



Circular Waste Solutions

A Case Study of Yelachenahalli (Ward 185) In achieving source segregation of waste



On behalf of

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About the project

Waste Solutions for a Circular Economy in India', also referred to as 'Circular Waste Solutions' (CWS), is a Mitigation Action (MA) facility-supported project aimed at reducing Greenhouse Gas emissions from the waste sector. To achieve this, the project is creating awareness about source segregation of waste and setting up waste management facilities to maximise resource recovery. It is implemented in Bengaluru, Karnataka by GIZ India in partnership with Bruhat Bengaluru Mahanagara Palike and Saahas as the local NGO partner. The project has the Ministry of Environment, Forest and Climate Change and the Ministry of Housing and Urban Affairs, Government of India as nodal ministries. Additionally, it is also being implemented in four other Indian geographies, namely Trichy, Goa, Patna and Varanasi.

The Mitigation Action Facility (formerly known as NAMA Facility) is a multi-donor programme that supports the implementation of NAMA Support Projects (NSPs) that effect sector-wide shifts toward sustainable, irreversible, carbon-neutral pathways. It was jointly established by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and the UK Department for Business, Energy and Industrial Strategy (BEIS). Additional donors are the Danish Ministry of Climate, Energy and Utilities (KEFM) and Ministry of Foreign Affairs (MFA), the European Commission and the Children's Investment Fund Foundation (CIFF).

Overview

Like most of the other growing urban centers in India, Bengaluru is also struggling for collection and scientific disposal of the solid waste generated in the city. In the current scenario, emphasizing on source segregation to maximize resource recovery is key to bringing in circularity in this sector. This case study showcases the success of solid waste management in Yelachenahalli (Ward 185), Bengaluru through the activities undertaken under CWS project by Saahas. The planning, process and execution of the said intervention and its positive impact on improving source segregation even amongst the low income areas of Ramaiah Nagar, Faizabad and Kankanagara is highlighted in this document. These areas were critical as during baseline study it was discovered that there was no source segregation of waste and irregular waste collection that led to issues in waste handling and disposal. Regular interaction with the residents and focused IEC activities under the intervention led to change in perception and improved segregation levels that had a positive impact on the visual cleanliness and overall hygiene of the neighbourhood.

Project Impact Data table

Parameter Before Intervention (June 2023)	After intervention (Oct 2023)
Wet waste collected (entire ward) 4.5 TPD	10.3 TPD
Wet waste collected (study area) 1.2 TPD (mixed waste)	3.25 TPD
Garbage vulnerable points - 12	2

Introduction

Yelachenahalli (Ward 185) has a population of 44,695 according to census 2011 population data and now is estimated to be nearly 60,000 as per Bruhat Bengaluru Municipal Corporation (BBMP). As per the latest Bruhat Bengaluru Mahanagara Palike data, there are 23000 households in the ward. The focus areas where this intervention was done include - Ramaiah Nagar, Fayazabad and Kankanagara are primarily residential, largely catering to low-income groups with monthly income ranging between from Rs 7,000 to Rs 12,000 per family. Such areas are generally given low priority with respect to regular waste collection. Thus, to establish an end-to-end sustainable waste management solution, various aspects need to be addressed such as: waste reduction, segregation, onsite storage, collection and transfer, processing, and disposal. It is critical to establish the perception of waste as a resource, which is one of the major project goals for Circular Waste Solutions. Regular and detailed interactions with various stakeholders such as Health Inspector, Junior Health Inspectors, auto collection drivers from BBMP or their appointed concessionaire, and residents of Faizabad were held to assess the impact of the intervention.

Baseline

Yelachenahalli ward's daily wet waste generation in June 2023 was recorded at 4.5 tonnes/day. The baseline indicated lack of daily wet and dry waste collection, minimal awareness amongst the residents about the importance of segregation and ill-effects of dumping waste in the open. Before starting the baseline survey, the Saahas CWS Team visited the ward and met with the Junior Health Inspector of the ward to collect information about the area. They gathered details on the total number of blocks, the number of households in each block, the waste collection vehicle schedule, the number of garbage vulnerable points (black spots), and the end destinations for collected waste. They also compared and assessed the waste collection routes based on their segregation performance, categorizing them into better, average, and low segregation levels. Using this information, the CWS field supervisors conducted the baseline survey in six locations within the ward, selecting two better-performing routes, two with moderate segregation levels, and two low-performing. Our survey showed that only 22% (167 out of 767) of the residents in the low performing routes were handing over their waste, while in the well-performing routes 77% (698 households out of 905) of the residents were handing over the waste to the waste collectors. Segregation of wet, dry and hazardous waste was not practiced by the majority of the residents in the five blocks. A mere 3-6% of the residents handing over waste were segregating wet and dry waste at the source and following the BBMP protocol on segregation. This practice was irrespective of the income levels and regular collection by the waste collectors.

The Circular Waste Solutions project team of Saahas began working in the low-income areas from June 2023. The decision to work in Ramaiah Nagar, Faizabad and Kankanagara was taken because of the low waste collection percentages and open dumping. The team implemented intense campaigns and monitoring. This involved deep, long term engagement where the team conducted capacity building sessions, numbering of households, creating door-to-door awareness, monitoring daily waste collection and segregation by going along the waste collection vehicle.

As per BBMP household level information, these 5 routes spread across 3 blocks covered a total of 3,387 households. This is where this intervention was carried out. And the main sources of waste are: Household waste, apartment complex waste, RWAs.

Solid Waste Management in Yelachenahalli

BBMP manages the solid waste of Bengaluru urban and thus also manages the collection of wet waste, dry waste and domestic hazardous waste of the Yelachenahalli ward. The wet waste collection happens 5 days a week, namely Monday, Tuesday, Thursday, Saturday and Sunday. And the dry waste vehicle collects waste from households on Wednesday and Friday only. There are 22 auto tippers with a capacity of 500 kg each deployed in Yelachenahalli. The waste collected by the auto tippers is taken to a loading-unloading point at Kumaraswamy Layout where the wet waste is loaded onto a truck and is taken to Chikkanagamangla, 23 km from the spot. Mixed waste collected from the households is taken to Yelahanka dumpsite, 27 km from the spot.

Waste generation rate: 0.9kg/ Household

Twenty houses were selected for waste auditing from one block on a daily basis for one complete week starting from Monday to Saturday. A day prior to waste auditing, these twenty houses were informed to clear any prior stocked waste. All these 20 houses were practicing source segregation.



Fayazabad wet waste collection

Problems in waste management in Yelachenahalli

Ramaiah Nagar, Fayazabad and Kanakanagara are low-income areas with prevalent issues in waste segregation, disposal of waste, lack of awareness about three-way segregation and also the ill-effects open dumping of waste has on health. At the start of the intervention, the CWS team noticed that each auto tipper with a capacity of 500 kg was carrying an average of 150 kg of mixed waste, whereas the segregated waste was pegged at a mere 50 kg from each of the five auto routes. Lack of awareness also was leading to dumping of unsegregated waste

on the roads creating garbage vulnerable points (blackspots).



Fayazabad waste collection vehicle

According to the drivers, before the intervention they feared collecting waste in Faizabad and Ramaiah Nagar as it was difficult for them to convince the residents to give segregated waste and sometimes the situation got worse as they were driven out of the neighborhood. The same was corroborated by the Health Inspector Satish and Junior Health Inspector Amruth. According to HI, it was difficult to complete collection schedules in the areas as the residents were reluctant to store waste separately and handover to the collection vehicles. “It was impossible to ask the residents to keep wet, dry and hazardous waste segregated and handover the waste separately to the BBMP drivers. The residents lack space to store waste hence they would throw the garbage on the road leading to garbage vulnerable points (blackspots).”



Yelachenahalli ward Health inspectors Satish and Amruth

System Implementation

In Circular Waste Solutions, there were three different modes of implementation followed based on the engagement with community and sanitation staff. In Yelachenahalli, Mode 1 (In which the team has a deeper engagement with the community) was opted as the modus operandi. The CWS team conducted its first capacity building session to the sanitation staff of Yelachenahalli ward on July 6, 2023. Capacity building is the first activity carried out at the beginning of intervention in any ward as a form of establishing communication with waste collection workers. Soon after, unique numbering was conducted in the three areas selected for intervention. During unique numbering, the designated waste buckets for wet waste from each household was given an unique number that helped the team to track them based on the kind of waste they were handing over to the sanitation staff. Mass awareness with the help of BBMP marshalls and health inspectors were conducted in the Ramaiah Nagar, Faizabad and Kanakanagara to address poor source segregation of waste and the need to reduce waste from reaching dump sites. Below is a detailed description of the activities undertaken to boost the BBMP officials and residents' knowledge on the importance of source segregation and how easy it is.

Capacity building session: After a conversation with BBMP officials and apprising them of the intervention, a Capacity Building session was planned. This session is also crucial to bring the Saahas CWS team and the BBMP officials on one page. During the session, CWS team emphasised on the importance of source segregation; how they can create awareness amongst the waste generators and also highlight the need for worker safety by providing suitable PPE (personal protective equipment). These sessions are instrumental in enhancing the proficiency and awareness of waste collection personnel, ensuring a unified and informed approach towards achieving three-way source segregation in collaboration with the citizens.

Mass Awareness campaigns: An activity that requires the support of BBMP Marshalls, collection vehicles and the BBMP health officers of the ward, Mass Awareness is a block level activity where the Saahas CWS team reaches out to the residents in door-to-door campaigns and distributes informative materials on waste segregation. This campaign relies on the social impact that this engagement has on the residents to improve the segregation levels in low-performing areas.

Household Numbering: In many low-income residential communities, houses have not been systematically numbered. Additionally, many housing plots are multi-dwelling units, making it challenging to track household-level waste segregation. To address this issue, the Circular Waste Solutions (CWS) project implemented a comprehensive household numbering system. This system provided a unique number to every household, enabling more precise monitoring and management of waste segregation.

The field team carried out a thorough assessment of the ground situation to identify all residences, including those previously overlooked due to the congested nature of these neighborhoods. Unique numbers were assigned to each household and were either written on the wall outside the house or, in some cases, on the designated wet waste bins. This approach ensured that every household, regardless of its location or size, was included in the waste management system. Once the numbering was completed, the field team maintained a detailed data log of the segregation percentages at the household level. This data was crucial for monitoring the effectiveness of the awareness campaigns to improve waste segregation and also for identifying consistent defaulters. The following steps were undertaken:

Household-Level Tracking: The unique numbers allowed the team to track the waste segregation practices of each household. This tracking involved recording the type and amount of waste handed over and segregation to the sanitation staff.

Block-Level Analysis: The data collected at the household level was rolled up to create block-level reports. This aggregation helped in identifying trends and problematic areas within each block. By analyzing these reports, the team could pinpoint blocks that required additional intervention or support.

Identifying Defaulters: Consistent defaulters' households that did not comply with segregation guidelines were identified through regular monitoring. These households were addressed separately through targeted awareness campaigns and, if necessary, penalties.

Door-to-door awareness: This is a face-to-face interaction with the residents detailing the methods and importance of three-way source segregation. Informative flyers are provided to the households describing the categories dry, wet and domestic hazardous. Repeated door-to-door awareness campaigns along with daily monitoring of HHs with the help of volunteers is taking place. The team also talks about the importance of waste reduction, reducing waste going to landfill or being burnt. The connection between good health, hygiene and source segregation of waste is also explained. They are given contact numbers of the local supervisors.

Dry waste bag distribution: The Circular Waste Solution project team distributed dry waste bags among low-income communities along with segregation awareness, as that acts as an important program symbol and a trigger/reminder for people to put their dry waste items in the bag. This distribution is aimed to facilitate the efficient collection of dry waste, which happens biweekly. Community members are encouraged to gather and store their dry waste, subsequently handing it over to the designated dry waste collection vehicle during scheduled visits. Recognizing the necessity for adequate storage over a 3-4 day period due to the substantial quantity of dry waste, these bags offer a convenient and cheap solution. Their practical design allows for easy hanging within households, optimizing space when compared to larger bins.



Dry waste bags distribution in Fayazabad

Street mobilization: Door-to-door awareness is time consuming and can be done only once. Street mobilization offers another route to communicate with the residents. During street mobilization, CWS team members remind the residents by showing responsible waste segregation and daily disposal of waste to BBMP auto tippers. This Activity involves assembling a crowd on specific streets to conduct live demonstrations showcasing three-way waste segregation using a 2-bin 1-bag kit and assorted waste items. These demonstrative activities aimed to provide the community with a tangible understanding of the simplicity of waste segregation practices.

Community events: To create multiple reminders, CWS also conducted various events like rangoli competition, mehendi competition, home composting sessions, awareness sessions in parks or any religious institutes. CWS also conducts awareness sessions in educational institutes and schools to imbibe the importance of segregation of waste from an early age.

Impact

The Circular Waste Solutions team helped the BBMP officials to get their field team work more effectively and additional 2 BBMP field supervisors were also posted in the ward to increase the efficiency. The field team was trained and supported by the CWS team helping them to communicate better with the residents. The field team did loudspeaker announcements on a daily basis and imposed penalties on residents for not segregating wet, dry and hazardous waste. The dry waste bags also helped in improving the segregation levels in the ward.

After five months, the three project locations, Ramaiah Nagar, Fayazabad and Kanakanagara, saw a significant rise in the total number of houses giving waste to the collection vehicles. In June 2023, before the start of intervention, the number of households giving waste in Yelachenahalli stood at 6-7% while the total households giving waste also stood at 10%. By October 2023, the total number of households giving waste jumped to 93% while the total number of households giving segregated waste also increased to 90%. This is based on the

daily data record that CWS team with the BBMP supervisors was maintaining.

In terms of the increase in wet waste collection, it has increased from 50 kg of segregated and 150 kg mixed waste to 700 kg of completely segregated wet waste in the project locations. This practice of pushing the residents to give waste to the Sanitation staff has also resulted in the reduction of garbage vulnerable points (blackspots). According to Shafiqa Banu, Shaheen and Nasreen Taj who are residents of the ward, cleaner surroundings have significantly improved their health. Nasreen mentioned, *"After the removal of the garbage vulnerable points (blackspots) in front of our homes, we have fewer mosquitoes and insects, which has greatly improved our living conditions here."* Shafiqa and Shaheen also expressed similar sentiments.



Faizabad residents and Saahas Team

Conclusion

The practices implemented by CWS in BBMP were replicated in three more blocks in the same ward. BBMP has been able to successfully improve the segregation levels of other areas in the ward due to the constant support and motivation from the CWS team of Saahas.

The above results also indicate that the Urban Local Bodies (ULBs) like BBMP can see improvement in waste segregation and reduction in garbage vulnerable points (blackspots) with the help of staff training and better resource availability which in turn achieve good results.
