Summer Internship Report

A report on performance of the urban local bodies in Chhattisgarh and UP for the garbage-free city indicators

A Report Submitted by

Chhandasri Mishra ,
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The past three months has been incredibly intense and full of experience, and reflecting on this we would like to express my gratitude to the people who have guided me to end up with this result day. This dissertation would not have been possible without the contribution of the following people. First, we would like to express my gratitude towards IIHMR DELHI for providing me with the opportunity to work with IQVIA. We are extremely thankful to **Ms. Divya Aggarwal** for putting in so much of efforts towards each one of us and at the same time, I am very grateful to all the core team members of IQVIA for trusting me and providing me the opportunity to work at IQVIA. Secondly, we would like to acknowledge our supervisors **Mr. Vaibhav Rao**, **Mr. Pankaj Bajaj** and **Ms. Rimsha.**

We would also like to thank **Dr. Anshul Sharma** for smooth on boarding and grooming us in the organization culture

Thirdly, we would like to express my special gratitude to the GFC team of IQVIA because of them we had an amazing opportunity to actively engage in the project itself. This has been an incredible experience both on a professional as on a personal level. Fourthly, we wish to thank all my team members who had a big role in supporting this journey. Lastly, and most importantly, we are grateful for the moral support that we have received from my parents, friends and my seniors. Without their presence in the both the good and difficult times, compiling this dissertation would never have been possible. We are extremely lucky to be surround by all of you in my life.

List of Abbreviation

MSWM	Municipal solid waste management
TPD	Tons per day
ULB	Urban local bodies
CAA	Constitutional Amendment Act
RWA	Resident welfare association
IEC	information, education and communication
A&OE	administrative and office expenses
GFC	garbage free city
ODF	open defecation free
SHG	Self-help group
STP	Sewerage treatment plant
C&D	Construction and demolition
TPA	Third party assessment
SBM	Swachh Bharat Mission
CPCB	Central Pollution Control Board
CPHEEO	*Central Public Health and Environmental Engineering Organization*
MoHUA	Ministry of Housing and Urban Affairs
UNDP	United Nations Development Programme

OBSERVATIONAL LEARNINGS

1. INTRODUCTION

IQVIA is a leading global provider of advanced analytics, technology solutions, and clinical research services to the life sciences industry. IQVIA creates intelligent connections across all aspects of healthcare through its analytics, transformative technology, big data resources and extensive domain expertise.

MISSION

Imagine a world where advances in data science and human ingenuity come together to provide creative solutions to improve human health. This is our vision. Where every challenge is seen as an opportunity to make a meaningful impact for customers, for patients, for people. Discover a career with purpose and help create a healthier world.

VALUES

- creativity
- teamwork
- innovation

IQVIA India currently undertakes the third party assessment for the project of Ministry of Housing and Urban Affairs (MoHUA), Government of India, namely Star Rating certification to improve on-ground waste management scenario of the cities to become 'Garbage Free Cities', release of Government of India funds based on conditional fulfillment of desired indicators , subject to a ULB achieving at least 1-star certification.

The Swachh Bharat Mission- Urban journey started in 2014 has helped India set and achieve new benchmarks of Swachhata. In this direction, the protocol for star rating of Garbage Free cities was lauched in January 2018. Seeing the impact Star Rating certification has made to improve on-ground waste management scenario of the cities to become 'Garbage Free Cities" and Cities growing participation in this certification. Currently the GFC is undergoing for its fourth-year assessment and IQVIA has been appointed as the third-party agency, which is in charge of executing independent assessments for the GFC Star rating protocol for Garbage Free Cities and ODF Certifications. IQVIA has been pivotal in the monitoring and evaluation of the flagship Swachh Bharat Mission. IQVIA is

uniquely positioned to engage, interact, and capture best practices from across the country as the first private sector agency to engage with all 35 states and conduct ODF and GFC inspections.

2 MODE OF DATA COLLECTION

As stated above , GFC is undergoing for its fourth-year assessment and IQVIA has been appointed as the third-party agency, which is in charge of executing independent assessments for the GFC Star rating protocol for Garbage Free Cities.

As a part of primary analysis , we did a comparative assessment based on the final performance of the ULB for these two states this year (2022) and previous year (2021). We constructed a matrix of the best performing ULB in GFC star rating this year as a portion of DA from the two states of Chhattisgarh and Uttar Pradesh.

The majority of the information was acquired from secondary sources, including documentation for SBM, Swachh Survekshan, and the GFC Protocol as well as reports, guidelines, and self-assessment forms offered by urban local governments. Our secondary survey, which was conducted through desktop assessment, the first step in evaluating the star rating process, included data for matrix building.

3 OUR **ROLE IN THE INTERNSHIP**

Our Role in the internship duration of 3 months included -

- Conduct a desktop assessment of the city documents for GFC certifications
- Develop a quality check mechanisms and conduct a quality check of field data collected by the assessors in various states and cities
- Liaison with senior government officials to facilitate the process for GFC
- Conduct workshops/training sessions with the states/cities coordinators and assessors on the GFC protocols
- Supporting IT dashboarding and performed test runs for portal and on-field assessment tool/app.
- Conduct field assessments (if necessary and in accordance with the COVID situation) of wastewater treatment plants and solid waste management plants.

4: **CONCLUSIVE LEARNINGS** limitations and suggestions for improvement

- Time management
- Maintaining work life balance
- Coordination among team members for timely achievement of outputs
- Handling work pressure
- Enhancement in communication skills
- Exposure to the corporate world
- Making new connections with our colleagues.
- Engaging with people from varied areas of experience and expertise
- Attending given deadlines.

Limitations

This three-month internship includes the research project in question. The GFC project is taking place mostly in urban regions across India's various cities, so the study's time frame does not provide the significant data collection and analysis that would be needed to examine the effects of such a sizable undertaking. There is a substantial likelihood of difference in the number of ULBs applying and the reaching the final stage form among the states that have been selected as part of our study because the star rating assessment is ongoing and only the DA has been completed. The lack of baseline data makes it difficult to do a comparative analysis for certain of the indicator data, which can only be assessed as to whether or not steps have been taken on the basis of DA's documents provided by the ULB's. The majority of the study and analysis is based on observational changes for the current year, which include the modifications that have been made but cannot precisely assess the level of change.

1. BACKGROUND

Between 1971 and 2011, India's urban population increased dramatically, from 19.9 percent to 31.2 percent. Greater population centers result from accelerated urbanization and population expansion. Because of this, it is more difficult for cities to collect garbage, find sites for treatment, and dispose of it. The trajectory of trash growth will significantly affect the environment and public health, necessitating immediate action. Ineffective waste management causes clogged drains and water contamination, which result in flooding. Improper garbage management disproportionately affects the poor, who are frequently unserved or have little influence.

In India, urban local bodies (ULB) are required to perform the task of solid waste management (SWM). More authority and duties have been given to the ULBs after the 74TH Constitutional Amendment Act (CAA) was passed. The Supreme Court of India's intervention in the Municipal Solid Waste Management and Handling Rules, 2000 has highlighted the necessity of including many actors in SWM in order to ensure improved coverage and efficiency.

The government launched the Swachh Bharat Mission to focus on sanitation and to speed up efforts to attain universal sanitation coverage.

Swachh Bharat Mission 1.0

On October 2, 2014, Prime Minister Narendra Modi introduced Swachh Bharat Mission 1.0 - Urban (SBM-U), a massive initiative to create a Clean India by 2019. SBM was mostly composed of SWM, household toilets, communal toilets, public restrooms, information, education, and communication, public awareness, capacity building, and administrative and office costs. In 2016, 73 cities were the subject of the initial survey. By 2021, 4320 cities had been examined. Three factors are taken into consideration when ranking cities: service level advancement, which is a self-declaration by the city, garbage-free city (GFC) and open defecation-free certificate (ODF), and citizen validation (CV).

Swachh Bharat Mission 2.0

With the overarching goal of producing "Garbage Free Cities," SBM 2.0 was introduced on October 1, 2021 by the Hon. Prime Minister. As per the Star Rating procedure, the main goal is to make every ULB at least 3-star Garbage Free. The development of PTs/urinals, SWM (Material Recovery Facilities & Waste

Processing Plants), C&D Waste Management – only for cities with populations of 5 lakhs and above, landfill remediation for all cities, and wastewater treatment would be the key focal areas.

2. RATIONALE

As part of our internship, we initially worked on the desktop assessment (DA) of the GFC star rating, where we evaluated the ULBs who applied for the relevant stars based on the supporting documentation or evidence that they provided in the portal for their DA. We chose Chhattisgarh and Uttar Pradesh as the two states with the highest number of ULBs applying for 5 stars in order to better analyse the effects of the current GFC star rating methodology (2022). At the conclusion of the evaluation, Surprisingly, neither of the top-performing ULBs in their respective states, Ambikapur nor Noida, applied this year. In contrast, the remainder of the ULBs and those who are applying are attempting to emulate Ambikapur and Noida's success in order to receive a 5-star rating. Therefore, as part of our internship project, ULBs of two states were evaluated based on their population criteria, their performance from the previous year, and the caliber of documents and evidences they submitted for DA in order to understand how other ULBs have carried out the new protocol and where all does the gap lie for improvement.

Research question

1. How is the current desktop assessment performance scoring affecting the star ratings of urban local bodies for Chhattisgarh and Uttar Pradesh?
2. How can the ULB with lower star rating under GFC assessment improve on their star rating performance for current Desktop Assessment?

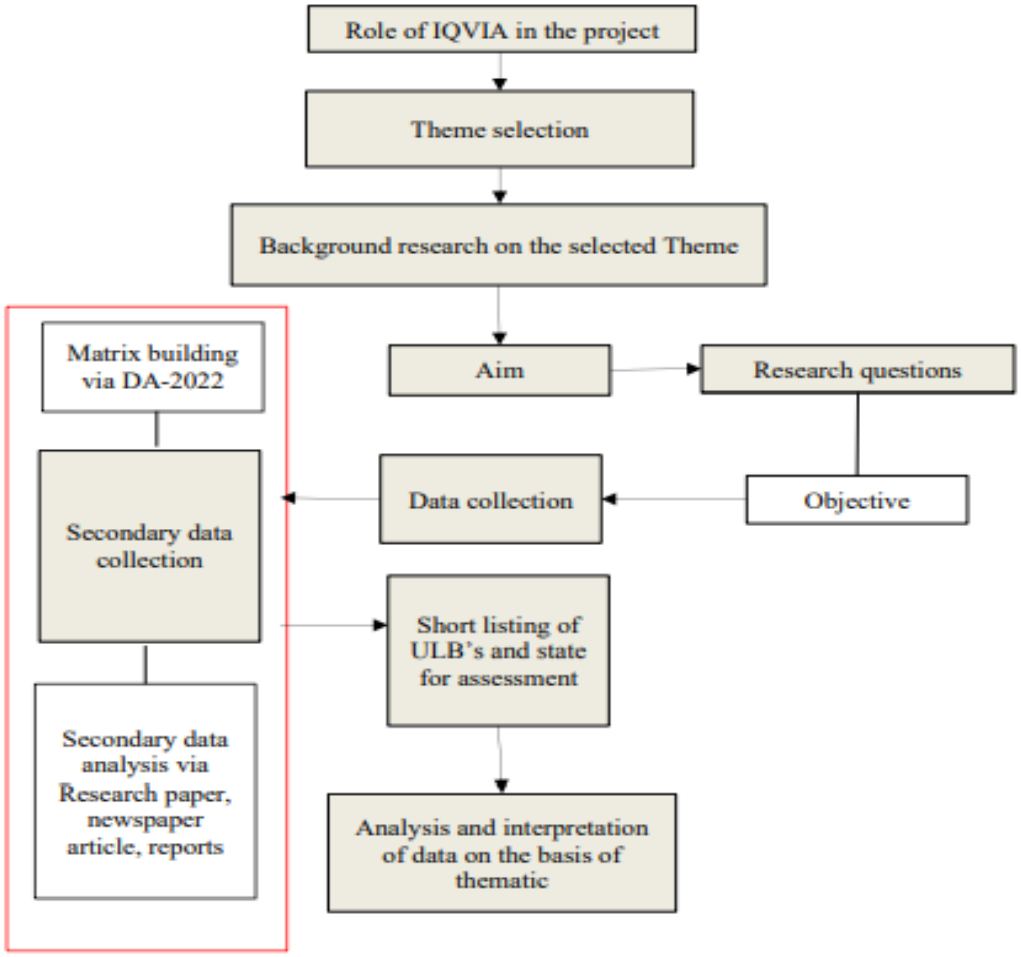
Research Objectives

1.To evaluate the performance of the urban local bodies in Chhattisgarh and UP for the garbage free city indicators
2.To identify the challenge and formulate appropriate solution for the urban local bodies in Chhattisgarh and UP in accordance to the garbage free city initiative.

3. METHODOLOGY

Learning about the Star Rating of the Garbage Free Cities Program and the function of the third-party organization, IQVIA, for carrying out the third-party assessment, was the first step in this study. To comprehend the actual operation of DA, which is the first step in the final GFC star rating procedure, numerous states and training sessions

were provided by IQVIA employees. We later selected a topic and a study area for the project after conducting extensive investigation and analysis. Data was then examined, and conclusions and findings were then presented. The full study procedure is shown in figure (1) below.



source 3: Author

Fig 1

MODE OF DATA COLLECTION

As a part of primary analysis, we did a comparative assessment based on the final performance of the ULB for these two states this year (2022) and previous year (2021). We constructed a matrix of the best performing ULB in GFC star rating this year as a portion of DA from the two states of Chhattisgarh and Uttar Pradesh. The majority of the information was acquired from secondary sources, including documentation for SBM, Swachh Sarvekshan, and the GFC Protocol as well as reports, guidelines, and self-assessment forms offered by urban local governments.

Our secondary survey, which was conducted through desktop assessment, the first step in evaluating the star rating process, included data for matrix building.

4. DATA COMPILATION AND ANALYSIS

Case study description

ULB's of two states has been chosen on the basis of population and their last year's final assessment and this year's DA performance.

Table 1: State wise status of GFC 2021

State	Total ULBs	ULB applied 2021	Applied %	DA Pass	DA Pass %	DA Fail	DA Fail %	FA Pass 2021	FA Pass %	FA Fail	FA Fail %
Andhra Pradesh	110	110	100%	109	99%	1	1%	7	6%	102	94%
Assam	96	92	96%	12	13%	80	87%	1	8%	11	92%
Bihar	144	11	8%	3	27%	8	73%	1	33%	2	67%
Chandigarh	1	1	100%	1	100%	0	0%	1	100%	0	0%
Chhattisgarh	166	166	**100%**	164	**99%**	2	**1%**	94	57%	70	43%
Delhi	5	3	60%	3	100%	0	0%	1	33%	2	67%
Gujarat	171	161	94%	135	84%	26	16%	10	7%	125	93%
Haryana	88	20	23%	7	35%	13	65%	2	29%	5	71%
Himachal	61	9	15%	1	11%	8	89%	1	100%	0	0%

Pradesh											
Jharkhand	42	40	95%	20	50%	20	50%	1	5%	19	95%
Karnataka	280	29	10%	12	41%	17	59%	3	25%	9	75%
Madhya Pradesh	384	365	95%	322	88%	43	12%	27	8%	295	92%
Maharashtra	402	379	94%	353	93%	26	7%	124	35%	229	65%
Manipur	27	1	4%	1	100%	0	0%	1	100%	0	0%
Meghalaya	10	0	0%	0	0%	0	0%	0	0%	0	0%
Mizoram	23	0	0%	0	0%	0	0%	0	0%	0	0%
Nagaland	19	2	11%	2	100%	0	0%	0	0%	2	100%
Odisha	114	78	68%	9	12%	69	88%	1	11%	8	89%
Punjab	170	164	96%	87	53%	77	47%	6	7%	81	93%
Rajasthan	199	44	22%	9	20%	35	80%	1	11%	8	89%
Tamil Nadu	666	129	19%	12	9%	117	91%	0	0%	12	100%
Telangana	141	139	99%	40	29%	99	71%	4	10%	36	90%
Tripura	20	0	0%	0	0%	0	0%	0	0%	0	0%
Uttar Pradesh	670	280	**42%**	76	**27%**	204	**73%**	10	13%	66	87%

source 6: IQVIA

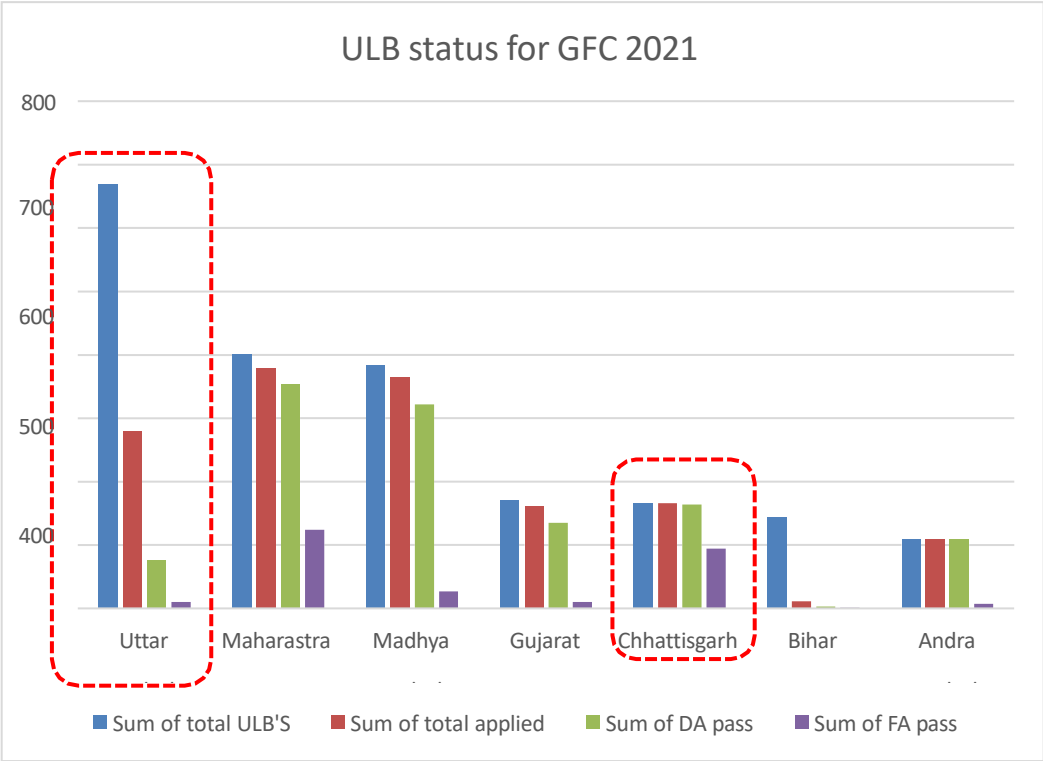


Figure 2: ULB status for GFC 2021

source 5: Desktop Accessment-2022

From the figure (2) and table (1), last year's performance for GFC star rating for the best and average execution of the ULB's amongst different states can be observed. It can be observed form table (1) that percentage of ULB's applying from Chhattisgarh is 100 percent whereas UP with highest number of ULB's had less than 50 percent of ULB's applying for GFC star rating. Not only this the percentage of ULB's clearing the final level field assessment (FA) was very low in case of UP and comparatively high for Chhattisgarh among all the states.

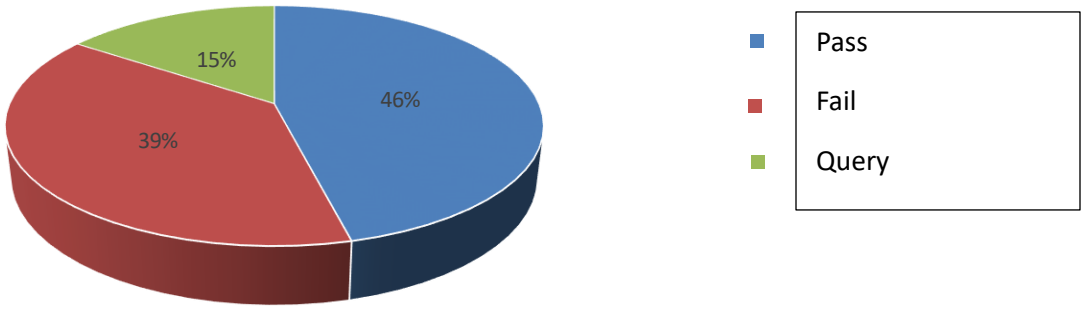
States	ULBs evaluated	Pass	Fail	Query
Uttar Pradesh	11	2	8	1
Madhya Pradesh	7	4	1	2
Maharashtra	4	2	1	1
Chhattisgarh	16	12	0	4
Tamil Nadu	4	1	3	0
Assam	3	0	3	0
Himachal	2	0	2	0
Andhra Pradesh	1	1	0	0
Jharkhand	1	1	0	0
Telangana	1	1	0	0
Uttarakhand	1	0	1	0
Haryana	1	0	1	0

Table 2: ULB's status for GFC 2022

source 7: desktop assessment-2022

In Chhattisgarh, the majority of ULBs filed for 7 stars last year, but when the results were in, they barely met the goal. In contrast, in UP, ULBs applied for a variety of star types, but again, the outcomes were varied. The number of ULB that received as part of DA is shown in table (3). Only 46% of them have successfully completed the DA, and 39% have failed it, as indicated in figure (3). Once more, it is clear that the number of ULBs in UP has been underperforming, in contrast to Chhattisgarh, where they are extremely effective, as seen in figure (5).

Figure 3: Total evaluated ULB's



source 8: outcome of ULB's assigned for DA

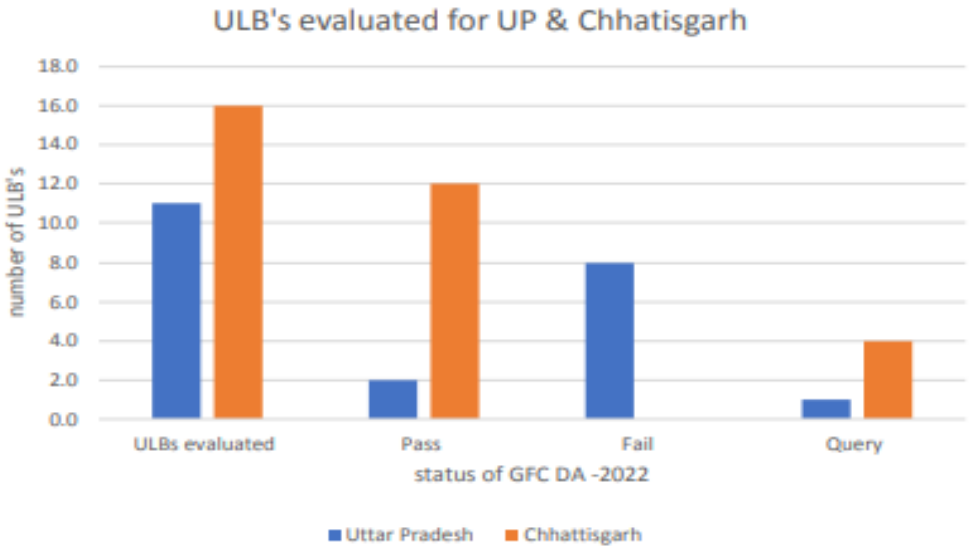


Figure 4: ULB's evaluated for UP and Chhatisgarh

State wise observation

Table 3: Generation and collection of solid waste

State	Solid waste generated (TPD), 2015	Solid waste generated (TPD), 2020	Collected (TPD), 2015	Collected (TPD), 2020	Treated (TPD)	Landfilled (TPD)
Chhattisgarh	2245.25	1650	2036.97	1650	1385	265
Uttar Pradesh	15192	14468	11394	13955	5395	0

source 9: CPCB report 2015 & 2020

The 168 ULBs in the state of Chhattisgarh are in responsible of upholding the SWM Rules, 2016. Approximately 1650 TPD of solid waste is produced in the state overall. As we can see from table (5), a total of 1650 TPD of solid waste is collected in the year 2020, of which 1385 TPD is treated. The trash

management strategy (Mission Clean City), which is currently being successfully implemented in Ambikapur, serves as the foundation for solid waste management in the state's 166 ULBs. Ambikapur sought 7 stars last year but was only able to receive 5, which the ULB opted to keep this year. As a result, Ambikapur did not request a GFC rating.

In Uttar Pradesh, 437 Nagar Panchayats, 198 Nagar Palika Parishads, and 17 Nagar Nigams are among the 652 ULBs in charge of managing solid waste. A total of 14468 TPD of solid waste is produced. A total of 13955 TPD of solid waste is collected (96.5 percent). There are 15 active MSW processing facilities with a 5395 TPD treatment capacity.

In 11801 of the 12022 wards, door-to-door collection is done. All 17 Nagar Nigam have installed vehicle tracking systems, and GPS-equipped vehicles are being used. The building of Solid Waste Management processing and disposal facilities has received land from 582 ULBs.

The State Level High Power Steering Committee has approved a comprehensive plan for a wet waste and a dry waste material recovery facility. In the state, 107871 compost pits have been constructed, while another 92077 are in the planning stages. 582 ULBs have currently designated and allocated land for the construction of Solid Waste Management processing and disposal facilities. The table (5) makes it clear that during the past five years, the amount of waste produced has somewhat decreased and the collection method for both states has improved.

Scoring methodology for GFC protocol

Source segregation, waste processing, and dumpsite rehabilitation, all received more weight this year, and the technique has been somewhat altered. The new GFC protocol has 2 types of components they are:

- Important: 1 and 3 stars: 16 components
- Aspirational: 5 and 7 stars: 24 components

Apart from this there is an addition of new components and some of them have been merged into one which we can see from the Table (6)

Table 4 (5: Components of GFC protocol 2021 & 2022

GFC protocol- 2021	
Mandatory Components	
Ward Level Parameters	Door-to-Door Collection
	Segregation at Ward Level
	Sweeping of Residential, Public & Commercial Areas
	Litter Bins
	Storage Bins
	Waste Processing- Wet Waste
	Waste Processing Capacity- Wet Waste

GFC protocol- 2022	
Important Components	
Ward Level Parameters	Door to Door Collection
	Source Segregation
	Sweeping + Litter Bins + Secondary Storage Bins
	Processing by Bulk Waste Generators
City-level Parameters	C&D Waste- Collection
	Waste Processing & Capacity- Wet Waste
	Waste Processing & Capacity- Dry Waste

	Waste Processing- Dry Waste		Dumpsite Remediation
	Waste Processing Capacity- Dry Waste		Plastic Ban
	Grievance Redressal		Grievance Redressal
Essential Components			User Charges
Ward level Parameters	Bulk Waste Generators		IEC and Capacity Building
	Penalty or Spot Fines		Scientific Landfill
City-level Parameters	Source Segregation at City level		No visible solid waste in water bodies + Screening of Storm water drains/ Nallahs
			C&D waste- Segregation (nonbulk waste generators)
	User Charges	Ward Level Parameters	Geo-mapping of waste processing facilities, C&D facilities, landfills, dumpsites, STPs/ FSTPs
	Water Bodies		C&D waste- Processing & Recycling
	Screening of drains/ Nallahs		C&D Waste- Use of Materials

Desirable Components		
Ward level Parameters	Sustainability (Applicable only for 5 Star & 7 Star)	
City Level Parameters	On-site wet waste processing	
	C&D Waste-Storage, Segregation, Processing & Recycling	
	C&D Waste- Use of Materials	
	Dumpsite Remediation	
		Sale of waste by-products
		Processing of Sanitary and Domestic Hazardous waste
		Digital Monitoring of SWM Operations (incl. City facilities)

Every ULB must achieve level 1 in each component in order to pass the DA, and if they are unable to do so even after the cool-off period, they lose their star rating for the entire star rating procedure.

Geo-mapping of cities and facilities was not previously thought of as a separate component in the GFC protocol 2021, but this year it is included as part of another component, and most ULBs aiming for the lower star, such as 1 or 3 stars, have not even been able to achieve level 1 in this component for a variety of reasons.

The additional additions, which can be seen in Table (6) in blue, include IEC and capacity building, geo-mapping of city assets, sales of trash by product, and digital monitoring of SWM operations. Once again, the ULB's have struggled due to a lack of knowledge and technology. Although passing level 1 is required, the final scoring is determined by the collective marking of the DA and FA, and the ULBs may end up scoring zero.

- **Indicator for qualitative analysis**

The matrix that is attached as an annexure was used to create the bar graphs in figure (3) for the states of Chhattisgarh and Uttar Pradesh. The goal for the majority of the ULBs this year was to at least achieve 5 or 7 stars

but due to the introduction of new components and lack of awareness has decreased their efficiency and scores. As part of desktop assessment, the ULB's submit various documents that are to be verified and assessed for level 1 with respect to the star they apply for.

These 24 components can be used to measure four indices, including service efficiency, employment and the economy, governance, and quality of life.

Table 5 (6): Categories and indicators linked with each component

Category	**Indicator**	**Impact measurement**	**Component for measuring the indicator**
Efficiency in services	Investment in SWM	Introduction of new machinery, geo tagged dustbins and garbage vehicle	Waste Processing & Capacity- Wet Waste and dry Geo-mapping of waste processing facilities, C&D facilities, landfills, dumpsites, STPs/ FSTPs Digital Monitoring of SWM Operations (incl. City facilities)
	Effective waste management	Improvement in collection, segregation and treatment or any other process involved in SWM chain	• Door to Door Collection • Source Segregation • Sweeping + Litter Bins + Secondary Storage Bins
	Maintenance of services	Training of staff, awareness programmes	IEC and Capacity Building
Employment and economy	Generation of employment	Involvement of any cluster-based facility or any NGO or SHG's engagement with the ULB's	IEC and Capacity Building

	Innovation	Introduction of any new technology or recycling of the waste product	• C&D Waste-Processing & Recycling • C&D Waste- Use of materials
Governance	Awareness	Awareness and knowledge session via various capacity building sessions and programmes	IEC and Capacity Building

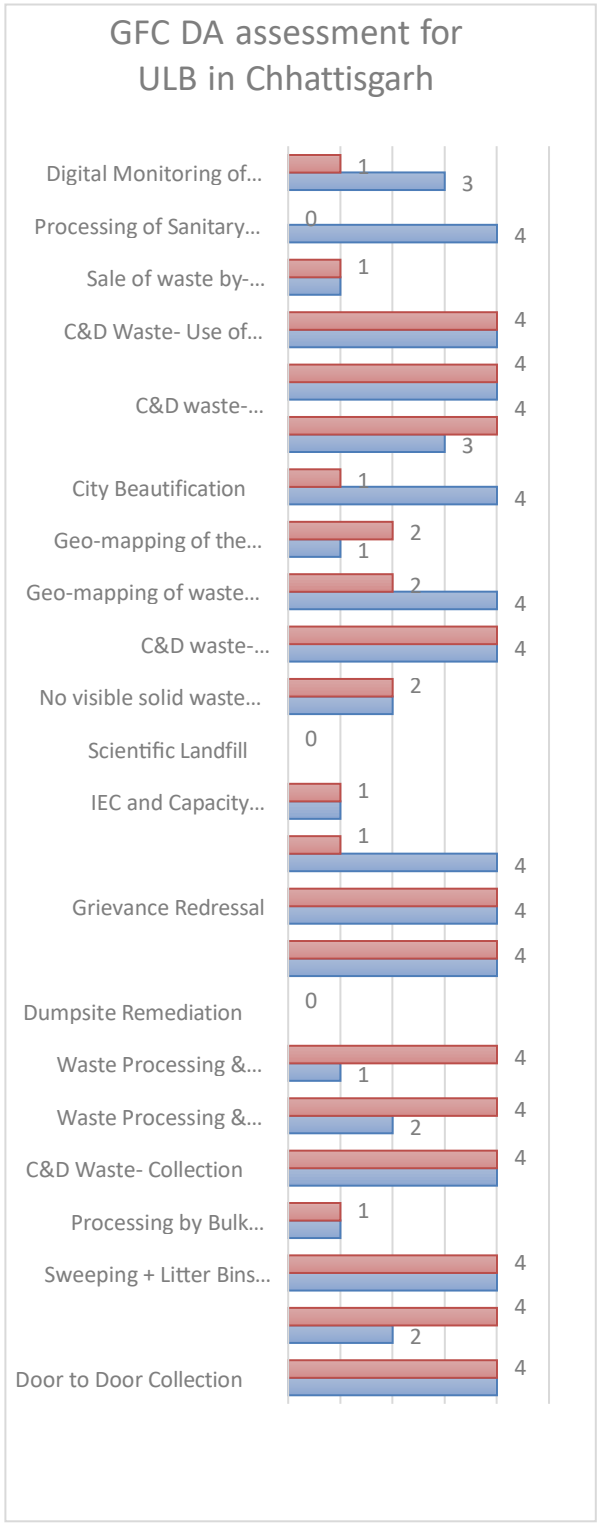
	Grievance redressal	Improvement of the knowledge of the citizen towards the Entire GFC programme	• Grievance Redressal • User Charges
	Public participation	Improving the involvement and participation of people.	• IEC and Capacity Building • City Beautification
Quality of life	Waste management	No GVP points, availability of twin bins as per the CPHEEO criteria and proper cleaning of nallah and SWD	• City Beautification • Plastic Ban • Sweeping + Litter Bins + Secondary Storage Bins • No visible solid waste in water bodies + Screening of Storm water drains/ Nallahs

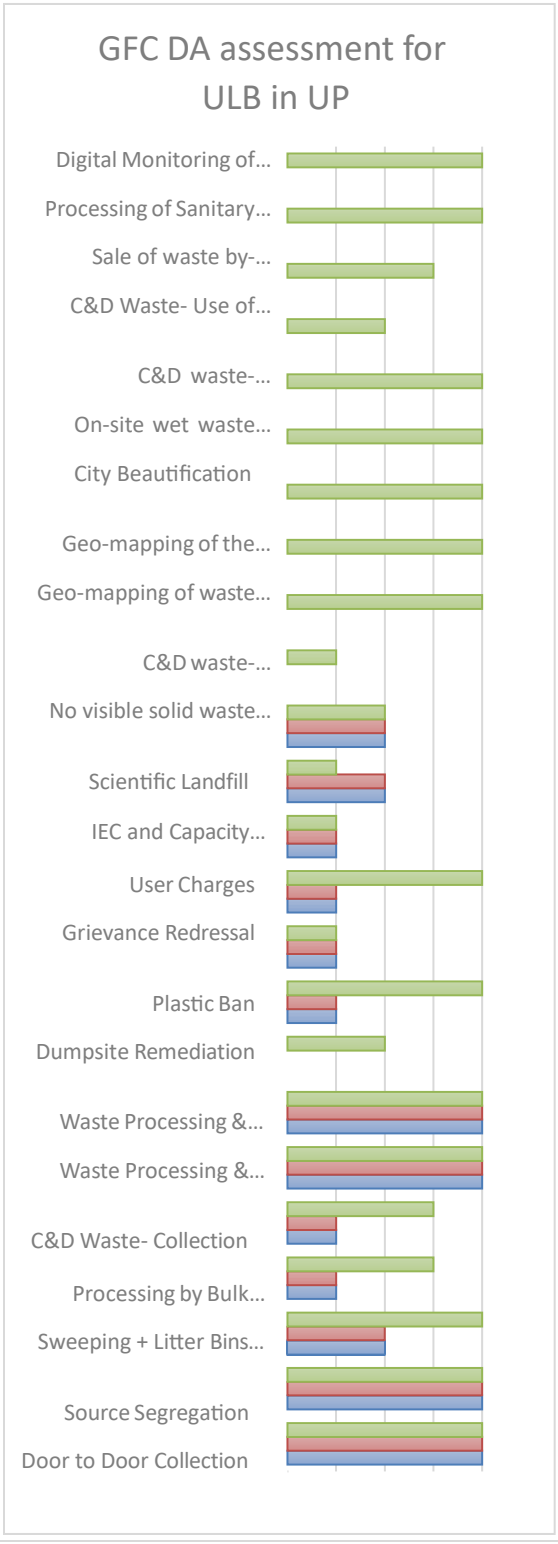
	City beautification	Presence of Green areas, banning the use of plastic and improvement of the surrounding in sustainable way.	• City Beautification

Figure (6) represents the indicator where all the ULB's has been underperforming for both the states. This bar graph shown below was developed from the matrix which is present in annexure A

Figure 4 (6) GFC DA assessment for ULB's in Chhattisgarh and UP

source 11: Desktop Assessment 24





- **Issues with the implementation**

Technical and infrastructural issues, financial, contractual and IEC issues, and capacity building issues are the four subcategories that states and ULBs face. All four are crucial to achieving SBM 2.0's goals:

Technical and infrastructural	Limited collection and treatment capacities for SWM as compared to the amount of waste being generated daily
	Lack of experienced contractors
	Lack of efficient tracing system for continuous updating of project
	Lack of specialized tools and machines for processing of different type of waste
Financial	E- payment and collection system
	Non-standard payment terms
Contractual	Developing effective PPP model
	In-built O&M contracts with contractors
IEC and Capacity building	Awareness generation on GFC components
	Comprehensive capacity building for all stakeholders

- **Suggestions for mitigation of gaps**

These requirements are specific to the gaps observed during the desktop assessment for the ULB's of Chhattisgarh and Uttar Pradesh for the components where they could not perform well due to certain reasons. Only when these ULB's manage to score more then only they can achieve the desired star when the final calculation is done. The following table (8) depicts the possible improvement the ULB's in Chhattisgarh and UP must look upon.

Table 6 (7: Improvement for specific component

S.No.	Components of GFC in which ULB's have scored less	Component type	Improvement
1	Processing by Bulk Waste Generators	ward level	Consultation with stakeholders, including RWAs and Bulk Generators, to increase awareness about waste segregation.
			Establish an incentive program/contest to encourage RWAs/Bulk Generators to undertake waste segregation. Recognize the work of RWAs/Bulk Generators who have adopted the technique.
			Guidelines to be circulated amongst the wards where ever BWG is present to ensure people follow the correct process and be aware.
			The usage of C&D waste must be done legitimately, either by processing the waste through different forms of machinery, recycling it for building bricks, pots, and so on, or using the raw C&D material in other building projects.

2	C&D Waste-Collection	city level	Copy of notification of charges for C&D Waste collection, transportation, processing and disposal should be maintained careful so that it can be provided during inspection.
			Separate collection vehicles for C&D trash should be used, and evidence for it, as well as dedicated collection points with the volume of waste collected, should be retained.
3	Dumpsite Remediation	city level	In case of ULB's in Chhattisgarh they are following the example of Ambikapur, where there is no landfill but the ULB's are unable to show 100% processing of all municipal waste due to which they are scoring less and this need to be improvised.
			In case of ULB's in UP, a proper surveyed list for all the dumpsite presents along with the details of the quantum of legacy waste has to be maintained. The description of the remediation sites should contain the current status of the remediation work as well as evidence of the percentage of work completed.

4	Plastic Ban	city level	Plastic ban can be improved by issuing a public notification and enforcing strict laws against the ban on plastic and regular inspections should be done in order to implement the complete ban and challans should be issued if someone is found to be violating the pre-defined rules.
			There must be a Swachhata portal maintained by the ULB, so that in case of any failure in the collection process the citizen can file a complaint to the authority.
5	IEC and Capacity Building	city level	Educating and training the citizen and officials like sanitary inspectors via conducting awareness campaigns regarding safe disposal of waste in public places and institutions in ways such as posters, banners, exhibitions, flash mobs, Nukkad Natak, competitions, etc. and various E-learning programs for capacity building
			Encouraging school children for 3R's
			Developing various waste management strategies which can be implemented during pandemic, epidemic or any natural disaster.
			Preparations of SOP's for implementing zero waste events.

			Conducting various staff training and engaging various citizens and government officials to understand their daily challenges and how to tackle them in a sustainable way
6	Geo-mapping of waste processing facilities, C&D facilities, landfills, dumpsites, STPs/ FSTPs	ward level	Swachhatam portal must be operational where the ULB's can easily update their digital marking of the facilities.
7	Geo-mapping of the wards i.e. ward boundaries, drains, nallahs, water bodies	ward level	Swachhatam portal must be operational where the ULB's can easily update their digital marking for the ward boundaries, drains, nallahs, water bodies. ULB official must be encouraged and made aware about the plus points of geo mapping their various facilities.
8	of waste by-products	city level	Encouraging the local or small retails by offering some incentives for the sale of waste by product.

5. RESULTS AND CONCLUSION

Twelve components were assessed during the first year of the garbage free cities (GFC) star rating, and six star ratings were given: one star, two stars, three stars, four stars, five stars, and seven stars. However, only three stars, five stars, and seven stars received certification through third-party assessment (TPA), the third party being chosen by MoHUA.

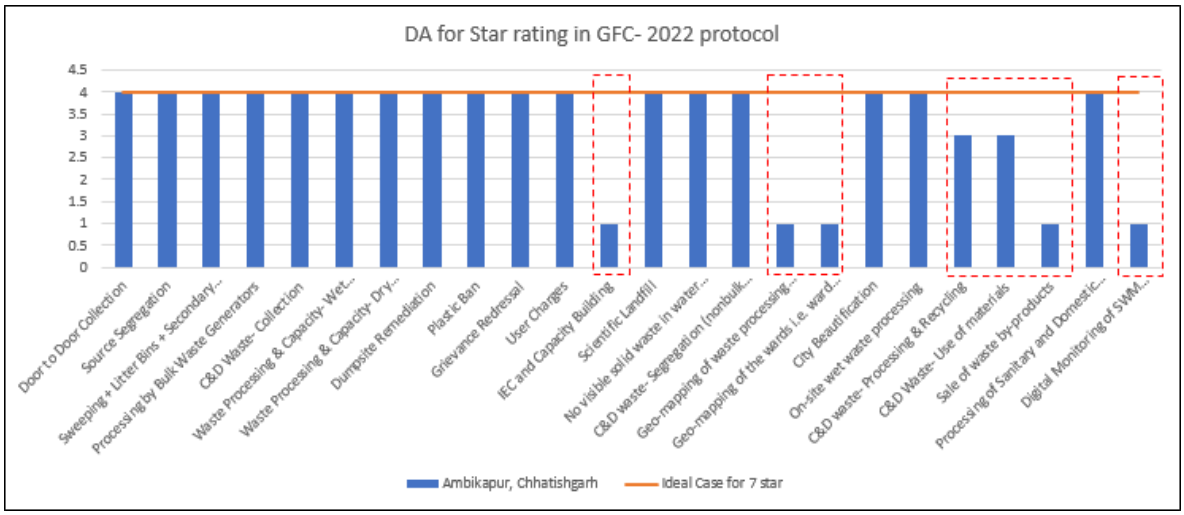
25 components were examined with three different categories—Mandatory, Essential, and Desirable—to which various weightages were allocated when the procedure was altered the following year, in 2021, resulting in a change in the number of components**.** From there on only 4 type of star rating were assigned i.e.: one star, three stars, five stars, and seven stars.

This year (2022) the protocol for star rating of garbage free cities (GFC) has been revised again and the below mentioned new components have been included to encourage cities to create an ecosystem in order to strengthen the waste management system, they are as follows:

- IEC and capacity building
- Geo mapping of city assets
- Sale of waste by product
- Digital monitoring of SWM operations

New Delhi (NDMC), Ambikapur, Patan, Indore, Surat, Navi Mumbai, Vijayvada, Mysore and Noida were the 9 ULB's out of 299, who had cleared the field assessment (FA) and had managed to achieved five-star rating.

Figure 5 (7: components with lower level



5. RECOMMENDATIONS

Our investigation has revealed a gap that can be filled by:

• The creation of sustainable business models and market linkages in combination with SBM 2.0, as well as the establishment of infrastructure for waste processing, such as WtE, WtC, and C&D facilities.

• Applying the concepts of the circular economy to waste management, with a focus on end-of-cycle methods for non-recyclables like RDF and IT-enabled monitoring systems coupled with performance-based payment systems to private partners in PPP models.

• Setting up STPs/FSTPs in urban locations with extensive sewer networks.

• State-specific regulations for the disposal of plastic trash, C&D waste, and the reuse of recovered wastewater can close the gap and provide a workable market connection, allowing the private sector to participate.

• Informing the ULBs of the weaknesses found over the full desktop assessment period so they can address them.

• The protocol shouldn't frequently change or add new elements because this makes it harder for some ULBs to maintain their successes.

• The time for reapplying has to be extended so that ULBs in progress can work toward receiving a high star rating.

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ANNEXURE

Annexure A

State		Chhattisgarh			Uttar Pradesh		
Population range		Below 50K	Between 50K to 1 Lakh		Below 50K	Between 50K to 1 Lakh	1 Lakh plus
Star applied		5	5		3	3	7
Door to Door Collection	Ward	4	4		4	4	4
Source Segregation	Ward	2	4		4	4	4
Sweeping + Litter Bins + Secondary Storage Bins	Ward	4	4		2	2	4
Processing by Bulk Waste Generators	Ward	1	1		1	1	3
C&D Waste-Collection	City	4	4		1	1	3
Waste Processing & Capacity- Wet Waste	City	2	4		4	4	4
Waste Processing & Capacity- Dry Waste	City	1	4		4	4	4
Dumpsite Remediation	City	no DS	no DS		0	0	2
Plastic Ban	City	4	4		1	1	4
Grievance Redressal	City	4	4		1	1	1
User Charges	City	4	1		1	1	4
IEC and Capacity Building	City	1	1		1	1	1
Scientific Landfill	City	no SL	no SL		2	2	1

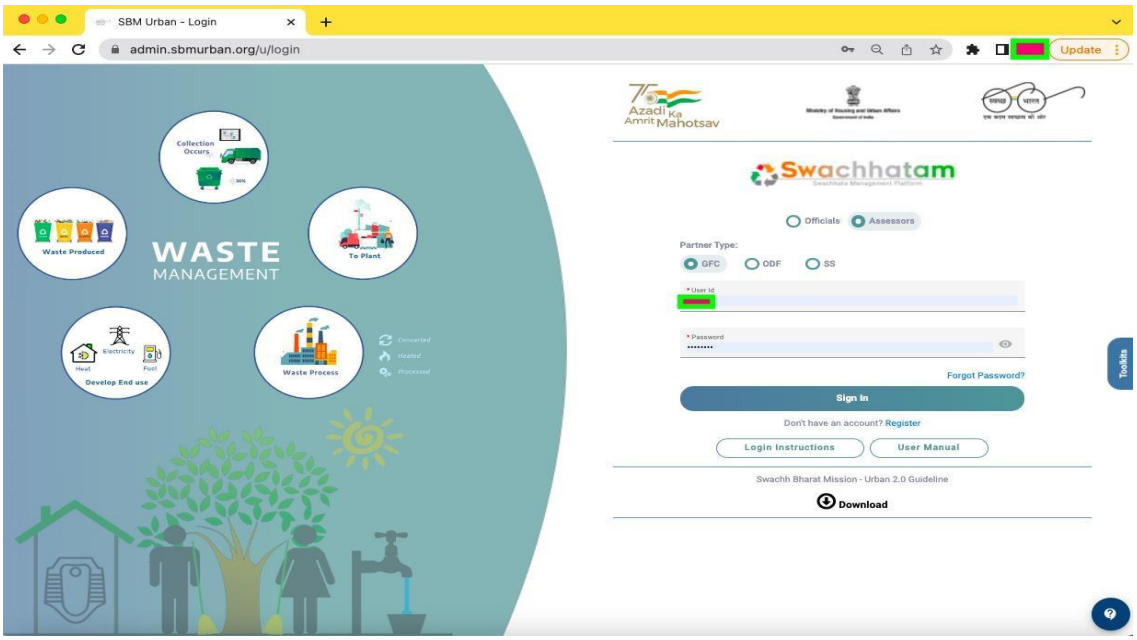
No visible solid waste in water bodies + Screening of Storm water drains/ Nallahs	City	2	2		2	2	2

C&D waste-Segregation (nonbulk waste generators)	City	4	4		0	0	1
Geo-mapping of waste processing facilities, C&D facilities, landfills, dumpsites, STPs/ FSTPs	Ward	4	2		0	0	4
Geo-mapping of the wards i.e. ward boundaries, drains, nallahs, water bodies	Ward	1	2		NA	NA	4
City Beautification	Ward	4	1		NA	NA	4
On-site wet waste processing	City	3	4		NA	NA	4
C&D waste-Processing & Recycling	City	4	4		NA	NA	4
C&D Waste-Use of materials	City	4	4		NA	NA	2
Sale of waste by-products	City	1	1		NA	NA	3
Processing of Sanitary and Domestic Hazardous waste	City	4	no plant		NA	NA	4

Digital Monitoring of SWM Operations (incl. City facilities)	City	3	1		NA	NA	4

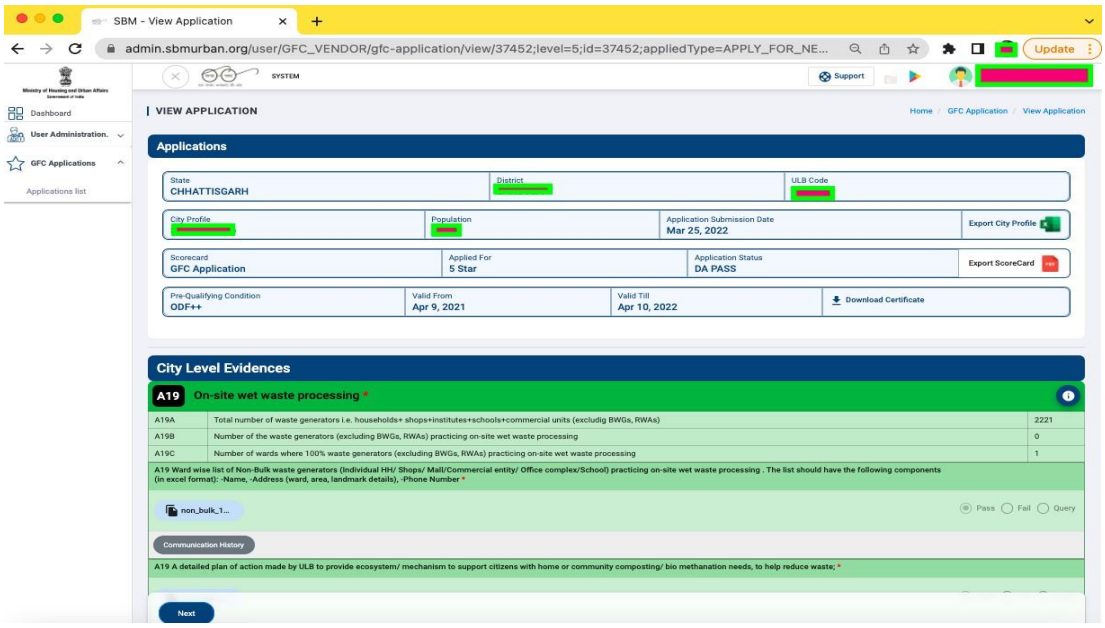
Annexure B

Example ULB application on portal

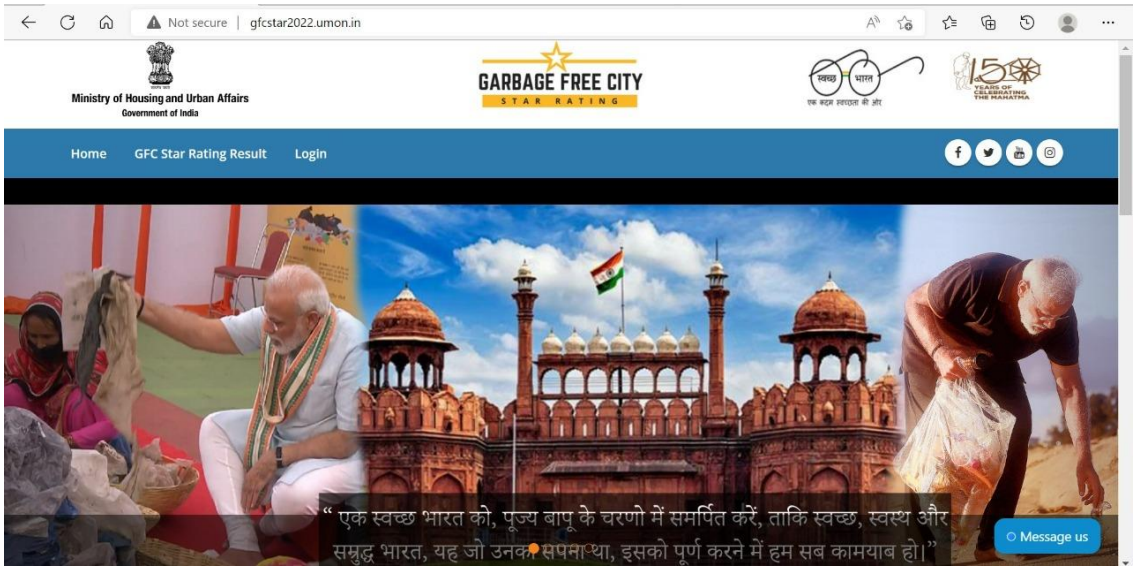


Annexure C

Spreadsheet for a ULB for scoring according to the protocol.



Annexure D - GFC QC portal



Example ULB application on GFC QC portal