its labor practices in Southeast Asia. Those were both based on the idea that organized consumers can be active participants in the economy and not just passive subjects. However, the announced and enforced goal of the public campaign is critical. A goal to reduce waste generation or dumping through greater recycling will not achieve a goal of product redesign and so cannot reasonably be called a Zero Waste campaign.

Various governments have declared zero waste as a goal, including

Brazil

Florianópolis, Santa Catarina

Canada

Vancouver

Italy

Capannori, Tuscany

Japan

Kamikatsu, Tokushima

United States

Austin, Texas

Boulder, Colorado

Fort Collins, Colorado

San Francisco, California

The latest development in Zero Waste is the city of Masdar in Abu Dhabi which promises to be a Zero Waste city. Innovation and technology are encouraged by government creating an innovation-friendly environment without being prescriptive. To be a successful model of sustainable urban development it will also require the involvement and co-operation from all members of society emphasizing the importance of network governance.

https://en.wikipedia.org/wiki/Zero_waste

Buzzfeed, an American Internet media and news company based in New York City, uploads a lot of videos about zero-waste and related subjects. Samantha White, Kate Arnell, Tayler Nicole, and Zero waste no worries are some of the top zero waste promoting and living youtubers.

Going back to basic hygiene like brushing and bathing and the zero waste options for the same. Bamboo toothbrushes and Bite 'Toothpaste Bits'.

Benefits of bamboo toothbrushes

The most widely known and popular advantage, a bamboo-based toothbrush eliminates unnecessary waste while giving you the same quality of cleaning that a plastic brush can offer. With both the packaging and tossing of your toothbrush, recycling, reusing, or composting has never been easier. Here at Parkcrest Dental Group, we recommend changing your toothbrush every one to three months for optimum care. With a biodegradable toothbrush, you can feel better about reaching for that new brush.

Another advantage of bamboo is that it is naturally antimicrobial. There's a reason for cutting boards and kitchen utensils are made out of wood and bamboo. Unlike plastic, properties inside the bamboo kill bacteria that penetrate it's surface, providing long-lasting protection against harmful bacteria.

<https://parkcrestdental.com/blog/dental-education/parkcrest-dental-group-bamboo-toothbrush-advantages-disadvantages/>

A grocery store in Vancouver, Canada, Nada Grocery Store, uses the 'Tap-Fill-Pay-Refill System'.

What is the Tap-Fill-Pay Refill System?

- **PREPARE** - Bring clean containers from home! Pack a few extra bags or jars in case you see something you love!
- **TAP & WEIGH** - Place a smart sticker on your container, tap it, & weigh it. Make sure the container is empty, & weighed with the lid on!
- **(RE)FILL** - We've got a big selection of local, organic, and responsibly sourced goodies for you to stock those containers with!
- **TAP & PAY** - Tap the smart sticker again to automatically deduct the weight of your containers so you're not paying for those precious grams.
- **FEEL GOOD** - Bravo! You've just bought only what you need while supporting your local food system and diverting a lot of waste along the way.

<https://www.nadagrocery.com/how-it-works/>

Data Analysis

Striving For Zero Waste Means:

- Moving up the waste stream to consumers, advertisers, manufacturers, and product designers, to the "front end" of the system.
- Pursuing waste prevention, reuse, repair, recycling and composting, and banning materials and products that don't allow for those activities.
- Paying up front the full costs of environmental degradation and social fragmentation by including those costs in the price of products and services.
- Focusing on renewable resources and doing more with less.
- Defining economic success as delivering more services with fewer energy resources and material resources (e.g. for housing, food, transportation)

- Developing information like the Toxics Release Inventory to report wastes generated and materials and energy used, to provide hard facts to consumers to make good choices.
- Promoting repair, resale, and reuse of durable products made of fewer material types and designed for recyclability when they outlive their usefulness.
- Manufacturers changing from delivering products to delivering services (e.g. leasing carpet squares.)

Recognizing that most environmental impacts from products (e.g. pollutants created, energy consumed, habitat destroyed) comes from resource extraction and industries ‘upstream’ of consumers, rather than from their disposal in landfills.

Eliminating subsidies for extraction and harvesting of virgin materials, and eliminating exemptions from hazardous waste rules for mining wastes.

Moving from a linear consumption-driven economy to a cyclical service-oriented economy.

Developing a sustainable system that everyone can benefit from, rather than continuing to have 20% of the earth’s population use 80% of its resources.

Harnessing the forces of the marketplace (e.g. through variable rate pricing for residential garbage collection systems) to achieve this goal.

Will Zero Waste Cost More?

- NO. This is not a centralized public works project like sewage treatment where there are exponential increases in costs when plants are designed for 95% removal of wastes compared to 80%.
- In fact, some of the steps that are more difficult to achieve in the short term and more difficult to imagine now are product and process improvements and redesigns that will reduce the use of resources and prevent the formation of waste, through design for recyclability and durability. These should all save money rather than cost money. That’s how many businesses are diverting 80-90% and saving money in the process.
- That’s why it’s important not to lock into one quick fix or centralized solution to achieve Zero Waste.

Is Zero Waste Attainable? Businesses Do It:

97% diversion - Mad River Brewing in Northern California

95% diversion - Zanker Construction & Demolition Landfill in San Jose, CA

97% diversion - Hewlett-Packard in Roseville, CA

95% recycling rates at office buildings in the EPA Green Buildings program

80-90% diversion rates at many businesses

Some progressive businesses are now adopting Factor 10 goals to achieve a ten-fold increase in efficiency

Nature Is The Model:

Nature does not waste. A waste to one species is food or a resource to another. Everything is connected. We may not get rid of all mines and landfills as we know them today, but we should not design our economy to be dependent on them.

Why Not Have A 50% (Or Some Other Number) Waste Diversion Goal?

- Then we will have to plan for more landfills and incinerators to meet the other 50% of our discards, on an on-going basis.
- Investment in waste disposal impedes entrepreneurs, businesses, and governments from innovations in waste prevention, reuse, recycling and composting.

Instead, We Need To Open Up Our System To Achieve Zero Waste.

We Need To:

- Provide economic incentives: Tax 'bads' (pollution and waste), not 'goods' (labor and income).
- Eliminate Corporate welfare for wasting.
- Encourage the use of recycled content products by manufacturers.
- Work with manufacturers, product designers, advertisers and consumers to share responsibility for the products produced and used prior to disposal.

<http://archive.grn.org/zerowaste/articles/whatiszw.html>

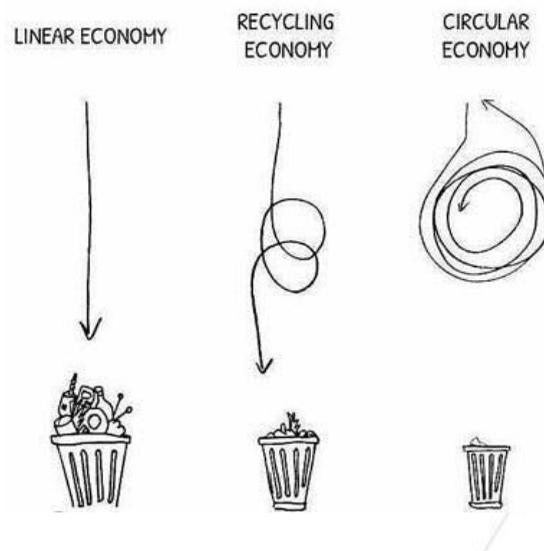
Conclusion

From all of the aforementioned research and information, I have reached the following conclusions:

1. Zero waste is a visionary concept for confronting waste management in our society.
2. The idea is developed and implemented including waste management, treatment, mining, manufacturing, and urban development.
3. The article presented a critical review of the major studies conducted by researchers on zero waste in the last decade and a half.
4. Based on the review findings the study concludes that zero waste concept has been applied widely in different phases of production and waste management systems.
5. The study identified the key gaps and trends in the current zero waste studies. Based on the available evidence, the study has presented overarching and guiding principles as recommendations for zero-waste development.
6. Further studies on how to transform existing systems into zero waste systems are important for moving towards a zero waste goal.
7. The study emphasizes that countries might be able to achieve zero waste goals by developing a national zero waste strategy; by integrating and promoting zero waste initiatives (in communities and industry) through waste management policies.
8. The findings of the study could assist to identify areas of zero waste strategy and to develop national zero waste guidances.

Suggestions and Recommendations

- According to UN Environment's latest report 'Single-use Plastics: A Roadmap for Sustainability' which was released in India on World Environment Day, the world consumes 5 trillion plastic bags – that is about 1 million bags a minute! Just in case you are wondering how much is it – if all the plastic bags consumed are stacked up, it would cover an area twice the size of France.
- Today, plastic bags are one of the most littered items in the world and are taking a huge toll on the planet. Firstly, the bags are non-biodegradable, secondly, the single-use item takes thousands of years to decompose.
- To make a difference, replace the plastic bags with reusable alternatives such as cotton bags, jute bags, cornstarch bags, canvas bags, compostable or biodegradable poly bags.
- Instead of dumping all the trash mindlessly in one bin, opt for three different bins – one for wet waste which covers items from your kitchen, second for dry waste that covers items such as papers, waste packaging and third for hazardous items like e-waste and batteries. This simple process of managing waste through different bins is called waste segregation.
- However, the green good deeds duty doesn't end there – the aim should be on effective waste management. The wet waste separated should be used for the process of composting, which is nature's own way of recycling. What you need to do is simply start putting your daily kitchen waste into a rich soil base and in few weeks your waste will be decomposed into a natural fertilizer or manure which one can further use in their gardens.
- Dry waste should be sent for recycling and hazardous waste or e-waste should be sent to the e-waste recycling units.



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