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Suraksha is an Architect & Alumni at SJB School of Architecture and Planning. She is currently a CORE faculty in SJB SOD and also a freelancing architect. Her area of interests includes human sensitive design, sustainability and Urbanism. Her architectural thesis gained appreciation which dealt with domestic waste and its linkage with neighbourhood and architecture. It was also presented at ISOLA, Bangalore Chapter, 2020. She is

UNBLACKBOXING - Architecture as a catalyst in integrating waste management facilities and neighbourhood

Abstract

Human settlements, especially urban areas are ever-evolving highly complex living organisms and to sustain their well-being within the larger region as well as the bio-physical environment, they need balanced ratios of input and output of different components that are vital for having a dynamic metabolism. This dynamic metabolism fosters a healthy relationship between human activities and the natural environment contributing to better liveability. However, on the contrary, insensitive and inexcusable ratios of inputs and outputs lead to CONFLICT that has various facets. Conflict arises as a result of the response. Hence, it does need a pertinent response to address it effectively.

Keywords

Waste systems, Transparency, Neighborhood, Solid Waste Management, Decentralization

1. Introduction

At present, the ever-expanding urban agglomerations are facing several conflicts of diverse magnitudes. The increasing unjustifiable requirements for resources and products are resulting in a huge conflict, waste, and mismanagement. The degree of this conflict is further aggravated as the waste is not being recognized as a resource. Also, the perceived negative notion of the society towards the waste is resulting in other related conflicts namely ecological, spatial, economic, social, and psychological. These conflicts have varied magnitudes and inhabitants face the negative impacts of the same in various forms such as dwindling natural resources, disasters, pandemics, social inequality, and economic crisis adversely affecting the quality of life.





Figure 1.0 *Waste hotspots across the city*

Against this background, the project, **UNBLACKBOXING** primarily attempts to evolve an architectural response that nudges a behavioural change and acts as a catalyst to set sustained and efficient responses from the inhabitants so as to make them an integral part of the waste management. Nudging has been attempted through various concepts such as coexistence, systemic interventions, transparency, and non-linearity.

The design proposal goes beyond the waste management facility which not only reimagines waste as a resource but incorporates socially engaging as well as exploration spaces while taking on a new form of public spaces unfolding various positive opportunities for instigating circular economy and socially responsible behaviour. The project endorses a modular decentralized approach ranging from individual unit levels to neighbourhood and at the urban area levels that can be scaled with contextual refinements. This feature makes it effective for wider applicability as the conflicts with regard to waste prevail everywhere in different magnitudes which require fitting responses.

2. Case studies

In order to understand the ground reality, several case studies were done by visiting existing waste management facilities.

I.KASA RASA, SWM Facility, Koramangala

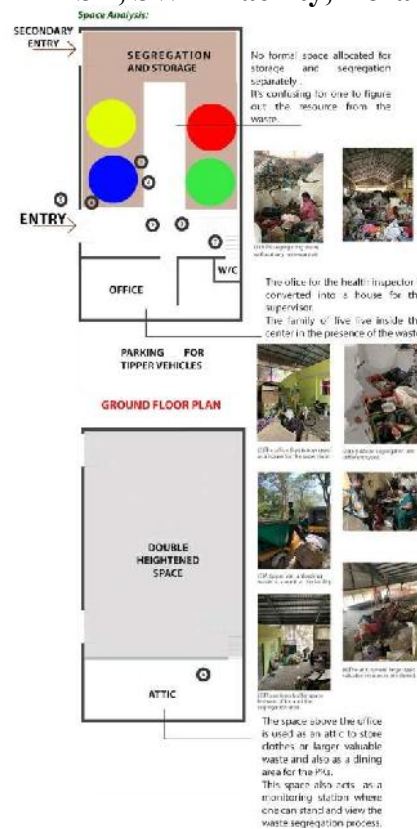


Figure 2.1 *DWCC, Malleswaram*

II.DWCC, Ward 151, Malleswaram

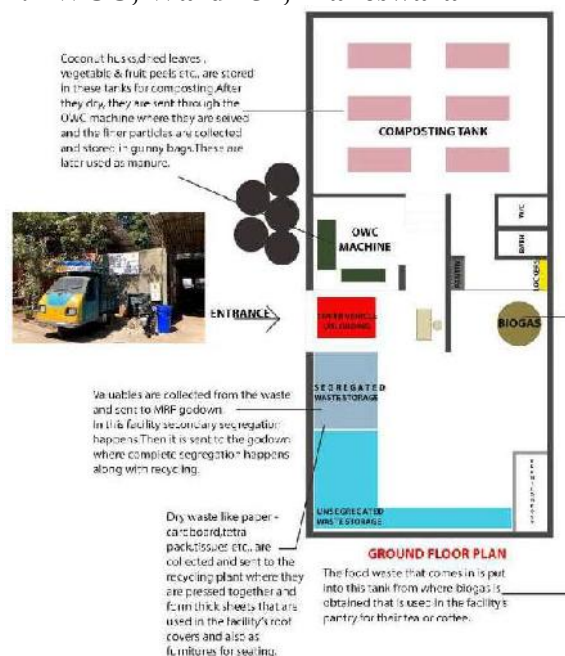


Figure 2.2 *KASA RASA facility, Bengaluru*



3. Architectural strategies and concepts:

In order to deal with the topic of waste, various levels of strategy and policymaking are required starting from the root level. The following methods were undertaken to understand the wider issue regarding waste management in India.

- Studying a macro area
- The processes involved in waste management and segregation
- Current practices involved
- Understanding the efficiency and faults in the present system
- Comparative study of different methods to deal with waste in different countries
- Understanding in **the neighbourhood** level of how waste is being looked at.

The solution to the issue of waste was looked at on a macro level that covered the entire city of Bangalore. A detailed study was required to understand the existing scenario of waste and its infrastructure. Case studies included visitations to waste collection yards, NGO's dealing with waste. Also, on a micro level study, neighbourhood analysis was done for the Ward 160 where a survey form was shared among the residences of a particular location pertaining to the issues and their ideology behind the waste management. Visitations to Dry waste collection centres were made to understand the living and working conditions of the pournakarmikas.

The study led to understanding the requirements and program development for a modular project that looked at solid waste generated in a household and the system to tackle it. Various tools as mentioned above were used in order to bring the waste system closer to its generator, utilising the concept of **IMBY**.

4. Deciphering “unblackboxing “

Black box here is referred to as dumb, non-functional facilities that hold very little to no value. The idea proposed in this project is to subvert the *black box* and give it value. In waste facilities, **Unblackboxing** means avoiding marginalization of these facilities and making them a part of day-to-day life as waste has value and one should take responsibility for the waste they produce.

As stated by Saverio Massaro in his paper “Rethinking the Spaces of waste management”, **Unblackboxing** is a political act: *an integrated approach by creating enabling conditions to foster multiple processes of self-organization, civic engagement, and prosumership.*

Architecture is called upon to create newer hybrids with more valuable and sensitive typologies that enable the cultural, socio-economic, psychological, and environmental patterns to coexist that were previously known incompatible. In order to legitimate waste management spaces as social and civic places, it requires a functional mix including education and cultural activities.

5. Proposed program study and solutions

- **An integrated, decentralized Solid waste management facility** that responds to the neighbourhood in regards to waste generation and management awareness and poses as a **Community Beacon**.
- Technological and infrastructural intervention on different parcels of land.
- Setting up processing facilities including dry and wet waste in different types of land parcels of varied scale in different parts of a zone to achieve the “**Zero**



waste ward “goal set by Bruhat Bangalore MahanagaraPalike

- Together, the intervention can become a module that is envisioned to be implemented across different wards with contextual readjustments.

5.1 Research on how to involve the community:

Can architecture be used to influence user behaviour as well? In order to make waste management facilities a part of society, user behaviour had to be studied. This process of design is called **Design for Behaviour Change**. It is an approach to making design decisions to encourage desirable human practices.

5.2. Concept of behavioural nudging: White architecture



Figure 5.2.1 *Madison Square, Before and After*
This design method deals in bridging the transparency gap between society and humans. It is an approach to making design decisions to encourage desirable human practices. Design plays a major role in human behaviour. The following are the various aspects of White architecture:

Aspirational – architecture that is transformative and suited to the present time period.

Collective – that looks into different fields, multi-disciplinary, Collaborative, and encourages participation of the society.

Harmonious – that is responsive of the surrounding, ties the cultures together, brings in a social understanding and responsibility.

Liveable – That which is natural, breathable.



Figure 5.2.2 *Practices of Behavioural nudging*

The attitude of the people plays a very big role while introducing waste systems in a residential neighbourhood. Behavioural nudging is one of the methods that can help in changing the mind-set of the people towards waste, an attempt to ward off the negative notion around the waste.

The various methods of behavioural nudging are:

Dr. Dan Lockton, in his **PhD**, categorized the various ways in which design can influence user behaviours to help designers and practitioners broaden the extent of influence of their designed project.

Interactive lens: How the system interacts with its user in terms of influencing their behaviour.

Cognitive lens: Ways wherein designer forges knowledge-based interaction between users and their surroundings and how design can be used to counter poor decisions taken by the users.



Perception lens: How the user interprets and perceives various hidden meanings and patterns embedded in the systems around them.

Ludic lens: Playful interactions where social psychology mechanisms such as goal setting, to common game elements and levels.

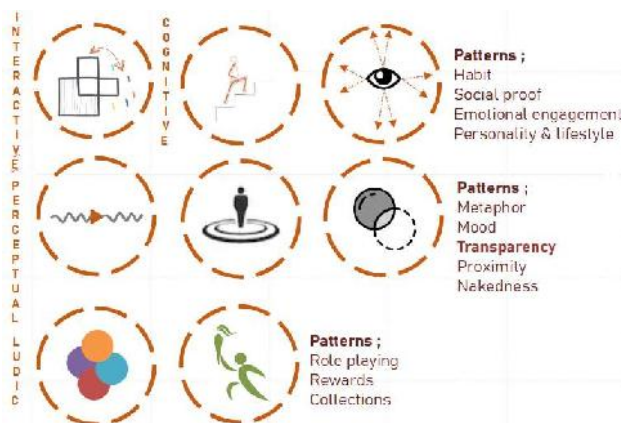


Figure 5.2.3 Behavioural Lens

5.3 Concept of transparency

Transparency in public buildings gives the message that everything is clear and it offers the possibility to fuse with other urban elements.

The need for transparency in the waste stream is a necessity as it helps in making it clear to the public of their doings. It opens up the system to the public, invites them to involve in the processes, to take responsibility for the waste they produce. Below Transparency has been described in three ways that can be implemented in the design process.



Figure 5.3.1 Concept of Transparency

Literal transparency: Literal transparency indicates how clear the visual boundary between

the interior and the exterior space is, depending on the physical characteristics of the material.

Phenomenal transparency: It describes the layered structure of the facade elements, voids, and even the form and their existence in a certain harmony without interfering with each other.

Experiential transparency: Experiential transparency is concerned with how easily the user can access the building and how the structure relates to the urban space.



Figure 5.3.2 Concept of Transparency

5.4 Circular economy

Circular economy – a way forward towards sustainable future. There are two main types of economy: **Linear** and **Circular**.

In the Linear economy, an object's lifecycle is direct starting from extraction, production to its disposal. An object is called waste in the last phase of its linear cycle. This poses a strain on the natural resources where when an object reaches the end of this cycle; its value is reduced and discarded.

In the Circular Economy, sustainability plays a very big role.

- The object undergoes varied processes in the cycle starting from **extraction, production, recycling, reuse, upcycle**.
- The loop is continuous and the object's value increases.
- The object here is not looked upon as waste rather it becomes a resource for the next cycle.



- A key objective is to give value to the waste by increasing the working life of a product or recirculating in the cycle.
- The main aim is to make societies more active in terms of waste and also to reduce the strain on landfills.

Project proposal – Generates Circular economy.

- The waste that is brought to the site is recycled, upcycled, and reused.
- **LLPU**- produces manure that can be used in the organic farm in the site, in turn producing locally and contributing to the community.
- **CWPU**- produces briquettes and pellets, coco fibre that can be procured by various other industries as fuel, textile raw material, etc.,
- **BMU**- produces liquid and gaseous CNG that can be used by the neighbourhood for **Recycling and upcycling workshops, repair café**- Teaches the community how to reuse and upgrade the value of waste instead of discarding it.

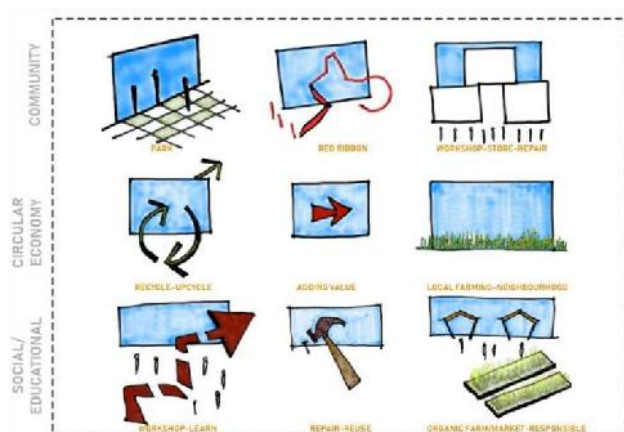


Figure 5.4.1 Design Attributes for a Circular Economy

5.5 Conclusion

“The chief function of the city is to convert power into form, energy into culture, dead matter into the living symbols of art, biological

reproduction into social creativity” - Lewis Mumford.

Waste has become a “*visible element*” in the present urban scenario. Hence, it becomes necessary to find ways to deal with it in order to keep the city clean, green and develop social awareness pertaining to waste management. Architectural intervention can be used to address the issues related to waste management facilities and also in integrating the neighbourhood for an efficient system of handling waste as a “*resource*”.

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