IMPACT ASSESSMENT OF PROJECTS UNDERTAKEN BY ITC'S SOCIAL INVESTMENTS PROGRAMME ACROSS INDIA: WASTE MANAGEMENT PROGRAMME

MARCH 2025

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CHAPTER I: OVERVIEW OF THE STUDY

1.1. Overview of ITC's Solid Waste Management (SWM) Programme

ITC's Social Investments Programmes are implemented under the banner of ITC Mission Sunehra Kal (MSK) with the 'Two-Horizon' approach to address the twin challenges of securing sustainable livelihoods today and tomorrow, keeping women and other poor and vulnerable communities, who are an integral part of all the programmes, at the core. The SWM interventions fall under the Horizon II approach which invests in developing opportunities for the future through human capital development, public health and strengthening women's livelihoods. Summarised descriptions of the activities undertaken in the area of waste management under Horizon II are provided as follows.

Table 1: Summary of Interventions

Intervention	Summary
Decentralised Waste Management Programme	• Focused on source segregation and reduction of landfill waste. Promotes community-driven waste management, revenue generation, additional income generation for waste collectors and ensuring their well-being • Operational in 36 Gram Panchayats spread across 10 states (Andhra Pradesh, Punjab, Maharashtra, Karnataka, Tamil Nadu, Telangana, West Bengal, Bihar, Uttar Pradesh, Uttarakhand) in collaboration with Panchayats and Urban Local Bodies (ULBs) aligned to Swachh Bharat Mission (SBM)
Urban Waste Management Programme	• ITC provides technical support to ULBs and builds capacity of ULB officials in planning and implementation of decentralised SWM programme. Households are encouraged to pay for waste management.
Liquid Waste Management Programme	• Being implemented in partnership with Lohiya Swachh Bihar Abhiyan, Government of Bihar, and Light House Initiative in partnership with FICCI-ISC
Green Temple Initiative	• Closed loop waste management model involving processing of temple waste converted into biogas and compost

1.2. About the Impact Assessment

Among the states where ITC is implementing SWM interventions are Uttar Pradesh (UP) and Bihar. The specific geographies where the projects are being implemented in these two states are indicated in the following table.

Table 2: Coverage of Programme

Project Code	State	District	Implementation Partner	Beneficiary Households	ULBs/Districts	Remarks
47	Uttar Pradesh	Lucknow	UMANG	3,00,636	Ayodhya, Shahjahanpur, Sitapur	Interventions are being undertaken in 85 ULBs
71	Uttar Pradesh	Saharanpur	-FORCE	4,495	Saharanpur	
71	Uttar Pradesh	Lucknow	FORCE	3,94,095	Amroha, Baraut, Etawah	
107	Bihar	Munger	WASH	23,553	Banka, Begusarai, Bhagalpur, Buxar, Munger, Patna, Samastipur	-

Sutra Consulting was engaged by ITC for conducting an impact assessment of the SWM projects being undertaken in these two states. The objective of the impact assessment was to measure the changes that have come about in key indicators on account of project interventions and to identify possible areas of improvement.

1.3. About this Report

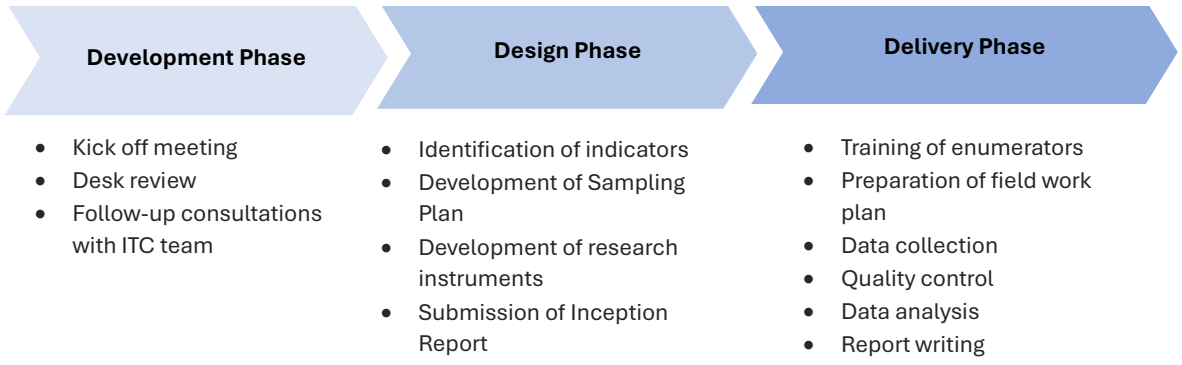
This Report has been prepared based on an exhaustive desk review, field-based data collection and analysis.

CHAPTER II: METHODOLOGY ADOPTED FOR THE STUDY

2.1. Phasing of the Study

The study was structured in three phases, namely, Development, Design, and Delivery. The key tasks undertaken as part of each phase of the study are depicted in the following figure.

Figure 1: Phases of Impact Assessment



The Development phase focused on developing a clear understanding of the interventions through desk-based review. During this stage, information was obtained on whether a baseline study had been conducted prior to the roll out of interventions, based on which the assessment design was finalised. The Design phase involved activities related to identification of indicators to be measured through the assessment, design of a sampling plan as well as quantitative and qualitative data collection tools. An Inception Report was prepared and submitted laying down the finalised approach and methodology, sampling plan, assessment plan and data collection tools. Finally, the Delivery phase involved training of the field enumerators, execution of the assessment through field-based surveys and interviews (quantitative and qualitative data collection), followed by data consolidation, analysis and report writing.

2.2. Study Design

The focus of the study was to understand the manner and extent to which ITC's SWM projects impacted relevant indicators by comparing the situation before and after implementation of the interventions. A post-intervention matched comparison design was adopted which allowed for measurement of impact by comparing areas where ITC's projects had been implemented (intervention group) with similar areas where implementation had not been undertaken (control group).

2.2.1. Limitations of the Study

Use of Recall Strategy for Baseline Data Collection: While baseline data was available for some of the areas of enquiry, there were some indicators for which baseline data was not available. ITC therefore approved the adoption of a recall-based approach for obtaining baseline data for such indicators, with respondents being asked to recall the status of key indicators before projects commenced. Dependence on respondent's recall of past data results in data that could be prone to recall error. The consultant adopted several strategies for reducing recall bias. Efforts were made to collect valid and reliable data by formulating questions that were clear and precise to reduce variation in comprehension[1]. In addition, backwards recall

[1] Roberts RO, Bergstralh EJ, Schmidt L, Jacobsen SJ. Comparison of self-reported and medical record health care utilization measures. J Clin Epidemiol 1996; 49: 989–95

was used to facilitate memory recall by following an ordered sequence of events; starting with the present and thinking backwards to a point in time[2].

Selection of Control Areas: A second limitation is the fact that apart from ITC's SWM related interventions, various other programmes and projects are being implemented across various parts of the country. The SBM is a nation-wide campaign which covers both urban and rural areas. Therefore, though ITC had not implemented any SWM initiatives in the control areas, they were exposed to other Government and non-Government programmes which would have affected their status between baseline and endline stages.

2.3. Identification of Key Indicators

A primary step that was undertaken as part of design of the assessment framework was the identification of indicators that were to be assessed. The Terms of Reference developed for the study by ITC had included key indicators and these were further streamlined and discussed prior to finalisation. The list of indicators that were to be measured along with sources of information were listed in the Inception Report.

2.4. Sampling Strategy

The consultant focused on four project areas located in Baraut, Etawah and Saharanpur in UP, and Munger in Bihar. Four control areas carefully matched for similarity were selected namely, Khekada, Ekdil and Hasanpur in UP and Bariarpur/Kharagpur in Bihar. The total sample of 1,840 was derived using Cochran's formula, adjusted for a finite population of 52,745 and a design effect of 2. Rounded to 1,840 (920 per group), this ensures detection of a 0.2 effect size at 95% confidence and 80% power, balancing precision with feasibility. The sampling strategy was approved by ITC prior to roll out of fieldwork.

Table 3: Intervention and Control Areas

State	Intervention Areas		Control Areas	
	ULB	Households	ULB	Households
UP	Baraut	17,741 households across 24 ward names, 68 samitis	Khekada	~ 5,000 households in non-project ULB clusters
UP	Etawah	16,256 households across 40 ward names, 64 samitis	Ekdil	~ 4,800 households in non- project ULB clusters
UP	Saharanpur	11,104 households across 34 ward names, 44 samitis	Hasanpur	~2,600 households in non- project ULB clusters
Bihar	Munger	7,644 households across 2 wards (Etahri, Katariya), 35 samitis	Bariarpur / Kharagpur	~1,896 households in non- project Gram Panchayat clusters

2.4.1. Sampling Technique

A Stratified Cluster Sampling approach was followed for the intervention group and a Propensity Score Matched (PSM) clustered sampling method was followed for the control group, ensuring precision and practicality.

2.4.2. Household Sample Coverage

In the final implementation of the sampling strategy, minor adjustments were necessary due to administrative and logistical feasibility constraints encountered during field data collection.

- Total households sampled increased slightly from the planned 1,840 (920 per group) to 1,958 total households (998 Intervention, 960 control).
- The distribution of households by state remained consistent:
  - UP: 1,680 (85.8%), evenly distributed between control and intervention.

[2] Loftus EF, Fathi DC. Retrieving multiple autobiographical memories. Soc Cogn 1985; 3: 280–95.

    - Bihar: 278 (14.2%), evenly distributed between control and intervention.
- **District-Level Sample Distribution:**
    - Intervention Areas:
        - Baraut: 337 households (33.8%)
        - Etawah: 313 households (31.4%)
        - Saharanpur: 206 households (20.6%) s
        - Munger: 142 households (14.2%)
    - Control Areas:
        - Ekdil: 300 households (31.2%) [Replaced Bharthana]
        - Hasanpur: 207 households (21.6%)
        - Khekada: 317 households (33.0%)
        - Munger: 136 households (14.2%)

2.4.3. Survey Among Other Respondent Groups

In addition to the household survey, Key Informant Interviews (KIIs) were conducted for the assessment and their coverage is indicated in the following table.

Table 4: Qualitative Data Collection (Key Informant Interviews)

Stakeholder	Uttar Pradesh	Bihar
Representatives from ITC	2	1
Representatives from Implementing Partners	3	1
Zila Panchayat/Municipal Corporation	8	4
PRI/Ward Committee members	8	4
Mohalla Committees	6	3
Waste Collectors	12	8
Total	**39**	**21**

2.4.4. Case Studies

In addition to the interviews, case studies were developed with a view to highlight and document good practices that can be replicated or scaled-up. The case studies were identified in consultation with the ITC team.

2.5. Design of Data Collection Tools

On the basis of indicators finalised, the team developed a set of questionnaires for the various categories of stakeholders. A household survey tool and multiple qualitative tools were developed. A summary list of the tools developed is provided in the following Table. These tools were approved by the ITC team prior to training and roll out of the survey. The household tool and four qualitative tools administered to respondents not conversant with English were translated to Hindi.

2.6. Design of CAPI Software and Manual

A Computer Assisted Personal Interviewing (CAPI) software was developed using Open Data Kit (ODK) platform. The CAPI based method of data collection was used for conducting the household survey. This helped ensure high quality data by facilitating logic checks, skip patterns, validations, high frequency checks, and enumerator monitoring.

2.7. Training of Data Collection Teams

The consultant conducted rigorous training for all supervisors and enumerators who were to be deployed for data collection subsequent to receiving formal approval from ITC on the study tools and training plan. A two-day combined training programme for both states was conducted at Etawah (UP). Representatives

from ITC also participated in the training programme and provided their valuable insights. A separate training programme was conducted for qualitative researchers with the aim of orienting them on the qualitative tools.

2.8. Data Collection and Quality Control

Quantitative data collection was conducted over a period of three weeks. Qualitative data collection was undertaken in parallel. Necessary monitoring and quality control measures were adopted for ensuring high-quality data collection. This included daily review meetings with the survey team, daily review of synced data and provision of handholding support by senior team members as and when it was required.

2.9. Data Cleaning, Analysis and Report Writing

Various formulae and techniques of MS-Excel were used for tabulation and analysis. Qualitative data obtained from open-ended questions in Key Informant Interview (KII) questionnaires was compiled and analysed. While synthesising and drawing conclusions, results from different pieces of analysis were brought together to generate insights by relating the results to the problem statement derived during the initial step of this study. Report writing was undertaken keeping in mind a systematically designed table of contents.

CHAPTER III: PROFILE OF HOUSEHOLD SAMPLE

3.1. Sample Size and Profile

A detailed discussion on the sampling methodology has been provided in a preceding chapter of this report. Four intervention areas, namely, Baraut, Etawah and Saharanpur in UP and Munger in Bihar were sampled for the household survey. Four areas were matched and selected to serve as control areas, namely, Khekada, Ekdil and Hasanpur in UP and Bariarpur/Kharagpur in Bihar. The total sample size covered was 1,958 households. The following Table provides the number of households covered per district/ULB.

District / ULB	Intervention (%)	Control (%)
Uttar Pradesh		
Baraut	33.8	-
Etawah	31.4	-
Saharanpur	20.6	-
Khekada	-	33.0
Ekdil	-	31.2
Hasanpur	-	21.6
Total- Uttar Pradesh	**85.8**	**85.8**
Bihar		
Munger	14.2	-
Bariarpur / Kharagpur	-	14.2
Total- Bihar	**14.2**	**14.2**
Total	**100.0**	**100.0**
N= 1,958	N= 998	N= 960

3.2. Household Information

A study of gender wise distribution of respondents revealed that 62.2% were male and 37.8% were female in intervention areas, whereas 67.6% respondents were male and 32.4% were female in control areas. The average age of respondents was 43 years in intervention areas and 41 years in control areas. In both intervention and control areas, the highest proportion of respondents (32% in intervention areas and 23% in control areas) had completed graduation or a higher degree, followed by those who had passed class 12 (20% in intervention areas and 19% in control areas) and those who had passed class 10 (16% in intervention areas and 18% in control areas). Only around 10% of respondents from both the areas reported that they were illiterate.

Around 50% of respondents from both the areas were the heads of their respective households, around 22% were sons of heads of households, followed by 20% in intervention areas and 17% in control areas who were spouses of heads of households. Majority of the respondents in both intervention and control areas reside in Pucca households, followed by Semi Pucca households. A negligible proportion of them live in Kutcha households. The average household size is around 6 (≈ 4 adults and 2 children) in both intervention and control areas. The highest percentage of respondents i.e., 48% in intervention areas and 60.5% in control areas belonged to Other Backward Class (OBC) followed by General Caste and Schedule Caste in both the areas. 66% of the respondents in intervention areas and 59% of the respondents in control areas confirmed that their HH members possess ration card.

Around 99% of respondents in intervention areas and 94% of respondents in control areas stated that they had an individual HH latrine. Out of the ones who do not have access to a HH latrine, 80% in intervention areas (12 out of 15) and 90% in control areas (54 out of 60) responded that go for open defecation.

CHAPTER IV: FINDINGS FROM HOUSEHOLD SURVEY

4.1. Awareness levels

4.1.1. Agency Responsible for SWM Service Delivery

Respondents were asked to share which agency they considered to be responsible for SWM service delivery.
A high level of awareness was observed with 87% of respondents in intervention areas being of the view that the agency responsible for SWM service provision was the Municipality / Municipal Corporation or Zilla Panchayat / Gram Panchayat. In the control areas, the response is 96.5% for identifying government as the primary agency responsible for SWM services. This is possible that on account of the various government programmes such as SBM - Urban and SBM - Grameen, the awareness levels are high across most areas, even control areas.

4.1.2. Household Responsibility for SWM

Around 94% of respondents in intervention areas were of the view that households are responsible for SWM actvities. Respondents were asked to recall whether they were aware of this before ITC's programme was rolled out. A lower 54% of respondents stated that they were aware of this prior to the programme. This reflects a significant improvement in awareness levels on this indicator after implementation of programme interventions.

4.1.3. Household Responsibility for Waste Segregation and Bio Degradable Waste (BDW) Treatment

Around 92% of respondents in intervention areas were of the view that households are responsible for waste segregation and 94% agreed for BDW.. Respondents were asked to recall whether they were aware of this before ITC's programme was rolled out. A lower 49% of respondents stated that they were aware of waste segregation and 50% for BDW prior to the programme. This reflects a significant improvement in awareness levels on this indicator after implementation of programme interventions.

4.2. Adoption of Practices

4.2.1. Regularity of Waste Segregation

Around 72% of respondents in intervention areas used to segregate waste always. Respondents were asked to recall whether they used to follow this before ITC's programme was rolled out. A lower 37% of respondents stated that they used to segregate waste always prior to the programme. This reflects a significant improvement in practice levels on this indicator after implementation of programme interventions.

Non-Biodegradable Waste Management (NBWM)

Around 66% of respondents in intervention areas used to handover NBDW to waste collectors. Respondents were asked to recall whether they used to follow this method of disposal before ITC's programme was rolled out. A lower 29% of respondents stated that they used to handover NBDW to waste collectors prior to the programme. This reflects a significant improvement in practice levels on this indicator after implementation of programme interventions.

Only 18% of the respondents in intervention areas; and 32% in control areas face problems with respect to NBDW management. Among those who responded that they face problems with NBDW management, the

major issues cited are the service providers do not come regularly, there is no space for NBDW disposal, and service providers charge a high fee.

Biodegradable Waste (BDW) Management (BWM)

Around 60% of respondents in intervention areas used to handover BDW to service providers. Respondents were asked to recall whether they used to follow this method of disposal before ITC's programme was rolled out. A lower 26% of respondents stated that they used to handover BDW to service providers prior to the programme. This reflects a significant improvement in practice levels on this indicator after implementation of programme interventions.

4.2.2. Treatment of BDW

Around 41% of respondents in intervention areas used to follow drum compostng for household treatment of BDW. Respondents were asked to recall whether they used to follow this before ITC's programme was rolled out. A higher 68% of respondents stated that they used to follow drum composting prior to the programme. Also around 15% of respondents in intervention areas used to follow pot compostng for household treatment of BDW; but when asked to recall, around 26% stated that they used to follow pot composting prior to the programme. This reflects a significant change in practice levels on this indicator after implementation of programme interventions.

4.3. Problems related to BDW Management

Only 17% of the respondents in intervention areas; and 23% in control areas face problems with respect to BDW management. Among those who responded that they face problems with BDW management, the major issues cited are they do not know how to treat waste, bad odour is emitted from home composting units and community-level treatment facilities are inadequate

4.4. Sanitation and Public Health

87% of the respondents in intervention areas and 72% in control areas perceive improvement in cleanliness and sanitation in their area due to improved condition of waste management compared to earlier (7-8 years back in case of UP and 1-2 years back in case of Bihar)

4.5. Regularity of Services

89% of the respondents in intervention areas observe the roads to be swept regularly, but the practice is much irregular (49%) in control areas. Similarly, garbage heaps are much lesser in intervention areas than in control areas.

4.6. Satisfaction with the Services

The rating of satisfaction with the cleanliness of public places and markets in their locality in intervention group is 7.7 (±2.1). Respondents were asked to recall about their satisfaction levels before ITC's programme was rolled out. A lower rating of 4.9 (±3.1) was given by the intervention group with respect to the cleanliness of public places and markets in their locality. This reflects a significant improvement in practice levels on this indicator after implementation of programme interventions.

4.7. Collection and Treatment Facilities

As per secondary sources of information, in Uttar Pradesh, ITC's Solid Waste Management Project has facilitated the setting up of 10 MRFs in Saharanpur; while the infrastructure has been built by the Municipal Corporation. In Baraut and Etawah, 1 MRF each has been set up by the respective Magar Palika Parishads, facilitated by ITC. In Bihar, 10 WPUs have been facilitated at GP level.

Around 35% of the respondents in intervention areas and 12% in control areas stated that a waste collection or processing unit was present near their house. Among the ones who are aware, majority stated about the existence of Material Collection Facility (MRF) and Waste Processing Unit (WPU) near their house.

Around 95% of the respondents in both the areas (95.8% in intervention areas and 94.9% in control areas) confirmed the facilities to be functional, which is indicative of the solid waste management responsibility of the state governments with adequate support and guidance from the State Pollution Control Boards (SPCBs) and the Central Pollution Control Board (CPCB). Around 20% of the respondents in intervention and 5% in control areas face difficulties due to the existence of such a facility near their home. Majority in both the areas find it difficult due to the foul smell emitted from the facilities.

4.8. User Fees for Solid Waste Management (SWM)

Around 86% in intervention areas, and 60% in control areas responded their house is served by a waste collector. This is true of the fact that ITC's SWM programme ensures that this service reaches to every HH. However, only 31.5% in intervention aeras responded that they pay a user fee for waste collection; whereas it is only 9% in control areas. The highest proportion of respondents (79%) paying User Fees belong to Saharanpur, and it is the least in Etawah. The reason could be that the programme is yet to mobilise all the HHs in their intervention areas for paying user fees for waste collection service.

A reasonable amount of user fee is also decided under the programme; so that everyone is able to afford it. The average user fee charged is about 47/- INR in intervention areas; whereas it is around 80/- INR in control areas. The average fee charged is highest in Etawah (89/- INR), Saharanpur (62/- INR), Munger (31/- INR) and least in Baraut (11/-INR). Around 71% of respondents in intervention areas have confirmed that the amount of user fees they pay is affordable.

4.9. Awareness of the Project and Training

Around 50% of the respondents in intervention areas confirmed thar they are aware of the ITC's Solid Waste Management (SWM) programme; Majority of them in intervention areas have come to know from the programme through Newspaper/TV/Radio news, followed by social media/Online news portal and IEC Campaigns; which indicates media publicity and acknowledgement of the good work ITC is doing on SWM.

Around 88% of the respondents in intervention areas have confirmed that they received training on waste segregation; and around 22% received training on waste treatment through composting. A very negligible proportion also responded that they received training on waste treatment through mini-biogas plant.

4.10. Satisfaction with Grievance Redressal Mechanism (GRM)

Awareness levels on Grievance Redressal Mechanisms (GRM) was found to be good in intervention areas with 47% of respondents affirming awareness. However, it was found to be relatively limited in control with only 25.5% of respondents aware about it. Overall, only 31.7% of respondents stated that they ever used such mechanisms for raising complaints related to waste management; it is 34% in intervention areas and 24% in control areas. Among the ones who used the GRM facility, majority (80%) of the respondents in intervention areas confirmed that the complaint was resolved in less than a week; whereas majority (47.8%) in control areas confirmed that complaint has not been resolved. This finding is indicative of the outcome of the awareness programmes and empowerment of the communities to demand for SWM services in their areas of residence.

4.11. Liquid Waste Management Facility at Household and Community Levels

58% of the respondents in intervention area have confirmed that their household is connected with covered drainage system and 48% have confirmed that their household is connected with individual or community soak pit. 30% have confirmed that their HH have a kitchen garden. If the waste water from the HH is used properly in the kitchen garden, then the waste water can provide plant growth and act as a replacement for mineral fertilisers. Around 19% of the respondents in intervention areas confirmed that there are community soak pits, 12% confirmed that there are junction chambers, 17% confirmed that there are individual soak pits and 70% confirmed that there are drains in their village. The findings reveal that the respondents might not be fully aware of all the types of Liquid Waste Management facilities, except for their knowledge about drains both in control and intervention areas.

4.12. Satisfaction with Liquid Waste Management (LWM) services

Overall, in intervention areas, the respondents find the cleanliness of their village to be high with respect to Liquid Waste Management services. *The rating is on a scale of 1-10 with respect to LWM (1 being unclean and 10 being very clean.* The respondents rated 8.1 (±7.0) with regards to the cleanliness level of their village with respect to liquid waste management. While the respondents find the cleanliness of their village to be high in UP, the rating is moderate in Bihar with respect to LWM services.

CHAPTER V: MOHALLA COMMITTEES

5.1. Existence and Functions of Mohalla Committees (MCs)

With the community led approach, the concept of forming community level committees known as "Mohalla Committees" was introduced. ITC mobilised the key members of the community to form Mohalla Committees (MCs). The major role MCs related to SWM is to hire the waste collectors, collect user charges from the HHs, decide on the amount of service charges to be paid by the users and pay salary to the waste collectors from the collected amount. Even if some HHs cannot afford to pay the user charges, the MCs have mandated that every family in the community should receive the SWM services.

Around 39% of the respondents in Uttar Pradesh confirmed that they are aware of the existence of Mohalla Committees; out of which 80% of them confirmed that a Mohalla Committee been formed in their locality.

40% (N=124) of the respondents were members of Mohalla Committees. More than 80% of the respondents confirmed that the Mohalla Committees have a role on awareness creation on SWM; whereas 40% have confirmed that Mohalla Committees have a role in engaging waste collectors

5.2. Satisfaction with the MC services

The respondents find the existence and utility of Mohalla Committees to be very relevant. *The rating is on a scale of 1-10 based on their relevance and utility (1 being low and 10 being high)*

Table 5: Average Rating on Relevance and Utility of Mohalla Committees

Relevance and Utility	Intervention
Saharanpur (Mean SD)	8.0 (±1.9)
Etawah (Mean SD)	7.1 (±2.5)
Baraut (Mean SD)	8.3 (±1.7)
	N=313

In Saharanpur as on today, the entire waste collection system is managed by the Mohalla Committees; due to which the Saharanpur Municipality has no financial commitment towards the waste management process at the ULB level.