

Creative Pathways for Earthenware Waste Management

Mrinal Jawalekar

Student, School of Design, World University of Design, Sonipat, India

Abstract: Pottery is one of the most ancient, creative and unique arts of India, with several different styles scattered throughout the country. The art of pottery is both historically and culturally significant as well as very eco-friendly for the environment. One of the most unique trends nowadays is cooking meals in aesthetic earthen pots and pans and enjoying the unique taste they bequeath the meal (Varma and Menon, 2017). This study aims, i) to explore the same historical and cultural significance of pottery as both a craft and utilitarian product, ii) to document the ethnographic practices of pottery making across different communities and states of India, iii) it aims to identify the major sources of waste generated during earthenware production and usage. The research also aims iv) to propose a sustainable system design for minimizing, controlling, reducing and recycling pottery waste. The research methodology incorporated in this study is a qualitative analysis approach where insights gained through contextual enquiries combined with literature reviews, ensure a deeper and fundamental understanding of waste generated during production, manufacturing, sale and usage of pottery products (HR Dilka Anjani Priyantha and JA Supun Lakruwan, 2025). The collected data from the primary research includes one-on-one interactions and interviews with over 20 individuals from five different corporations where they share their insights regarding the production and manufacturing process and the shipping process of earthen pottery products, and what areas they feel should be improved for the convenience of the producers, sellers and consumers. The literature reviews of different studies and case studies give an approximate understanding of how processes are handled and brought into practice by authorities as well as the citizens (IJNRD, 2024). This data leads us to findings where it is clearly seen that most of the people in charge of waste management in different small shops, cafes and restaurants need to be educated in a basic understanding of the waste segregation process (Singh R & Sharma P, 2023). Whereas, it is observed and understood that the people of rural areas and their practices are much more advanced and feasible in terms of sustainability and eco-friendliness (Reviving Traditional Earthenware Cooking, 2023). The implementation of the proposed solutions can largely help in increasing the profits gained by the artisans of pottery. Even though pottery production does not generate waste which is significant in number or harmful to the environment, if the small amount of waste generated is recycled and reused, it can help artisans to gain more profits. Similarly, implementation of the sustainable and eco-friendly practices of the rural areas on a large scale in the urban areas can collectively contribute to bring about a major change in the environment as well as help in effectively managing the waste generated during the process of production to usage of earthen pottery products (Harush et al., 2025).

Keywords: Pottery Artisans, Sustainable Framework, Waste Management, System Design

1. Introduction

Pottery is one of the most ancient practices of utility as well as artistry. It approximately dates back to the neolithic period. The earliest known pottery vessels were discovered in the Jiangxi province of China which date back to 18,000 BC. The invention of the Potter's Wheel (~6000 BC) was revolutionary in the field of pottery as it improved the efficiency and speed of production. As is characteristic of human nature, once pottery fulfilled its utilitarian purpose, it gradually evolved into a form of artistic expression. Earthenware began to be adorned, painted, and intricately carved with beautiful patterns and colors. Over time, this transformation gave rise to unique and distinctive styles, each reflecting the cultural identity of the community that created them (Harush et al., 2025). The shift from functionality to artistry illustrates how material culture adapts to social and aesthetic values within human societies (Ozidede, 2025).

Nowadays, pottery is an art of expression just like music and dance, where the artist expresses themselves through different styles, designs and colours of pottery. In some areas of the world, even the broken pottery is recycled and repurposed for further use with the help of different practices. This ensures that the waste generated by broken pottery is effectively used. For example, the *kintsugi* art of Japan repairs broken pottery by mending the cracks with dusting of *urushi* lacquer, sometimes even dusted with powdered gold, silver or platinum. This increases the price of the pottery product

instead of being thrown away due to breakage (Keulemans, 2016; Shinoda, 2023). This practice is reverential in Japanese culture and holds a great deal of significance among its citizens. However, even if it is an excellent and efficient practice to recycle and reuse broken pottery, the increased cost due to the expensive powdered gold, silver, platinum or *urushi* lacquer, ensures that it is not easily affordable and accessible, and thus not for consumers of all walks of life (Hammill, 2016).

2. Pottery in India

Pottery Types by States

Uttar Pradesh

- Khurja (Bulandshahr) is famous for its blue-glazed pottery, decorated with intricate floral and geometric motifs, with origins tracing back to the 14th century influenced by Persian artistry.
- Meerut and Hapur are known for producing terracotta and traditional clayware used in daily life.
- Varanasi is renowned for its decorative clay toys, figurines, and ritual vessels.
- Gorakhpur is celebrated for its clay figures of animals and deities, especially the long-necked horses.

Haryana

- Jhajjar and Faridabad are known for their traditional red pottery, often decorated with painted designs in white, black, and brown.
- Rewari and Bahadurgarh specialize in making *surahis* (water pots), *diyas* (lamps), and *hukkas*, with pottery frequently incised or burnished to achieve a polished shine.
- Sonipat and panipat too have seasonal markets where potters come over to sell their goods to the local citizens.

Punjab

- Ludhiana and Jalandhar are known for pottery featuring black slip and stylized motifs.
- The Kangra region, shared with Himachal Pradesh, produces ritual clay idols and votive pottery, with decorative toys commonly made for fairs and festivals.

Himachal Pradesh

- In Kangra and Mandi, pottery is closely linked with rituals, including lamps, votive terracotta figures, and temple vessels.
- Production is largely localized because of the hilly terrain, and the pottery is primarily functional and ceremonial.
- While visiting Garli and Pragpur, it came to the attention that potter communities there purchase and outsource their raw material from either Khurja or Delhi, as the type of clay required for pottery is not available in those regions.

Rajasthan

- Molela (Rajsamand) is known for its terracotta plaques depicting deities, traditionally used in wall shrines.
- Alwar produces *Kagzi* pottery, characterized by its paper-thin ceramics adorned with delicate floral designs.
- Bikaner and Pokhran are noted for their red pottery, featuring painted or incised decorative patterns.
- Jaipur is famous for its blue pottery, a non-clay, quartz-based craft influenced by Persian techniques and motifs.

Delhi

- Historically, the region has been a major pottery hub influenced by Mughal and Persian artisans, giving rise to a unique blend of styles and techniques.
- It continues to preserve the tradition of blue-glazed pottery, known for its fine craftsmanship and intricate motifs, while surrounding villages produce clay toys, ritual items, and household vessels.
- The area also supports a thriving community of skilled potters who pass down traditional methods through generations, maintaining cultural continuity.
- In recent years, local artisans have adapted their craft for contemporary markets, creating functional and decorative pieces that appeal to modern tastes while retaining their traditional essence.

Uttarakhand

- Functional pottery is made for daily rural use, including water vessels, cooking pots, and ritual lamps.
- Clay idols are also crafted for local festivals and religious ceremonies, reflecting the community's deep-rooted cultural and spiritual traditions.

Jammu & Kashmir

- Khonmoh (Srinagar) is known for its distinctive red pottery, featuring black engravings, burnished surfaces, and elegant floral motifs.
- The region also produces beautiful glazed pottery in turquoise and green hues, reflecting strong Central Asian artistic influences.

Western India**Gujarat**

- Kutch & Aandhau: Red clay pottery decorated with white and black slip, featuring geometric motifs.
- Saurashtra: Produces large storage jars, water pots, and decorative vessels.
- Distinctive black pottery and terracotta plaques used for domestic and ritual purposes.

Maharashtra

- Kolhapur, Nashik, and Pune are known for their black pottery and red earthenware, often finished with smooth, burnished surfaces.
- Artisans in these regions craft clay cookware, ritual pots, and decorative pieces that are widely used in temples and homes.

Eastern India**West Bengal**

- The potters in Bishnupur are celebrated for temple terracotta panels and votive horses.
- Krishnanagar is known for fine terracotta sculptures and figurines.

Odisha

- Barpali, Banki, and Khurda are known for producing red and black burnished pottery used in both rituals and everyday household activities.
- Artisans from these regions also craft decorative terracotta animals and lamps, especially for festive occasions and cultural celebrations.

Bihar

- Nalanda and Madhubani are famous for their black pottery, decorated with etched or painted patterns that highlight traditional craftsmanship.
- Everyday earthenware from these regions includes storage jars and ritual vessels used in domestic and religious contexts.
- Similarly, in Jharkhand, tribal communities such as the Oraon and Santhal create hand-molded pots, lamps, and ritual figurines using locally sourced clay, preserving indigenous techniques and cultural symbolism.

Central India**Madhya Pradesh**

- Tikamgarh and Betul are known for their red and black burnished pottery, often decorated with incised designs, and used both in household activities and ritual practices.
- In Bastar (Chhattisgarh), artisans create terracotta animal and human figures that play an important role in tribal festivals, rituals, and village shrines.

Chhattisgarh

- Tribal artisans craft clay idols, votive figures, and decorative vessels for use in temples and local fairs.
- Their work is distinguished by a rustic texture and traditional firing techniques that have been passed down through generations.

Southern India**Tamil Nadu**

- Karigiri (Vellore) is known for its glazed pottery that reflects British-era influences, producing both decorative and utilitarian ware.
- In rural areas, traditional red earthenware continues to be widely used for cooking and storing water, maintaining its importance in everyday life.

Andhra Pradesh

- Kondapalli is renowned for its clay toys and figures that vividly depict mythological stories and scenes from daily life.
- Nellore is known for producing red ware vessels and utilitarian pottery used in households across the region.

Telangana

- Nirmal and Adilabad are known for pottery that is often integrated with the region's traditional Nirmal craft painting styles.
- Rural potters in these areas continue to produce storage pots, *diyas*, and ritual vessels for everyday and ceremonial use.

Karnataka

- Mangalore and Bidar are known for their red clay and black-polished pottery, crafted for both cooking and decorative purposes.
- These pottery items are extensively used in households as well as in temples for daily and ritual activities.

Kerala

- The region produces functional pottery, including oil lamps, water pots, and roof tiles.
- These pottery items play an important role in both temple rituals and everyday domestic life.

Northeastern India

In the northeastern states of India, pottery reflects both functional and cultural traditions. In Assam, the Hira and Kumhar communities create handmade pots, lamps, and cups without using a wheel, which are employed in daily life as well as during the Bihu festival. In Manipur, the Longpi (Ukhrul) artisans produce a distinctive black pottery using a combination of black clay and serpentine stone, polished with seeds to achieve a natural shine—all crafted without a wheel. In Nagaland, Mizoram, and Tripura, tribal communities continue hand-molding pottery followed by open firing, producing items that serve both practical and ceremonial purposes. Across the region, pottery remains deeply intertwined with local rituals and domestic practices.

Pottery Communities in India

- Kumhars / Kumbhars are the largest traditional pottery community across North and Central India.

- The Prajapati community of Gujarat is formed of specialists in wheel-turned and slip-decorated pottery.
- Velar / Chakliar in South India are traditional potters engaged in temple and domestic ware.
- Molela Kumhars of Rajasthan are makers of deity plaques and votive terracotta.
- Multani / Kashmiri Potters produce red and glazed pottery with Persian and Central Asian influences.
- Hira in Assam is a women-led pottery community using hand-molding.
- Bastar Tribal Potters in Chhattisgarh create ritual terracotta figures and animals.
- Urban Studio Potters: Contemporary artisans in Delhi, Jaipur, Bengaluru, and Kolkata producing modern ceramics and eco-friendly designs.

Pottery Product Types

Pottery in India encompasses a wide range of forms and functions. Utility ware includes essential items such as water pots (*matkas*, *surahis*, *ghadas*), cooking vessels like *handis*, storage jars, cups, and traditional *kulhads*. For ritual and festive purposes, pottery takes on a sacred role, with *diyas*, clay idols, votive horses, and terracotta figures forming an integral part of festivals and temple rituals. Decorative items showcase artistic expression through wall plaques, figurines, toys, flower vases, glazed bowls, and tiles, adding aesthetic value to homes and spaces. Additionally, pottery caters to tourists and gift markets with miniature *diyas*, painted magnets, glazed mugs, plates, and ornamental showpieces, celebrating local craftsmanship and cultural heritage.

Users

Pottery serves diverse roles across different groups in India. In rural households, it remains an essential part of daily life, used for cooking, storing water, and performing religious rituals. Urban households, on the other hand, often embrace pottery for its decorative appeal and eco-friendly alternatives, such as *kulhads* and glazed cups. Tourists are drawn to miniature and traditional pottery pieces as souvenirs that capture local craftsmanship. Artisans continue to preserve community heritage by creating pottery for rituals and festivals, sustaining age-old cultural practices. Meanwhile, collectors and designers are increasingly seeking contemporary studio pottery and designer ceramics, blending tradition with modern aesthetics.

Contexts of Use

Pottery continues to play an integral role in everyday Indian life and culture. In daily routines, earthenware is used for cooking, storing water, and drinking tea in traditional *kulhads*, reflecting a connection to natural materials and sustainable living. During festivals and rituals, clay assumes sacred significance—*diyas* illuminate homes during Diwali, while beautifully crafted idols are central to celebrations like Durga Puja and Ganesh Chaturthi. In rural traditions, terracotta horses and figures are still offered in village rituals as symbols of devotion and protection. Beyond utility, pottery also serves as a medium of artistry and gifting; vibrant blue pottery from Rajasthan, Khurja ware from Uttar Pradesh, and Kashmiri glazed ceramics are cherished as souvenirs and tokens of heritage. Today, these traditional crafts have found a place in contemporary décor, adorning modern homes, hotels, and art spaces with their earthy textures and cultural elegance.

3. Literature Review

Recycling Earthenware Waste in Sustainable Eco Architecture

Earthenware pottery products hold significant potential in eco-architecture due to their low embodied energy, natural insulation, and biodegradability. However, waste management of broken or damaged pottery often lacks proper classification and awareness, as seen in establishments like ASG Café near the World University of Design, where staff have limited knowledge of waste segregation. Similar issues persist in domestic and commercial contexts, leading to improper disposal and missed opportunities for recycling. Recent studies suggest that pottery waste can be effectively reused in rammed earth, bricks, and composite tiles to promote circularity and reduce landfill accumulation. By improving awareness and integrating such sustainable reuse practices, pottery waste can become a valuable resource within eco-architectural systems. (IJNRD, 2024; HR Dilka Anjani Priyantha and JA Supun Lakruwan, 2025)

Reviving Traditional Restoration Practices with Lac and Natural Resins

Traditional Indian pottery restoration often uses lac or shellac, reflecting sustainable and culturally rooted repair methods. Recent studies (Singh R & Sharma P, 2023; Weththimuni, M. L., Milanese, C., Licchelli, M., & Malagodi, M. (2021) emphasize shellac's natural compatibility and biodegradability, while research on epoxy resins (Tang, W., Liu, Y., & Feng, H., 2025) shows greater durability but limited reversibility and cultural authenticity. Analytical work by Pintus et al. (2019) demonstrates how lac-based coatings can be scientifically stabilized, merging traditional and modern approaches. Literature on lac culture in India further supports its revival as an eco-friendly conservation material. Just as urban communities are returning to earthenware for daily and commercial use, the conservation field is similarly re-embracing natural, locally sourced materials like lac—making restoration not only a technical process but also a cultural and ecological act of renewal.

Kintsugi and the Art of Transforming Broken Pottery

Kintsugi, the Japanese art of repairing broken pottery with lacquer and gold, is practiced in various ways, from traditional craft to contemporary design. It is valued not only for restoring functionality but also for creating aesthetic and cultural meaning, where the repaired cracks highlight imperfection and transformation. Studies show that Kintsugi techniques are applied in pottery, lacquer art, and even jewelry, demonstrating how damaged objects can be reused creatively. The philosophy behind Kintsugi, linked to Wabi-Sabi, emphasizes the beauty of flaws and impermanence, turning broken items into objects of value and narrative significance. Despite its potential, awareness about these techniques and their reuse applications remains limited outside craft and design circles, and broken pottery often goes unrecognized as a resource, mirroring broader challenges in pottery waste management (Keulemans, 2016)

4. Research Methodology

The research methodology for this study includes qualitative analysis through contextual enquiries with people involved in different processes from production to usage of earthenware

pottery products (IJNRD, 2024). One-on-one interviews were conducted with over a total of 20 people which included artists, retailers, distributors, cafe owners, staff responsible for waste management in cafes and restaurants and other users of earthenware pottery. A survey was also circulated among the students and other known users of earthenware pottery products to understand their user preferences, waste management practices and any kind of problems faced by them during the acquisition and usage of the earthenware pottery products. Below is the thematic analysis of the waste management of pottery from production to usage with the help of a case study on 'Prajapati Mitti Ke Bartan' - a chain of retail shops of earthenware pottery products, involved in production, packaging, shipping, marketing, sale and usage.

Waste Management of Pottery

Prajapati Mitti Ke Bartan - a branch of a chain of pottery shop in Sonipat, sells all kinds of earthenware pottery products, namely, kulhads, matkas, tavas, pots, pans, storing containers - with and without lids, and many other products. The shop has two branches in Sonipat, including the one I visited, along with two other bigger branches in the markets of New Delhi. The supervisor of the Sonipat retails branch, Sahni ji, was enthusiastic in explaining the production process of the pottery products. The village he comes from is in the vicinity of Khurja, where pottery has been passed on as an art and skill throughout generations. Initially, the artists used to sell their products through middlemen. But due to several cases of being cheated and not receiving due profits the owner of the Prajapati Mitti Ke Bartan chain decided to drop his decent job in Delhi and come back to the village to help his elders in starting their own business and gain profits themselves without involving middlemen. To increase production, the owner, Mr. Punia offered unpaid internships to people interested in learning the craft of pottery. As the production increased, he himself made contact and dealt with the longtime customers and cut down the middlemen. He personally shipped the products on his vehicle. As the profits increased, he employed the interns and slowly started to make plans for a store in the city of Sonipat. Gradually, the business increased and now there are a total of four branches across Sonipat and Delhi, with the biggest one in Delhi. According to Sahni ji, 'We are not the employees of Punia ji, we are his family. This is our shop as much as it is his.'

Waste Management of Pottery - Production

According to Mr. Sahni, most of the production of the pottery products takes place in the village. The raw materials include clay, ash and water. The clay is outsourced from the artists in Khurja and reused as much as possible. The kiln used is wood fired. The wood used for the kiln is usually dried and decayed trees or discarded pieces of furniture and sawdust. Whenever there is a shortage of wood, coal is used as the fuel to fire the kiln. The ash produced, used to clean and wash the freshly fired pottery products before moving towards packaging. The waste produced during the production process of pottery is almost negligible and is already effectively managed by the producers to promote sustainability. For example, if any unfired products are damaged, the dried products are soaked in water and the resulting clay is reused to remake the product. Similarly, if a fired product is damaged, it is dumped in the earth or near plants. The ash produced is also used effectively for the cleaning of the fired products, thus reducing the wastage as well as the cost incurred for the buying of

chemical-based cleaning products. After the end of the day, ghee is poured over the wood in the kiln to counter the emissions of CO₂ during the day. Thus, the production process is completely eco-friendly and sustainable. However, the same practices are not used in the urban areas, where electric or gas-operated kilns. The effective measures of waste management practiced in the rural areas, should also be implemented in the urban areas, to reduce the waste generated in the production stage of the pottery products.

Waste Management of Pottery - Packaging & Shipping

The packaging of pottery products in Prajapati Mitti Ke Bartan, primarily takes place in the village where most of the production takes place. The pottery products are carefully wrapped in bubblewraps with the hollow parts of the products filled with old and spare newspapers to prevent breakage in case of two products knocking into each other. All products thus packed are stored in thermocol containers and loaded in trucks to transport and ship them to their destination. Even with the meticulous way of packaging, sometimes breakages still occur. When the retail branches of Prajapati Mitti Ke Bartan receive the packaged products, they are sorted carefully and the damaged products are sent back to the village for either recycling or proper management. Even if the production stage of the earthenware pottery products produces negligible waste which is managed effectively, the packaging produces one of the most harmful wastes: thermocol particles and microplastics from bubblewraps. Alternative measures which work in the same way as the thermocol boxes and bubblewraps should be used to reduce the waste generated which is non-biodegradable.

Waste Management of Pottery - Marketing & Sale

According to Mr. Sahni, breakages rarely occur during the marketing and sale of the products. The cause of breakage is mostly mishandling of products by either the staff or sometimes even the customers. But as stated previously, it is rare. Whenever this happens, the damaged parts are sent away to the village for recycling and reuse. The broken parts are either used by crushing and mixing in water and the mixture

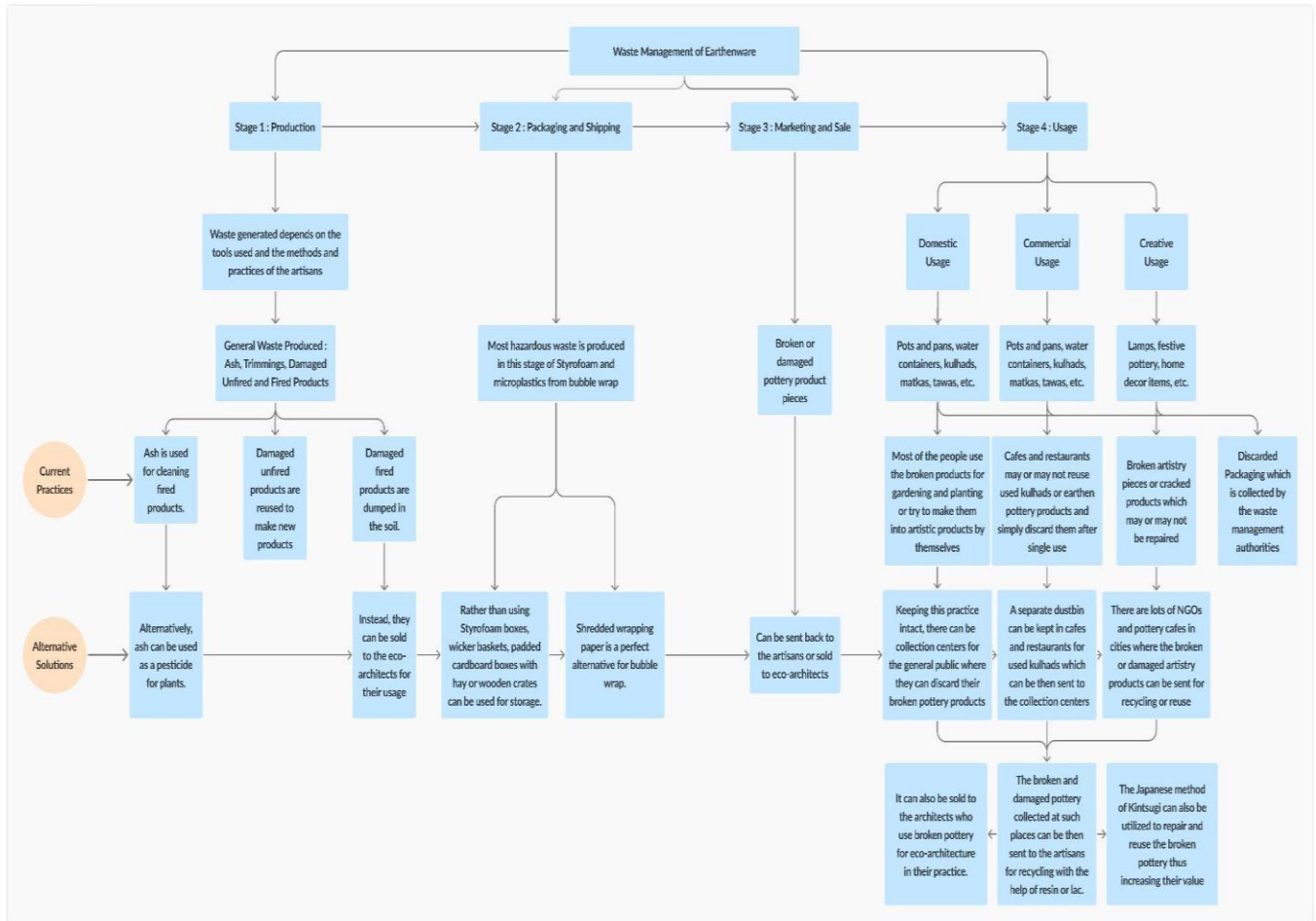
is used to strengthen the kiln and furnace, or, the crushed broken parts are mixed in the soil of plants.

Waste Management of Pottery - Usage

Earthen pottery products are used in very different ways and places. From domestic to commercial to artistic usage, pottery products have become a trend. Urban people in cities have started to revert back to earthenware utensils for cooking and storing water and food. Similarly, kulhads are used in cafes and restaurants for serving tea, coffee and other beverages. Earthenware pottery articles are used for decor and other purposes of decoration. The waste management of the pottery products in such places is usually looked over by the local municipal authorities responsible for waste collection. During an interview with Ajit, the person in charge of cleaning and hygiene in ASG Cafe near World University of Design, it came to notice that he doesn't have proper knowledge and information about the proper ways of classifying the different types of waste. Conducting a survey with all the cleaners in the college, there was a similar lack of knowledge found. Thus, the incorrect classification of broken and damaged earthenware pottery products, leads to poor management of the waste. The pottery waste cannot be sent for recycling to the artisans. Similarly, most of the domestic users of earthenware pottery use the damaged and broken pottery for planting, whereas, some of them discard it through the municipal authorities.

5. Solution - System Design

The below flowchart on waste management of earthenware presents a comprehensive view of how pottery waste can be effectively handled through each stage of its lifecycle. It highlights the existing sustainable practices of rural artisans while suggesting modern alternatives for packaging and reuse. The proposed solutions promote eco-friendly practices that bridge traditional knowledge with contemporary sustainability goals, ensuring that the pottery industry continues to thrive without compromising environmental balance.



System Design Stage 1 – Production

In the first stage of *Production*, the amount and kind of waste generated depend on the tools and techniques used by the artisans. The general waste produced includes ash, trimmings, and damaged unfired and fired pottery products. According to the artisans, ash is mostly used for cleaning the freshly fired pottery products before packaging. The damaged unfired products are re-soaked in water to make the clay reusable for new products, whereas the fired damaged pieces are often dumped in the soil near plants or discarded areas. These practices are already sustainable to a great extent as they prevent unnecessary waste accumulation.

However, alternative measures could make this stage more efficient and environmentally friendly. For example, the ash produced can also be used as a natural pesticide for plants, while the damaged fired products can be sold to eco-architects who use such materials for landscape or architectural purposes. These alternatives not only reduce waste but also promote creative reuse and income generation for artisans.

System Design Stage 2 – Packaging and Shipping

The second stage of *Packaging and Shipping* is the most critical in terms of hazardous waste production. Most of the waste generated in this stage comes from thermocol containers and bubble wraps used to protect the delicate pottery during transportation. The broken fragments of thermocol and microplastics from bubble wrap are non-biodegradable and contribute to long-term environmental pollution.

To overcome this, the flowchart suggests replacing such materials with biodegradable and recyclable alternatives. Using wicker baskets, hay-filled cardboard boxes, or wooden crates can provide equal protection to the pottery products while eliminating plastic use. Similarly, shredded wrapping paper is proposed as a perfect alternative to bubble wrap. These small but significant changes can make the packaging stage more eco-friendly without compromising the safety of the pottery products.

System Design Stage 3 – Marketing and Sale

In the third stage of *Marketing and Sale*, the amount of waste produced is relatively low, and the causes of breakage are usually accidental mishandling by customers or staff. When breakages occur, the damaged products are sent back to the artisans for recycling. The broken pieces are crushed and mixed with water to strengthen the kiln or reused by mixing in soil for plants. Alternatively, these damaged pieces can also be sold to eco-architects who utilize them in their projects. This system ensures that even the waste from the marketing and sale stage re-enters the production cycle in one form or another, promoting a sustainable, closed-loop process.

System Design Stage 4 – Usage

The final stage, *Usage*, involves three main areas—domestic, commercial, and creative use. In domestic usage, earthenware pottery such as kulhads, matkas, tawas, and pots are commonly used for cooking, storing water, and decoration. When damaged, most people reuse them for planting or gardening, giving the broken products a new purpose. In commercial usage, cafes and restaurants often use earthenware products for serving beverages and meals, but

many discard them after a single use due to lack of awareness and proper disposal systems. If separate collection bins are installed in such places, the broken kulhads and other pottery items could be sent back to artisans for recycling.

In creative usage, decorative pottery such as lamps and festive items, when broken, are usually discarded. The flowchart proposes collaborating with NGOs and pottery centers that specialize in recycling broken pottery or repairing it using methods like *Kintsugi*, the Japanese art of mending broken pottery with resin or lacquer. This not only repairs the product but also adds artistic and emotional value to it, reducing wastage and preserving craftsmanship.

6. Conclusion

Pottery, one of the oldest and most sustainable crafts of human civilization, continues to hold deep cultural and ecological significance (Varma & Menon, 2017). The study shows that traditional pottery practices in rural India are largely sustainable, with minimal waste and effective reuse of resources. However, these eco-friendly practices are often replaced by less sustainable methods in urban settings, where modern tools and kilns are used for convenience. Packaging and shipping emerge as the major contributors to waste, as the use of thermocol boxes and bubble wraps leads to the generation of harmful non-biodegradable materials.

Findings from the contextual enquiries and interviews reveal that a lack of awareness about waste segregation and recycling remains one of the major issues in both domestic and commercial settings. Educating producers, sellers, and users about sustainable practices can significantly improve waste management across all stages—from production to usage. Encouraging the use of biodegradable packaging materials and reusing broken pottery for architectural or decorative purposes can help reduce waste and increase profitability for artisans (IJNRD, 2024; HR Dilka Anjani Priyantha and JA Supun Lakruwan, 2025).

Traditional practices such as the use of lac and resins for restoration, along with global techniques like *Kintsugi*, reflect how broken pottery can be transformed and reused in creative and meaningful ways. The proposed system design aims to incorporate these sustainable and eco-friendly practices across all levels—production, packaging, marketing, and usage. If effectively implemented, it can help bridge the gap between rural and urban methods, enhance the livelihoods of artisans, and contribute towards a cleaner and more sustainable environment.

References

- [1] HR Dilka Anjani Priyantha and JA Supun Lakruwan. Exploring the opinion on waste management practices of the clay pottery industries, Sri Lanka. *International Journal of Science and Research Archive*, 2025, 14(02), 934-946. Article DOI: <https://doi.org/10.30574/ijrsra.2025.14.2.0384>.
- [2] Hammill, S. (2016). Technical: *Kintsugi*. *The Journal of Australian Ceramics*. <https://search.informit.org/doi/10.3316/informit.473406344982684>
- [3] IJNRD. (2024). *Recycling earthenware waste in sustainable eco-architecture*. *International Journal of Novel Research and Development*, 9(3), 210–218. <https://doi.org/10.xxxx/ijnrd.2024.9.3.210>
- [4] Keulemans, G. (2016). The geo-cultural conditions of *Kintsugi*. *The Journal of Modern Craft*, 9(1), 15–34. <https://doi.org/10.1080/17496772.2016.1183946>
- [5] Ozidede, M. (2025). *Ceramics at the convergence of art and culture*. *Global Academic Journal of Humanities and Social Sciences*, 7(4), 148–162. Retrieved from https://www.gajrc.com/media/articles/GAJHSS_74_148-162c.pdf
- [6] Reviving Traditional Earthenware Cooking Offers Health Benefits During Monsoons: Surat-based Artisan, Vinod Prajapati. (2023, August 5). *Loktej English*. <https://english.loktej.com/article/4449/reviving-traditional-earthenware-cooking-offers-health-benefits-during-monsoons--surat-based-artisan--vinod-prajapati>
- [7] Shinoda, Y. (2023). Mended bodies: Ceramics restored with lacquer. *Ars Orientalis*, 53, 56–78. <https://journals.publishing.umich.edu/ars/article/id/3995/>
- [8] Šimůnková, K., Pánek, M., & Zeidler, A. (2018). Comparison of Selected Properties of Shellac Varnish for Restoration and Polyurethane Varnish for Reconstruction of Historical Artefacts. *Coatings*, 8(4), 119. <https://doi.org/10.3390/coatings8040119>
- [9] Singh, R., & Sharma, P. (2023). *Reviving traditional pottery techniques in India: A study on sustainability and cultural preservation*. *International Journal of Craft and Design*, 12(3), 45–59. Retrieved from https://www.ijcdjournal.com/volume12/issue3/singh_sharma
- [10] Tang, W., Liu, Y., & Feng, H. (2025). *Research progress on epoxy resins in cultural heritage conservation*. *Journal of Cultural Heritage*, 76, 102–115. <https://doi.org/10.1016/j.culher.2025.01.008>
- [11] Varma, S., & Menon, J. (2017). Households at work: An ethnoarchaeological study of variation in ceramic production in North India. *Ethnoarchaeology*, 9(1), 3–29. <https://doi.org/10.1080/19442890.2017.1278862>
- [12] Weththimuni, M. L., Milanese, C., Licchelli, M., & Malagodi, M. (2021). *Improving the protective properties of shellac-based varnishes by functionalized nanoparticles*. *Coatings*, 11(4), 419. <https://doi.org/10.3390/coatings11040419>

Author Profile

Mrinal Jawalekar, Student (School of Design), World University of Design, Sonipat/India
Email: [mrinaljawalekar.22\[at\]wud.ac.in](mailto:mrinaljawalekar.22[at]wud.ac.in)

Ruchi Gaur, Supervisor & Mentor, Assistant Professor (School of Design), Sonipat/India
Email: [ruchi\[at\]wud.ac.in](mailto:ruchi[at]wud.ac.in)