

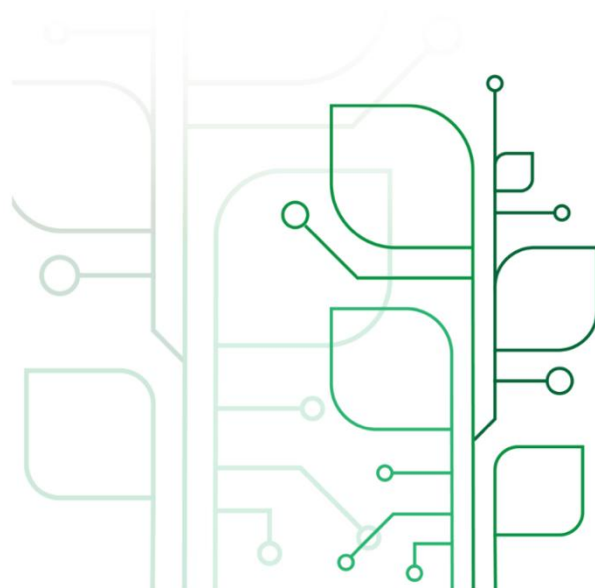


SELECTION OF AGENCY TO CONDUCT NATIONAL LEVEL STUDY ON MUNICIPAL SOLID WASTE CHARACTERISTICS IN INDIAN CITIES

EXPRESSION OF INTEREST (EOI)

Issue Date: 16-10-2026

Closing Date: 10-11-2026



National Institute of Urban Affairs

1 Floor, Core 4B India Habitat Centre
Lodhi Road, New Delhi –110003
(91-11) 24643284 24617543, 24617517, (91-11) 24617513

Letter of Invitation

New Delhi
16-10-2026

Dear Mr./Ms.:

1. The Government of India has undertaken various initiatives to promote climate-sensitive planning and development. During COP26 under the United Nations Framework Convention on Climate Change held at Glasgow in November 2021, the Honourable Prime Minister of India presented the five nectar elements (Panchamrit) of India's climate actions, which include achieving the target of net zero emissions by 2070. Moreover, there are eight National Missions under the National Action Plan on Climate Change which are focused on climate change adaptation and mitigation. One of them is the National Mission on Sustainable Habitat (NMSH) anchored at MoHUA.
2. CITIIS 2.0, the second phase of the CITIIS program, has been conceived by MoHUA in collaboration with AFD, KfW, EU, and NIUA. The program builds upon the learnings and successes of CITIIS 1.0 and is designed to supplement MoHUA's actions undertaken through ongoing national programs, while deepening the values of innovation, inclusion, and sustainability. CITIIS 2.0 has following objectives -
 - **Foster climate-sensitive planning and action** – The program will nurture climate planning and action in States and cities through evidence-driven approaches.
 - **Drive investments into urban climate action** – The program will provide financial assistance for competitively selected projects promoting circular economy with focus on integrated waste management.
 - **Build institutional mechanisms, leverage partnerships and anchor capacity building** – The program will help put into place a climate governance framework at the State and City levels as well as provide a three-tier technical assistance structure with domestic, international, and transversal experts to support capacity development for climate action in cities and States.
3. The National Institute of Urban Affairs (NIUA) (hereinafter called "Client") has been designated as the Program Management Unit (PMU) by the MoHUA for managing the CITIIS 2.0 program. The Client intends to apply a portion of the funds to eligible payments under the contract for which this Expression of Interest (EOI) is issued for selection of an Agency. The duration of the services is expected to extend up to 15 months.
4. NIUA invites proposals from reputed Technical Institutes (including but not limited to) Indian Institutes of Technology (IITs), National Institutes of Technology (NITs), Indian

Institute of Science (IISc), National Environmental Engineering Research Institute (NEERI), Indian Institute of Forest Management (IIFM), Indian Institute of Management (IIMs) etc, herein after referred “Technical Institute” having demonstrable experience in environmental studies, municipal solid waste management, filed surveys, sampling, testing, analysis and preparation of technical reports. Eligible entities can either bid as a sole bidder or form Joint Venture (JV)/ Consortium with maximum of one-member entity. The Lead member of the JV/Consortium shall mandatorily be a Technical Institute. The Lead member shall act as the Technical Partner for this assignment.

5. Section 8 companies shall be eligible to participate as Lead member/member of the JV/Consortium, provided that such companies are working under Institutes of national repute and are headed by Professors/Faculty of such Institutes, and subject to fulfilment of the prescribed technical and financial criteria.
6. If the Applicant is a JV/Consortium, the EOI shall include a Letter of Intent to execute a JV Agreement or JV/Consortium Agreement as per sample format, signed by all members together with a copy of the Agreement proposal. In the absence of this document, the other members will be considered as sub-consultants. Experiences and qualifications of sub-consultants will not be considered in the evaluation of the applications.
7. Among the submitted EOI applications, the Agencies qualifying the Eligibility Requirements will be issued RFP documents including Terms of Reference (TOR) for the assignment and be invited to submit a detailed proposal. CITIIS-PMU expects to appoint one Agency/ JV in this bidding process. In accordance with Government of India Procurement Guidelines and AFD Procurement Guidelines, Quality cum Cost Based Selection (QCBS) mode of procurement will be adopted at the RFP stage.
8. Eligibility criteria to AFD financing are specified in sub-clause 1.3 of the “Guidelines for the Procurement of the AFD-Financed Contracts in Foreign Countries” available online at www.afd.fr. Candidates are required to submit the “COVENANT OF INTEGRITY” as per the format provided as a part of their EOI.
9. The EOI shall be published on the NIUA website and e-published on CPPP. The EOI is free of cost for download. Bid Security / Earnest Money Deposit (EMD) is not required for the submission of the proposal. Performance Bank Guarantee (5% of the contract value) will be required from the selected Agency. It is not permissible to transfer this invitation to any other Agency.
10. Any queries in relation to the EOI to be sent prior to **23-10-2026 17:00 hr IST** at the e-mail ID: **citiis@niua.org** and the responses will be available online by **30-10-2026**. For details refer to <https://niua.in/tenders> page and click on “Invitation for EOI for Selection of Agency to Conduct National Level Study on Municipal Solid Waste Characteristics in Indian Cities”. The responses to the queries including corrigendum/amendment will also be provided on the same page.

The queries should necessarily be submitted in the following format:

S. No.	EOI Document Reference (Section & Page Number(s))	Content of EOI requiring clarification	Points of clarification
1.			
2.			

11. **The Consultant has to submit electronic copy as well as hardbound physical copy of the EOI as follows –**

- EOI should be uploaded as electronic copy in English language only, not later than 1700 Hrs hours on 10-11-2026, 17:00 hr IST **at the NIUA website**. For details on online submission, refer to <https://niua.in/tenders> page and click on. The Check List for submission of documents should be adhered. **Late submissions would be rejected.**
- The physical copy of EOI should also be submitted at the following address - National Institute of Urban Affairs, Core 4B, 1st Floor, India Habitat Centre, New Delhi-110003 by 10-11-2026, 17:00 hr IST. **The EOI received in physical copies shall be further evaluated.**

12. To substantiate their credentials and to respond to any queries, the Consultants may be asked to make a presentation of their EOI, during the evaluation stage.

13. The issue of the EOI does not imply that the NIUA is bound to select bid(s), and it reserves the right without assigning any reason to

- reject any or all of the bids, or
- cancel the tender process; or
- abandon the procurement process; or
- issue another bid for identical or similar work

Yours sincerely,

Director - NIUA

National Institute of Urban Affairs

Terms of Reference

A. Background

Waste Characterization & Composition Study in Geographically Diverse Indian Cities and to Understand seasonal & temporal changing trends in Solid Waste Management

Urban India is witnessing rapid population growth, urbanisation and lifestyle transition, leading to increased waste generation and changing composition and characteristics. The composition of solid waste generated in a city change dynamically across seasons, socio-economic classes, tourism influxes, market behaviour, policy interventions, etc. According to the Central Pollution Control Board (CPCB), India generated more than 170,900 tonnes of municipal solid waste per day in 2023 (CPCB, 2023), CPCB in 2024 projected that annual waste generation in India will increase to 165 million Tonnes per year by 2030. As per the 2011 Census, over 70% of India's urban population lived in Class-I cities (population above 1 million), with 52 metropolitan cities accounting for nearly 43% of the total urban population. Subsequent analysis indicates rapid urban expansion beyond municipal boundaries, with peri-urban and fringe areas growing faster than core city areas between 2000 and 2020. However, most Urban Local Bodies (ULBs) continue to rely on periodic and static waste characterisation studies that provide only short-term snapshots of waste streams and fail to capture future trends and variability.

The last National level Municipal Solid Waste Characterisation exercise was undertaken by CPCB in 2004-05, covering 59 cities (35 metro cities and 24 state capitals). Nearly two decades on, this data is significantly dated – global evidence indicates that as an economy develops and incomes rise, the organic fraction of waste declines while the dry/ recyclable fraction rises, driven by growing preference for packaged and processed food. Several higher-population cities that have since emerged were also not part of the original CPCB sample frame. There is, therefore, a clear and pressing need for a fresh, statistically robust, and geographically representative national waste characterisation exercise, generating primary field data across a much larger and more diverse set of cities than has previously been attempted, to serve as the empirical foundation for forward-looking waste planning and forecasting.

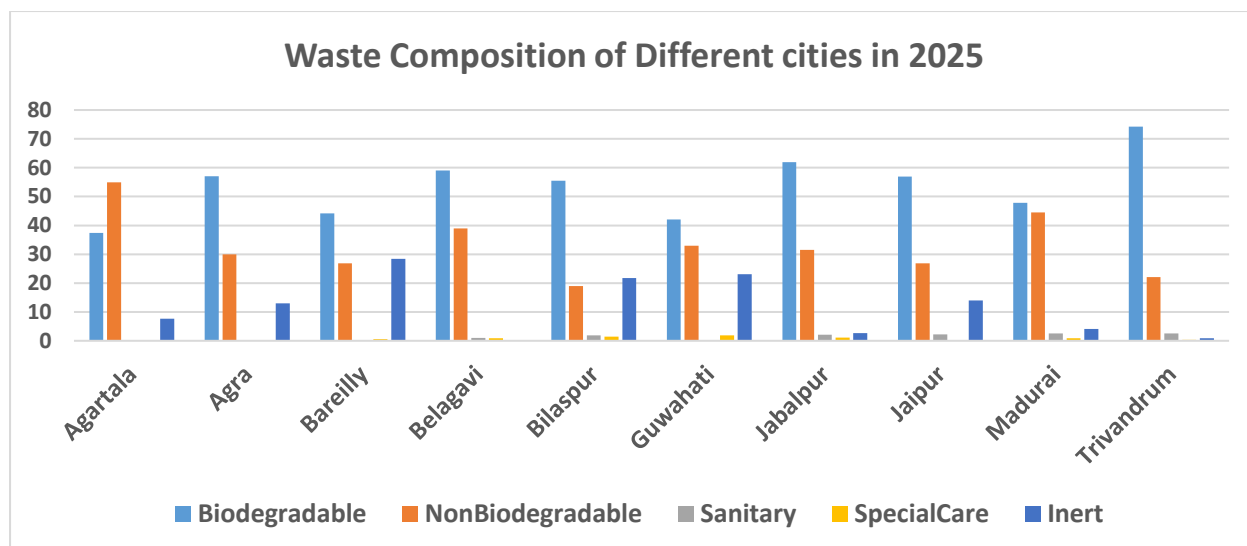


Figure 1 Waste Composition of Different cities in 2025 – Waste characterization study- CITIIS 2.0

Since waste management planning in a city is largely dependent on quantity and characteristics of waste, it is important to both measure present-day waste composition accurately and to understand and predict how it will evolve, so as to plan the handling/processing of segregated waste streams. This gap creates major challenges in planning and designing waste management infrastructure and financial needs at all functional elements of waste management. In many cities, infrastructure remains either under-designed or over-designed due to inaccurate estimates of waste quantity and composition, resulting in unsustainable operation, financial inefficiencies, poor operational performance, and increased landfill dependency. Furthermore, emerging policy interventions such as Extended Producer Responsibility (EPR), single-use plastic Ban, various waste management rules including 3Rs, decentralised waste management, and circular economy approaches are also influencing waste streams in ways that are not adequately understood or implemented by ULBs.

The Solid Waste Management Rules, 2026 and the objectives under Swachh Bharat Mission 2.0 emphasise scientific waste management, reduction of landfill disposal, with focus on resource recovery, evidence-based planning and transparent digital monitoring and reporting through centralised online platform. However, there remains a lack of contemporary, ground-truthed waste characterisation data, as well as analytical tools and decision-support systems, that can help cities forecast future waste composition and generation patterns and plan accordingly. This also constrains the ability of approximately 4,850 Urban Local Bodies (ULBs) to predict waste composition and characterisation and plan better.

Urban waste characterisation plays a critical role in enabling Urban Local Bodies (ULBs) to plan future waste management systems and infrastructure investments. While the growth in waste quantities can be estimated using existing forecasting approaches with municipal solid waste management manual (CPHEEO-2016) estimate of 1.33% annually, changes in waste composition remain an understudied yet critical planning parameter. Waste characterisation is influenced by a wide range of factors including climate, geography, demographic profile, tourism activity, nature of commercial establishments, regional consumption patterns, cultural

practices, policy interventions, and seasonality (pre-monsoon and post-monsoon variation in organic and market waste being a particularly significant driver in the Indian context). As these factors evolve over time, the composition and characteristics of municipal solid waste also change significantly.

B. Objectives of the Study

The proposed exercise combines a national-scale primary waste characterisation and composition study with a forward-looking simulation and modelling exercise, and seeks to:

- Undertake a scientifically rigorous, field-based Waste Characterisation & Composition Study across 80 geographically diverse Indian cities – spanning coastal and non-coastal regions, mega/million-plus cities, mid-sized and small towns, and tourism, industrial, religious and metropolitan typologies – following the ASTM D5231-92 standard test method (latest version), across two seasonal rounds (pre-monsoon and post-monsoon) to capture seasonal variability.
- Generate a robust, current, and nationally representative database of waste quantity, physical composition, and physico-chemical characteristics.
- Develop a hybrid System Dynamics, Machine Learning and fuzzy-logic based simulation and forecasting model to understand and project changing trends in solid waste generation and composition, incorporating demographic, socio-economic, climatic, behavioral and policy variables.
- Translate the database and model into a practical, user-friendly decision-support toolkit and guidance framework that ULBs, State agencies and national programmes can use for infrastructure planning, investment prioritisation, and policy assessment.

Where continuous time-series data remain unavailable even after the primary survey, the model will rely on cross-sectional variation across cities and periodic resurveys to approximate temporal trends, with data gaps and assumptions clearly documented for transparency. Given the limited availability of continuous historical datasets, the study will also examine the integration of fuzzy logic-based modelling approaches alongside System Dynamics and Machine Learning techniques. Fuzzy logic methods are well suited to handling uncertainty, incomplete datasets and seasonal or qualitative variations, and their inclusion in a hybrid modelling architecture is expected to improve the robustness and reliability of the forecasting framework, particularly for cities with sparse data histories.

Given the complex and interrelated nature of factors influencing waste generation and composition, a systems modelling approach is required to analyse the interactions among socio-economic, environmental, behavioural, climatic, and policy variables. Such an approach would enable cities to better understand future waste profiles and assess the implications of different development and policy scenarios.

The proposed modelling framework is particularly relevant in the context of India's evolving urban waste management landscape and the better implementation of solid waste management across the country. The Solid Waste Management Rules 2026, place increased emphasis on multi-stream waste segregation, landfill diversion, resource recovery, digital tracking of waste

flows, and scientific processing of municipal waste. Effective planning under these provisions requires reliable, current estimates of stream-wise waste fractions, as these directly influence the sizing and performance of collection systems, Material Recovery Facilities (MRFs), composting and bio-methanation facilities, RDF production systems, and sanitary landfill capacity. Static or dated assumptions regarding waste composition can result in under-sizing or over-sizing of infrastructure, leading to inefficient investments and suboptimal technology selection – underscoring the value of a fresh, field-verified national dataset.

Further, Indian cities exhibit highly diverse characteristics and waste generation patterns. The proposed study will therefore cover 80 geographically diverse cities – selected to represent this range of population sizes, climatic zones, and city typologies – and incorporate city-specific variables such as population growth, socio-economic changes, consumption patterns, tourism, climate variability, policy interventions etc., and stakeholder consultations to ensure that the modelling framework remains context-sensitive, reliable, and adaptable across different urban typologies to make our cities more “Anti-fragile”.

The study will also contribute to the objectives of Swachh Bharat Mission–Urban (SBM-U 2.0), the Circular Economy agenda, by supporting methane reduction, landfill diversion, enhanced resource recovery, and evidence-based infrastructure planning. By combining a ground-truthed national waste characterisation exercise with a forward-looking, city-specific waste composition forecasting tool, the study will support Urban Local Bodies (ULBs) in planning inclusive and equitable urban services, adopting resilient and future-ready waste management technologies, prioritising investments, ensuring regulatory compliance, and advancing the development of sustainable, resilient, and equitable cities.

Globally and nationally, several approaches are being explored to improve waste forecasting and scientific planning. Advanced simulation and modelling tools using System Dynamics, Artificial Intelligence (AI), Geographic Information Systems (GIS), and Machine Learning (ML) have been increasingly adopted in developed urban systems to estimate future waste generation and optimise infrastructure planning (Kaza, 2018). Studies by organisations such as the World Bank, United Nations Environment Programme (UNEP), and International Solid Waste Association (ISWA) highlight that predictive modelling and scenario-based planning significantly improve waste processing efficiency and reduce infrastructure investment risks (ISWA, 2015).

C. Review of Comparable Studies and Tools

A limited number of comparable initiatives have been undertaken to date. Internationally, the World Bank’s What a Waste 2.0 study and the UNEP/ISWA Global Waste Management Outlook have developed global waste generation projections and highlighted the value of scenario-based planning, though these operate largely at a global or national aggregate level rather than at the scale of individual Indian cities (Kaza, 2018; ISWA, 2015). System Dynamics, GIS and AI/ML-based simulation tools have also been piloted in several developed urban contexts to optimise waste infrastructure planning. In the Indian context, exploratory work such as the TOSCA toolkit application discussed under the Indo-German Hanseatic Dialogue has examined digital modelling approaches for Indian urban waste systems, but a field-verified, city-specific, composition-focused national dataset and forecasting tool of the

scale proposed here remain largely absent (Noennig, 2023). This concept note will further compile a more detailed inventory of such tools and institutions during the Phase 3 literature review, to clearly position the novelty of the proposed exercise and to help identify institutions or firms with relevant domain expertise, including potential Technical Partner institutes for the field characterisation exercise.

Possible solutions that can be offered to cities include:

- Generation of a current, statistically robust, field-verified waste characterisation dataset across 80 geographically diverse cities, covering two seasons (pre-monsoon and post-monsoon) to capture seasonal variability. This shall also cover waste characteristics and generation rates from different economic groups across 40 cities.
- Development of dynamic waste forecasting systems that estimate future waste quantities based on parameters related to population growth, income levels, tourism, climate variability, consumption patterns etc.
- Integration of climate-sensitive and seasonal waste trends into planning processes.
- Creation of standardised, ASTM-aligned waste characterisation databases for Indian cities, that will help in adoption of circular economy planning tools : estimating material recovery potential and landfill diversion capacity.

The study will develop a user-friendly planning toolkit and decision-support system that can be customized by individual ULBs based on their local conditions and priorities. Through this approach, cities will be better equipped to undertake proactive and adaptive planning, enhance operational efficiency, and transition from reactive waste management practices to predictive and evidence-based systems. Ultimately, the study will generate a national-level knowledge product, a current national waste characterisation database, and a practical planning guide that can be scaled and replicated across Indian cities, supporting the development of resilient, sustainable, and future-ready urban solid waste management systems.

D. Alignment with CITIIS 2.0 Programme Objectives

The proposed exercise is positioned primarily under Component 3 of the CITIIS 2.0 Programme, which supports institutional strengthening, capacity building, knowledge generation and climate-related research at the national level. As the maturation phase of Component 1 city-level investments is already underway, the study is not intended to influence the design of ongoing infrastructure projects. Instead, by generating a current, field-verified national waste characterisation database across 80 cities and a forward-looking, evidence-based decision-support tool, it is expected to strengthen the analytical capacity of ULBs and sector institutions to plan for future waste streams, consistent with Component 3's emphasis on national-level learning, tool development and dissemination.

E. Study Approach and Phases

The proposed study will be implemented through the following interconnected phases, culminating in a validated national waste characterisation database, a simulation model, a decision-support tool, and a guidance framework for Urban Local Bodies (ULBs).

Phase 1: Inception – Stakeholder Engagement, City Selection and Methodology Finalisation

The study will commence with an inception phase aimed at establishing a common understanding of the objectives, scope, expected outcomes, and implementation approach. Consultations will be conducted with key stakeholders and sector experts to identify existing challenges in waste quantification, characterisation, infrastructure planning and influencing factors.

Finalization of 80 study cities in consultation with NIUA based on geographical location, climate condition, population category, urban typology and other relevant parameters.

Preparation and presentation of the overall study methodology covering field investigation, waste characterization, sampling protocol, laboratory analysis, forecasting methodology, simulation framework and quality assurance mechanism for approval by NIUA

Given the scale and geographic spread of the exercise, the executing team will be required to partner with one or more Technical Institutes of National repute (such as IITs, NITs, IISc, NEERI, or CSIR institutes) with demonstrated experience in Solid Waste Management, to provide regional field coverage, technical oversight, and quality assurance across the study cities.

Based on stakeholder inputs and available data, the study team will present and finalise the overall field and modelling methodology with the Ministry, define pilot/first-round city requirements, identify secondary data sources, and establish the framework for subsequent field and modelling activities. Coordination with each selected city will be established through official letters of support issued by the Ministry/NIUA. The inception phase will also define the institutional arrangements, reporting mechanisms, and validation process for the study.

Phase 2: National Waste Characterization & Composition Study

The agency is expected to conduct waste characterization study at 80 Cities. Following is the scope of work.

Project Inception and Methodology Finalization: Selection of 80 cities under the study and preparation of inception report, implementation plan, field manuals and quality assurance framework.

Coordination with selected cities: Establish a coordination mechanism with the selected Urban Local Bodies (ULBs), State Governments, and other stakeholders for conducting the study and collecting secondary data on solid waste, supported by a letter of support from NIUA / MoHUA.

Collection of secondary data on solid waste: Collection and compilation of secondary information relating to municipal solid waste generation, collection, transportation, processing, disposal, existing infrastructure, demographic profile, socio-economic indicators, tourism, climatic conditions and other relevant parameters using standardized formats approved by NIUA. Compilation of datasets from ULBs, CPCB, SBM-U, Census, CITIIS, NCDO and other relevant national and state-level databases

Primary data collection and National Waste Characterization Study: Deployment and training of field team for waste estimation, physical characterization, household surveys, sample collection and laboratory analysis. Conduct of waste characterization study in accordance with ASTM D5231-92 (latest version). Determine of sampling parameters, sampling locations, sample preparation, household-level surveys, seasonal sampling and laboratory testing in accordance with approved methodology. Preparation of city wise and national characterization datasets covering physical, chemical and material composition of municipal solid waste.

Development of National Waste Characterization Database

- Standardization, validation and integration of all primary datasets..
- Development of a structured database capable of supporting future updates, comparative assessments and integration with national urban information systems.

1.1 Determination of parameter for waste Characterization

- a. The solid waste characterization method is based on the Standard Test Method for Determination of the Composition of Unprocessed Municipal Solid Waste, American Society for Testing and Materials (ASTM) standard test method (D5231- 92). As per methodology, the following parameters are to be decided prior to initiation of the Waste Characterization:
- b. Number of Vehicles to be sampled (n): It refers to the number of vehicles transporting municipal waste from which the waste sample for characterization is to be collected.
- c. Sorting sample size (kg) (s) : It is the quantum of sample extracted for further analysis, from each vehicle load, using cone and quarter method. It is to be in the range of 91-136 Kg
- d. Vehicle load Size (kg) (v): It is the quantum of waste which the aforementioned vehicles can transport in one trip. It is generally four times the size of the sorting samples i.e 2500-4000 kg for Million plus cities, 1500-3000 for 5 to 10 Lakh population cities and 500-1500 Kgs for other medium size and smaller cities.
- e. Duration of sampling (No of Days) (k): It is the number of days during which waste samples for analysis have to be collected.

The steps to be followed for determination of Sorting Sample size, number of vehicle to be sampled, Vehicle load size and no. of days for sampling in a particular Local body's jurisdiction as per ASTM D 5231-92 (latest version). Wide variation in quantum of waste generation in the country, depending upon the population, has been observed in the country. Further, sampling and analysis capacity also varies significantly with the type of the local body, being higher for large cities as compared to smaller cities. Further, higher Confidence level and lower precision level in the Assessment is required for the larger cities. Accordingly, the various parameters (n, v, s & k as per (a-d above) have to be computed using ATM D 5231-92 depending on population size of city.

1.2 Distribution of the sampling locations:

Three stage random sampling method is to be followed to ensure full coverage of the geographical area as well as to include impact of socio-economic variation of the population on the waste generation.

Stage 1: Division of the city area into five zones East, West, North, south and central zone
Stage 2: Classification of the various wards in the zone under the following five major categories based on its socio-economic attributes of the ward as given below

- High-income residential wards (HI)
- Middle-income residential wards (MI)
- Low – income residential wards (LI)
- Economically Weaker Section (EWS) residential wards/slums
- Commercial wards (CW) / Mixed commercial and residential wards (MX)
- Institutions (I)

It is to be noted that the class assignment as per aforementioned details, should be based on the predominant feature of the ward. In addition to above, one disposal point should be identified in each Zone.

The number of vehicles loads to be collected from each zone would be distributed amongst the wards, to ensure adequate representation of the socio-economic attributes of the population in the Assessment. The number of samples from each economic category and zone should be uniformly distributed throughout the assessment duration (k days).

1.3 Sample preparation:

One Sorting sample is to be selected using the Cone & Quarter method from each vehicle load following the given steps

- A location is to be selected for discharge of designated vehicle loads, manual sorting activities, and weighing operations. The location should be flat, level, and away from the normal waste handling and processing areas.
- The entire vehicle load of waste should be discharged in a designated area.
- The waste should be mixed and using the Quartering and coning, the vehicle load size (400-500 kg) and Sorting sample size (91-136 kgs).
- The entire vehicle load of all the vehicles is to be disposed on the ground and divided into four parts. Two samples positioned diagonally opposite to each other are to be selected for the next step, the other two have to be discarded. The process is to be repeated to reduce the size of the sample from 91-136 kg.

1.4 Sampling cycles for SW analysis:

- Sampling of municipal solid waste shall be carried out in phases to capture spatial and seasonal variations, as may be required for the study. The number of phases shall be pre monsoon and post monsoon, their timing, duration, and geographical coverage shall be approved by NIUA based on project requirements and initial findings.
- The selected Agency shall plan and undertake the sampling activities in accordance with the directions issued by NIUA from time to time and the approved methodology.
- NIUA reserves the right to modify, expand, or restrict the scope, timing, and coverage of sampling cycles, including introduction of additional phases or seasonal studies, without altering the overall objectives of the assignment.

1.5 Sampling size across different cities for city waste characterization

All the proposed cities and towns will be subjected to waste characterization from three different locations like primary collection points, secondary collection points and final dump sites. The total number of samples to be analyzed in each phase is indicated in the table 2 and Table 3.

Table 2: Method of sample calculation Sample size: 91-136 Kg (for each phase)

Population Range	No. of Cities	No. of Samples/city/phase	Total Samples per phase
Mega Cities	6	20	120
Million Plus Cities	12	18	216
5 to 10 Lakh	16	15	240
3 to 5 lakh	12	12	144
1 to 3 lakh	12	12	144
50 K to 1 lakh	10	12	120
Less than 50 K	12	12	144
	80		1128

1.6 Sampling across different Socio economic groups of citizens

- In selected city, sampling will be done at five economic categories of society like High income group (HIG) Middle income group (MIG), lower income group (LIG), commercial and institutional for waste composition analysis. For this purpose approximately 100 Households will be surveyed in each of the income group to gather the insights of quality of the waste being generated by different income group citizens along with generation rates. Total 3 days samples will be analyzed in each phase. Thus total samples to be analyzed are indicated in table 3

Table 3: Calculation of samples for HH categories.

- 40 cities out of 80 cities will be selected for HH level survey and sampling
- **7 cities** each from Mega, Million plus, 5 to 10 Lakh and 3 to 5 Lakh and **4 cities**

each from rest

- Survey will be done in total 400 entities in different category per city per phase:

Population Range	No. of Cities to be sampled	HIG*	MIG**	LIG***	Commercial /Mix	Institutions	Total	Grand Total @3 Days
Mega Cities	7	700	700	700	350	350	2800	8400
Million Plus Cities	7	700	700	700	350	350	2800	8400
5 to 10 Lakh	7	700	700	700	350	350	2800	8400
3 to 5 lakh	7	700	700	700	350	350	2800	8400
1 to 3 lakh	4	400	400	400	200	200	1600	4800
50 K to 1 lakh	4	400	400	400	200	200	1600	4800
Less than 50 K	4	400	400	400	200	200	1600	4800
Total	40	4000	4000	4000	2000	2000	16000	48000

* Households with an annual gross income exceeding Rs 18 lakh

** Households with an annual gross income between Rs 6 lakh and Rs 18 lakh

*** Households with an annual gross income between Rs 3 lakh and Rs 6 lakh

Total 3 samples will be analyzed per city in each category in three days (each phase: 48,000 HH will be surveyed)

Total HHs: 2 Phases – 48000X 2= **96,000**

Chemical characteristic of waste: Samples will be tested from NABL accredited labs only following standard procedure prescribed by Bureau of Indian Standards (BIS No. 10158-1982) to obtain authentic results under the Supervision of Technical Institute for the following parameters (not limited to):

1. Moisture Content (%)
2. pH
3. Loss on Ignition at 550°C

4. Carbon (%)
5. Nitrogen as N (%)
6. Phosphorus as PO₄ (%)
7. Potassium as K₂O (%)
8. C/N Ratio
9. Calorific Value (Kcal/kg)
10. Ash (%)
11. Cadmium (mg/kg)
12. Nickel (mg/kg)
13. Zinc (mg/kg)
14. Lead (mg/kg)

Table: Indicative list of components of biodegradable and non-biodegradable waste for physical characterization:

Biodegradable/Organic Waste		
S. No.	Sub-categories	
1	Kitchen/food scrap waste	
2	Green/garden waste	
3	Other Biodegradables	
Non-biodegradable waste		
S. No.	Material	Sub-Material_1
1.1		PET Bottle
1.2		LDPE - Thickness less than 60 microns
		LDPE - Thickness between 60-120
1.3		microns
		LDPE - Thickness more than 120
1.4		microns

1.5	Plastic	HDPE
1.6		Polypropylene
1.7		Polycarbonate
1.8		Polystyrene
1.9		Multi-layered Plastics
1.10		HDPE Milk Packets
1.11		Others*
2.1	Paper & Cardboard	Newspaper
2.2		White Paper
2.3		Colored Paper
2.4		Books
2.5		Magazines
2.6		Cardboard- 3 ply
2.7		Cardboard-5 ply
2.8		Duplex board
2.9		Others*
3.1	Metal	Iron
3.2		Steel
3.3		Aluminium
3.4		Zinc
3.5		Brass
3.6		Copper
3.7		Tin
3.8		Others*

4.1	Glass	Plain Glass
4.2		Colored Glass
4.3		Mirror
4.4		Glass cullet (Broken glass)
4.5		Others*
5.1	Rubber & Tyre	2 & 3-wheeler tyre
5.2		4-wheeler passenger
5.3		4-wheeler commercial
5.4		Rubber - Chappal
5.5		Rubber - Gloves
5.6		Rubber - Tubes
5.7		Rubber - Shoe Bottoms
5.8		Others*
6.1	E-waste	Batteries- Lithium Ion
6.2		Batteries- Conventional
6.3		Wires
6.4		Electrical Appliances
6.5		Cell Phones
6.6		Laptops
6.7		Others*
7.1	Textile	Rags
7.2		Clothes
7.3		Others*
8	Used Beverage Cartons	

9	Leather
10	Coconut Shell
11	Ceramic
12	Wood
13.1	Hair - Length more than 6 inch
13.2	Hair - Length less than 6 inch
14	Non-Recyclable rejects suitable for combustion (RDF)
15	Others

In addition: other categories may be added like Sanitary waste: diapers and sanitary napkins, inert: including C&D waste; fines; special care waste including domestic hazardous and HH biomedical waste etc.

Phase 3: Methodology Development and Model Formulation

Literature Review and Parameter Definition

Running in parallel with the field characterisation exercise, this phase will focus on developing the technical foundation for the modelling exercise. A comprehensive review of national and international literature, policy documents, waste forecasting methodologies, waste characterisation studies, circular economy frameworks, and simulation models will be undertaken.

The review will assess existing approaches for estimating waste generation and composition and identify key variables influencing waste generation in urban India. Based on the findings, the study will establish model parameters, assumptions, indicators, and relationships that will be used in the simulation framework. The phase will also involve compilation and analysis of secondary data from CITIIS 2.0, CPCB, SBM-U, ULBs, census records, economic datasets, tourism statistics, and climate databases, to complement the primary field dataset generated.

Development of Waste Forecasting and Simulation Framework:

- Development of an integrated waste forecasting and simulation framework using the waste characterization database and relevant secondary datasets.
- Identification of key variables influencing waste generation and composition including population growth, socio-economic conditions, tourism, urbanization, climate variability, consumption patterns, policy interventions and technological advancements.
- Development of a scientifically robust modelling framework integrating suitable analytical techniques such as System Dynamics, Machine Learning, Artificial Intelligence and Fuzzy Logic, wherever appropriate.

- Calibration and validation of the model using field datasets generated under the assignment and available historical datasets.

Scenario Analysis and Decision Support:

- Simulation of multiple waste generation and management scenarios including Business-as-Usual, enhanced source segregation, improved recycling, circular economy interventions, tourism growth, climate variability, infrastructure expansion and regulatory measures.
- Assessment of future waste quantity, waste composition, treatment requirement, landfill demand, material recovery potential and resource opportunities under different planning scenarios.

Development of the Decision Support Tool:

- Development of a user-friendly digital decision tool for application of Urban Local Bodies

Model Run, Scenario Analysis and Validation

The calibrated model will be tested under various development and policy scenarios to assess future trends in waste generation and composition. Multiple scenarios will be simulated to understand the potential impacts of demographic changes, economic growth, climate variability, circular economy interventions, and regulatory measures on urban waste systems.

Indicative scenarios may include Business-as-Usual, High Circular Economy Adoption, Enhanced Segregation and Recycling, Strict Policy Enforcement, Climate-Sensitive Waste Generation, Integrated Sustainable Waste Management etc.

Model outputs will be validated through expert consultations, stakeholder workshops, and comparison with the primary field dataset and historical data. Necessary refinements will be incorporated to improve reliability and usability. Key deliverables include the Scenario Analysis Report, Waste Generation and Composition Forecasts, Model Validation Report and Final Simulation Model.

F. Guidance Document, Capacity Building and Dissemination

The final phase will focus on translating the national waste characterisation database and modelling framework into a practical planning and decision-support tool for Urban Local Bodies. A user-friendly toolkit and guidance document will be prepared to support cities in applying the model for infrastructure planning, investment prioritisation, and policy assessment.

Capacity-building workshops and training programmes will be organised for city officials, state agencies, and technical stakeholders to facilitate adoption of the framework. The study findings, national characterisation database, forecasting tool, and guidance materials will be disseminated through national workshops and stakeholder consultations.

A national knowledge product documenting the methodology, key findings, lessons learned, and replication strategy will also be prepared and formally launched for wider use by cities

across India. Key deliverables include the ULB Decision-Support Toolkit, Guidance Document, National Knowledge Product, Capacity Building and Training Workshops, and Policy Recommendations for National Scale-up.

G. Reporting & Deliverables

The selected Agency shall submit all reports and deliverables, including Inception Report, periodic progress reports, intermediate outputs, draft final report, and final report, along with all supporting data, as may be required by NIUA. The content, format, and timelines for submission of such deliverables shall be as specified by NIUA from time to time. All deliverables shall be subject to review and approval of NIUA. The Agency shall incorporate comments and revisions as communicated by NIUA, and no deliverable shall be treated as final unless formally accepted by NIUA.

Data analysis and compilation: The team will analyze and compile all the information collected from primary and secondary sources, into a presentable form.

Submission of draft report: The team will submit a draft report to MoHUA for review and comments. The report will include present characterization study and also capture the change since the last study conducted by CPCB/NEERI.

Final submission of Report: After incorporation all inputs and addressing comments, report will be finalized for final submission to NIUA/MoHUA.

H. Institutional Ownership and Sustainability

On completion of the assignment, the modelling platform, the underlying national waste characterisation database, and knowledge products are proposed to be hosted and maintained by NIUA, in coordination with the Ministry of Housing and Urban Affairs (MoHUA), so as to enable periodic updating of parameters, onward use by ULBs and state agencies, and integration with future rounds of waste characterisation data.

The proposed study is expected to be completed over a period of approximately 14 months, to accommodate two seasonally separated rounds of field characterisation (Pre-Monsoon and Post-Monsoon) across 80 cities, in addition to the modelling and dissemination activities. The study timeline may be structured as in Table 1.

Milestones	Duration
Inception, city selection and methodology finalization	1.5 months
Waste Characterization & Composition Study – Season 1 (Pre-Monsoon) and secondary data compilation	3 months
Interim data analysis, literature review and parameter definition	1.5 months
Waste Characterization & Composition Study – Season 2 (Post-Monsoon) and data consolidation	3 months

Milestones	Duration
Modelling and simulation development (model formulation and calibration)	2.5 months
Model run, scenario analysis and validation	1.5 months
Tool development, pilot validation, final reporting, dissemination and capacity building	1 month

Table 1 Milestones and duration of each phase (indicative – exact Pre-Monsoon/Post-Monsoon field windows to be finalised in consultation with MoHUA based on regional monsoon calendars)

The study will require a multidisciplinary team comprising experts in solid waste management, environmental engineering, urban planning, data science, modelling, GIS, and policy analysis, together with a Technical Institute partner and field sampling personnel to execute the national characterisation exercise. An indicative manpower structure may include as in Table 2.

Sl. No	Team Composition	No. of Experts	No. of Man-days	Remarks
1	Team Leader / SWM Expert	1	45	
2	Environmental Expert	1	180	
3	Data Scientist / Modelling Expert	1	60	
4	Technical Institute Partner (IIT/NIT/IISc/NEERI/CSIR) – Field Technical Oversight	01	180	
5	Regional Field Coordinators	10	160 days i.e 10 positions $\times$ ((40) + (8 $\times$ 5)) = 800 (one season) = 800 $\times$ 2 = 1,600 (two sessions)	There shall be 10 coordinators (8 cities each). Each coordinator supervises 2 teams working in parallel (4 city each team): 40 days field supervision + 5 days per city for coordination, data analysis

Sl. No	Team Composition	No. of Experts	No. of Man-days	Remarks
6	Field Assessors (Junior) for sampling and sorting across 80 cities	120 junior assessors	6 Jr assessors x 20 teams x 40 days each season x 2 seasons = 9600	20 teams, each with 2 senior and 6 junior assessors. Each team covers 4 cities in 10 days per city (40 days per session)
7	Field Assessors (Senior) for sampling and sorting across 80 cities	40 (senior assessors)	2 Sr assessors x 20 teams x 40 days each season x 2 seasons = 3200	
8	NABL-accredited Laboratory Coordination	01	160	2 days per city = 160 days

The estimated manpower deployment would vary across study phases, with field personnel deployment peaking during the two seasonal characterisation rounds.

The Job Profiles of the Team are as follows:

1. Team Leader / SWM Expert (1 expert, 45 days)

Roles and responsibilities

- Overall technical and managerial responsibility for the assignment, and single point of contact with NIUA/MoHUA.
- Coordinate with ULBs and State Governments, supported by NIUA/MoHUA letters of support.
- Oversee the Technical Institute partner and ensure quality across both seasonal rounds.
- Integrate field data, the model and the decision-support tool into the final deliverables.
- Review and finalise all deliverables, including Inception Reports, progress reports, draft and final reports,
- Present at stakeholder consultations, validation workshops and the national launch.

Any other task assigned by NIUA/MoHUA within the scope of the assignment. **Experience required**

- Master's or PhD in Environmental, Civil or Public Health Engineering, or an equivalent field.
- At least 15 years in SWM planning, with 7 or more years leading (as a Team Leader / Project Director) across city at national-level waste characterisation studies.
- Led at least two waste characterisation, SWM master plan or DPR assignments for government clients, ideally covering 10 or more ULBs and waste characterisation studies conducted with ASTM methods.
- Sound knowledge of SWM Rules 2016, SBM-U 2.0, the CPHEEO MSW (2016) manuals, EPR provisions and ASTM D5231.

2. Environmental Expert (1 expert, 180 days)

Roles and responsibilities

- Prepare the field manuals, sampling SOPs and QA/QC protocols (cone-and-quarter method, sorting categories, weighing, safety), aligned with ASTM D5231 and the ToR. The SOPs shall state clearly where each method applies, for example ASTM D5231 for physical composition and cone-and-quarter for lab sub-samples.
- Design city-wise sampling plans: three-stage random sampling, five zones, ward income categories, and primary, secondary and disposal-point locations, including sample-size and statistical confidence calculations, in consultation with the Data Scientist.
- Design the household survey instruments (about 100 households per income group in the 40 survey cities), including informed-consent and data-protection protocols. Train and certify regional coordinators and field assessors, and conduct field audits during both seasonal rounds.
- Validate, clean and standardise city datasets for the national database.
- Analyse physical and chemical composition and compare with the CPCB/NEERI 2004-05 baseline.
- Contribute the technical content of the draft and final reports.

Experience required

- Master's degree in Environmental Engineering or Science, or an equivalent field.
- At least 10 years in SWM or environmental assessment, including field-based waste studies. Hands-on experience of ASTM D5231-based waste characterisation in at least 5 Indian cities.
- Experience running field teams, coordinating NABL-accredited lab testing, and applying QA/QC.
- Familiarity with household waste surveys and the physical, chemical and calorific analysis of MSW.

3. Data Scientist / Modelling Expert (1 expert, 60 days)

Roles and responsibilities

- Define model architecture, variables and assumptions: the hybrid System Dynamics, Machine Learning and Fuzzy Logic framework.
- Design the data structure of the national waste characterisation database so it supports updates and links to national urban information systems.
- Compile secondary datasets (Census, CPCB, SBM-U, CITIIS, tourism, climate, economic data).
- Handle sparse data and gaps using cross-sectional methods and fuzzy approaches and document assumptions.
- Calibrate and validate the model against verified field data.
- Run scenarios (Business As Usual, enhanced segregation, high circular economy, strict enforcement, climate-sensitive, and so on).
- Build the user-friendly decision-support tool for ULBs, along with its user manual.
- Prepare the Model Validation Report and Scenario Analysis Report. Reports shall be shared with NIUA in parallel with the lead agency

Experience required

- M.Tech or PhD in Data Science, Systems Engineering, Environmental Modelling or a related field.
- At least 8 years in simulation and forecasting, with proven work in waste, environment or urban systems.
- Demonstrated use of System Dynamics tools (Vensim, Stella, AnyLogic), Python/R for ML, and fuzzy-logic frameworks (for example MATLAB).
- Has developed at least one dashboard or decision-support tool deployed to government users.
- Published or documented modelling work on waste generation or composition forecasting is desirable.

4. Technical Institute Partner (IIT / NIT / IISc /CSIR- NEERI)

Roles and responsibilities

- Provide technical oversight and independent quality assurance of the field methodology and sampling. QA findings shall be shared with NIUA in parallel with the lead agency.
- Provide technical supervision of regional field coverage, with one or more institutes (or institute centres) assigned to clusters of cities. Regional Field Coordinators manage field operations; the Institute provides technical supervision.
- Supervise lab testing and verify the NABL-accredited lab results.

- Take part in field audits, data validation and technical review of the city datasets.
- Review the modelling approach and results and contribute to the validation workshops and reports.
- Support capacity-building for ULB officials and field staff.

Experience required

- Nationally reputed institute with a demonstrated SWM research and consultancy track record.
- A principal investigator with 15 or more years in SWM or environmental engineering, plus a research team and graduate students available for field supervision.
- Prior experience with waste characterisation studies, preferably multi-city or multi-state.
- In-house or associated NABL-accredited labs.
- Willingness to sign a formal MoU or consortium agreement with the lead agency.

6. Regional Field Coordinators (as required, for the field phase)

Roles and responsibilities

- Manage field operations for a cluster of cities (about 8 to 12 cities each).
- Handle ULB liaison: permissions, vehicle access, sorting sites and disposal-point access.
- Supervise sampling per the approved plan (vehicle selection, cone-and-quarter, sorting, weighing) and household surveys.
- Ensure sample integrity, labelling, chain of custody and timely dispatch to labs, , up to handover to the laboratory.
- Verify daily data entries, ensure no discrepancies, and report progress to the Environmental Expert.
- Enforce and ensure safety, PPE and hygiene protocols.

Experience required

- Graduate or postgraduate in Environmental Science or Engineering, or Civil Engineering.
- At least 5 years in field-based SWM or environmental survey work.
- Experience of working with ULBs, including obtaining permissions and site access.Has supervised teams on two or more waste characterisation or similar large surveys.
- Strong working knowledge of the regional language (as per assigned cities geography) including English and Hindi.

7. Field Assessors, Junior and Senior (as required, for the field phase)

Roles and responsibilities

- Carry out waste sampling, sorting into the categories as specified in the ToR, and weighing as per the ASTM method and mentioned in the ToR.
- Conduct household surveys and record generation rates.
- Record data on the digital data collection app (including as paper documents as a proof) or paper data sheets accurately and take geo-tagged photographs. Senior assessors lead sorting teams and verify data.
- Prepare composite samples for lab analysis, with proper labelling and packing.
- Follow safety and hygiene protocols.

Experience required

- **Senior assessors:** Diploma, B.Sc. or B.Tech in Environmental Science or Engineering, with 3 or more years of field experience in waste sorting or surveys. They lead sorting teams and verify data. Experience in conducting waste characterisation studies will be preferred. **Junior assessors:** Graduate or diploma holders with 1 or more years of experience, in field surveys or SWM. Experience in conducting waste characterisation studies will be preferred. Medically fit for field work involving handling of the Solid Waste and willingness to work in the field for the whole phase.

8. NABL-Accredited Laboratory Coordination

Roles and responsibilities

- Identify and empanel NABL-accredited labs covering the regions, with the Technical Institute partner.
- Coordinate sample logistics, holding times and preservation, and chain of custody, from handover by the Regional Field Coordinators.
- Ensure testing follows BIS 10158-1982 for the 14 listed parameters (moisture, pH, LOI, C, N, P, K, C/N, calorific value, ash, Cd, Ni, Zn, Pb).
- Review lab reports for completeness, accreditation scope and outliers, and arrange re-testing where needed.
- Deliver validated lab datasets to the database team within the timelines.
- The Coordinator is responsible for sample logistics and completeness of lab reports; technical verification of results rests with the Technical Institute partner.

Experience required

- M.Sc. in Chemistry or Environmental Science, or B.Tech/M.Tech in Environmental Engineering.
- At least 5 years in environmental lab management or lab QA/QC.

- Working knowledge of ISO/IEC 17025, NABL scope verification and solid waste testing methods.
- Has coordinated multi-lab sample testing for large studies.

I. Duration of consulting services

It is envisaged that the duration of consulting services will be for a period of upto 15 months.

Technical Proposal

Eligibility Requirements

- i. The Bidder shall be reputed Technical Institutes (including but not limited to) Indian Institutes of Technology (IITs), National Institutes of Technology (NITs), Indian Institute of Science (IISc), National Environmental Engineering Research Institute (NEERI), Indian Institute of Forest Management (IIFM), Indian Institute of Management (IIMs) etc, herein after referred “Technical Institute” having demonstrable experience in environmental studies, municipal solid waste management, filed surveys, sampling, testing, analysis and preparation of technical reports. Eligible entities can either bid as a sole bidder or form Joint Venture (JV)/ Consortium with maximum of two (2) member entities. The Lead member of the JV/Consortium shall mandatorily be a Technical Institute. The Lead member shall act as the Technical Partner for this assignment.
- ii. Section 8 companies shall be eligible to participate as Lead member/member of the JV/Consortium, provided that such companies are working under Institutes of national repute and are headed by Professors/Faculty of such Institutes, and subject to fulfilment of the prescribed technical and financial criteria.
- iii. The Lead Member may form a JV/Consortium with one (1) institute/firm/agency/environment laboratory possessing demonstrable experience in the survey & assessment/environment monitoring/Solid Waste Management sector. Such experience shall include, but not limited to, execution of assignments as Technical Support Unit (TSU), Project Management Unit (PMU), Independent Engineer (IE), Project Development and Management Consultant (PDMC), baseline surveys, large-scale surveys and assessments, socio-economic certification engagements, and/or socio-economic impact assessment studies.
- iv. All members of the JV/Consortium shall be jointly and severally liable for the performance of the contract, in accordance with the terms and conditions of the contract. The JV/Consortium can hire subcontractors for sampling and analysis and providing the manpower for sample collection, but they have to be necessarily trained and acclimatized by the Lead Member as per the sampling methodology.
- v. The Bidder shall meet following eligibility requirements to qualify for further procurement process:

S. No.	Eligibility Criteria	Supporting Evidence
1	The term Bidder used herein would apply to both a single entity and JV/Consortium. A Bidder may be a body incorporate including but not limited to a company incorporated	Certificate of Incorporation or copy of the partnership deed/instrument of

	under the Companies Act, 1956/2013 or under the applicable laws of the jurisdiction of its origin or a society registered under the Societies Registration Act, 1860 or any other applicable governing law or a trust registered under the Indian Trust Act, 1882 or any other governing law for public trusts or a partnership, limited liability partnership under the relevant applicable governing law or any combination of them with formal intent to enter into a Joint Bidding Agreement or under an existing agreement to form an Joint Venture/Consortium.	partnerships or a copy of LLP agreement and any other supporting document, with name change, if any. Letter of Intent to form JV/Consortium. The Lead Member will have minimum 51% share in the JV/Consortium.
2	The Agency/Company should be registered with Income Tax Authorities and GST Network.	Copy of PAN and GST Certificate. For both members in case of JV/Consortium.
3	On the last date of submission of the Proposal, the Consultant should not be blacklisted by Central Government/State Governments/Union Territories/PSUs in India for unsatisfactory past performance, corrupt, fraudulent or any other unethical business practices. The form for self – certified undertaking is attached in Tech Forms. To be submitted by each member of the JV/Consortium.	Affidavit as per Form TECH - 2.
4	Minimum average annual turnover for the last three financial years (FY 2022-23, FY 2023-24 & FY 2024-25) should be at least INR 4.2 crore. In case of JV/Consortium combined turnover of each member will be considered.	As per Form TECH – 6. In case of JV/Consortium combined turnover for both members shall be considered. Separate certificate of each member of JV/Consortium.
5	The Bidder should have a positive net-worth and net profit during any two of the last three financial years (FY 2022-23, FY 2023-24 & FY 2024-25).	As per Form TECH – 6 The net worth of only the bidding entity will be considered. Net worth of any parent, subsidiary,

		associated or other related entity will not be considered. Separate certificate of each member of JV/Consortium.
6	Experience of having successfully completed relevant assignments during last 10 years, ending last day of the month previous to the one in which applications were invited. The assignments should be either of the following: - Three similar assignments of value $\geq$ INR 3.5 crore - Two similar assignments of value $\geq$ INR 4.2 crore - One similar assignment of value $\geq$ INR 5.6 crore Relevant assignments here refer to: Studies involving field surveys, sampling, testing & analysis and compilation of findings and report development in one or more of the following sectors: - Sanitation - Solid Waste Management - Used Water Management or air pollution control - Climate Change - Forestry - Other areas of Urban Environment	• Copy of work order/contract agreement AND contract completion certificate on letterhead of the client. • In case the bidder has not received completion certificate from the client despite successfully delivering the deliverables, then a self-certificate supported by other client documents such as CA certified payment receipts etc can be submitted along with work order/ contract agreement. • In case the experience is shown for a project which was executed as a joint venture/consortium, the value of JV/Consortium must be shared with proofs. For evaluation purpose, the effective

		value of the assignments shall be calculated by multiplying total value of the assignment with the corresponding JV share of the bidder.
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The eligibility criteria's set out above can be wholly or individually sufficed by the JV/Consortium members.

The Agency is requested to submit the check list for above mentioned eligibility criteria in tabular form alongwith detailed description and supporting documents.

Check List for Submission of the EOI

The Consultant has to ensure that the physical copy of proposal is page numbered. After scanning the page numbered physical copy, the soft copy of the Technical Proposal is uploaded on the NIUA Website.

The physical copy of the Technical Proposal is properly bound and submitted to the NIUA Office as per Letter of Invitation.

The envelope should clearly mention details of the contact person with mobile number and e-mail ID and written Technical Proposal for ‘Selection of Agency to Conduct National Level Study on Municipal Solid Waste Characteristics in Indian Cities’

Following checklist should be adhered with submission of EOI -

S. No.	Description	Page Number	Tech Forms
1	Technical Proposal Submission Form along with Power of Attorney and Covenant of Integrity on the letterhead and signed on each page – as for given formats (by each member in case of JV/Consortium)		Tech Form 1
2	Declaration Regarding Blacklisting/ Non-Blacklisting From Taking Part in Govt. Tender (by each member in case of JV/Consortium)		Tech Form 2
3	Bidder Information Form		Tech Form 3
4	Information for JV Bidders (if applicable)		Tech Form 4
5	Sample Format for Joint Bidding Agreement		Tech Form 5
6	Work Experience		Tech Form 6

7	Average Annual Turnover – Turnover Figure for previous 3 years (FY 2022-23, FY 2023-24, FY 2024-25).		Tech Form 7
8	Certificate of net worth (The Consultant should have positive Net Worth during previous 3 years)		Tech Form 8

Tech Form 1 -Technical Proposal Submission Form

(on the letter head of the company specifying his name and address)

Location _____

Date _____

To:

The Director,

National Institute of Urban Affairs

Core 4B, 01st Floor, India Habitat Centre

Lodhi Road, New Delhi – 110003

Subject: Selection of Agency to Conduct National Level Study on Municipal Solid Waste Characteristics in Indian Cities

Dear Sir,

I, the undersigned, offer to provide the Services for Selection of Agency to Conduct National Level Study on Municipal Solid Waste Characteristics in Indian Cities in accordance with your EOI dated [XXXX] and our Proposal. I am hereby submitting my Technical Proposal.

I, hereby, declare that:

- a) All the information and statements made in this Proposal are true and I accept that any misrepresentation contained in this Proposal may lead to the rejection of my Proposal by the Client;
- b) My Proposal shall be valid and remain binding upon us for the period of 90 days;
- c) My Proposal is binding upon us and subject to any modifications resulting from the Contract negotiations.

I acknowledge and agree that the Client reserves the right to annul the selection process and reject all Proposals at any time prior to Contract award, without thereby incurring any liability to me.

Enclosed -

- i. Power of Attorney
- ii. Covenant of Integrity on the letter head of the company and signed with stamp on each page. In case of JV, all the members should sign.

I remain,

Yours sincerely,

Name of the Consultant: _____

Signature of the Consultant: _____

Address: _____

Sample Format of Power of Attorney (POA)

Know all men by these presents, we, ... (name of Firm and address of the registered office) do hereby constitute, nominate, appoint and authorise Mr / Ms..... son/daughter/wife of and presently residing at, who is presently employed with us and holding the position of as our true and lawful attorney (hereinafter referred to as the “authorized Representative”) to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our Proposal fo XXXXXX, proposed to be developed by the (the “Client”) including but not limited to signing and submission of all applications, proposals and other documents and writings, participating in pre-bid and other conferences and providing information/ responses to the Client, representing us in all matters before the Client, signing and execution of all contracts and undertakings consequent to acceptance of our proposal and generally dealing with the Client in all matters in connection with or relating to or arising out of our Proposal for the said Project and/or upon award thereof to us till the entering into of the Agreement with the Client.

AND, we do hereby agree to ratify and confirm all acts, deeds and things lawfully done or caused to be done by our said authorized Representative pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said authorized Representative in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE, ... THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS DAY OF, 20.....

For

(Signature, name, designation and address)

Witnesses:

1.

2.

Notarised

Accepted

.....

(Signature, name, designation and address of the Attorney)

Notes:

- The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure. The Power of Attorney should be executed on a non-judicial stamp paper of Rs. 100 (hundred) and duly notarised by a notary public.
- Wherever required, the Bidder should submit for verification the extract of the charter documents and other documents such as a resolution/power of attorney in favor of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder.
- For a Power of Attorney executed and issued overseas, the document will also have to be legalized by the Indian Embassy and notarised in the jurisdiction where the Power of Attorney is being issued. However, Bidders from countries that have signed the Hague Legislation Convention 1961 need not get their Power of Attorney legalized by the Indian Embassy if it carries a conforming Apostille certificate.

COVENANT OF INTEGRITY

I [Name], in my function as [function/position held] in [name of the company] and duly authorized representative for the signature of the contract to be signed for [title of the call for tender or the contract] hereby declare that we observe the highest standards of ethics during the procurement and, if we are successful in our tender, during the performance of the contract. We have not engaged nor will engage in, or have been convicted or sanctioned by any authority of, any fraud, corruption, collusion, coercion, obstruction, money laundering, financing of terrorism or other malpractice (hereafter referred to as “Prohibited Conduct”)¹. Where convictions occurred, details of the conviction and remedial measures are provided. If such events should occur in the future, including if any instance of Prohibited Conduct shall come to our attention, we hereby undertake to so inform [Promoter and AFD/EIB/KfW (whoever is MRI Lead Financier)] immediately.

Moreover, neither our company² nor any entity member of the joint venture or of the consortium or any one acting on our behalf, such as sub-contractors, is the subject of a current exclusion /has been the subject of any debarment, exclusion or other sanctioning decision by any of the Participating MRI Partners (AFD, EIB and/or KfW), EU institutions and/or any major Multi-lateral Development Bank (including World Bank Group, African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development or Inter-American Development Bank) on the grounds of Prohibited Conduct and we further undertake to immediately inform [Promoter and AFD/EIB/KfW (whoever is MRI Lead Financier)] if this situation was to occur at a later stage. Where such a decision of exclusion has occurred, we commit to provide all necessary information and any remedial measures that have already been taken.

I also declare that neither our company nor any entity member of the joint venture or of the consortium is currently included /has been included on the list of financial sanctions (including in particular the fight against financing of terrorism) adopted by the United Nations, the EU financial or any national sanction³ list which is binding for any of the MRI Partners and we further undertake to immediately inform [Promoter and AFD] if this situation were to occur at a later stage.

We acknowledge that in the event our company or any entity member of the joint venture or of the consortium (i) is, after this Covenant of Integrity or the contract have been signed, added to any financial sanctions list enumerated above or (ii) is, before the contract has been signed, subject to any debarment, exclusion or otherwise sanctioning decision enumerated above or

¹ For KfW, please see “Guidelines for the Procurement of Consulting Services, Works, Plant, Goods and Non-Consulting Services in Financial Cooperation with Partner Countries” and FATF Recommendations ;
For AFD, please see “AFD Group’s policy to prevent and combat corruption, fraud, anti-competitive practices, money laundering and terrorist financing” and Guidelines for the procurement of AFD financed contracts in foreign countries”.

² For the purposes of these provisions “company” or “entity” shall include directors, employees, agents.

³ i.e. French sanction list for AFD, German sanction list for KfW.

(iii) made a false statement in the Covenant of Integrity, the contract may not be eligible for funding by one or more of the Participating MRI Partners (AFD, KfW). We commit not to procure goods and services from countries which are under an embargo which is binding upon AFD and KfW.

We also acknowledge that, in any of the afore-mentioned events, [Promoter] is entitled to exclude our company/the consortium from the procurement procedure and, if the contract is awarded to our company/the consortium, we undertake to take all necessary remedial actions in a manner satisfactory to [Promoter]. Such events may lead to termination of the contract, in accordance with the terms of the contract.

We declare that we have paid, or will pay, the following commissions, gratuities, or fees with respect to the Tendering process or execution of the Contract:⁴

Name of Recipient	Address	Reason	Amount
.....			
.....			

We grant the Participating MRI Partners and auditors appointed by either of them, as well as any authority or European Union institution or body having competence under European Union law, the right to inspect and copy our books and records and those of all our sub-contractors, under the contract, as well as joint venture/consortium partners. We accept to preserve these books and records generally in accordance with applicable law but in any case, for at least six years from the date of tender submission and, in the event, we are awarded the contract, at least six years from the date of substantial performance of the contract.

I declare that our company / consortium undertakes to comply with labour laws and national and international standards of environmental protection, health and safety applicable in the jurisdiction / country of implementation of the Project, including those contained in any relevant International Labour Organization (ILO) conventions and international agreements on

⁴ If none has been paid or is to be paid, indicate "none".

environmental protection, as well as with mitigation measures of the Environmental and Social Management Plan if applicable.

.....

(Place)

(Date)

(Signature)

Tech Form 2 - Declaration Regarding Blacklisting/ Non-Blacklisting From Taking Part in Govt. Tender

(To be executed on Rs.20/- Stamp paper & attested by Public Notary/Executive Magistrate by the bidder)

I / We Proprietor/ Partner(s)/ Director(s) of M/s ----- hereby declare that the firm/company namely M/s----- -----has not been blacklisted or debarred in the past by any other Government organization from taking part in Government tenders.

Or

I / We Proprietor/ Partner(s)/ Director(s) of M/s ----- hereby declare that the firm/company namely M/s----- -----was blacklisted or debarred by any other Government Department from taking part in Government tenders for a period of ----- years w.e.f.----- ----- . The period is over on -----and now the firm/company is entitled to take part in Government tenders.

In case the above information found false I/We are fully aware that the tender/ contract will be rejected/cancelled.

Dated this Day of, 2026....

Yours sincerely,

Name of the Consultant: _____

Signature of the Consultant: _____

Address:

Tech Form 3 - Bidder Information Form

a	Name of Bidder with full address		
b	Tel. No.		
c	Fax No.		
d	Email		
e	Year of Incorporation.		Proof of registration of the Bidder to be submitted
f	Name and address of the person holding the Power of Attorney.		
g	(i) Place of Business.		
	(ii) Date of Registration.		
h	Name of Bankers with full address.		
i	Regional presence (Direct office)		The location details to be provided
j	GST Registration Number		Copy to be submitted.

k	Are you presently debarred / Blacklisted by any Central/ State Government Department / Union Territory (If Yes, please furnished details)		
l	Name and details (Tel / Mobile / Email) of contact persons		

Tech Form 4 - Information for JV Bidders

(to be completed for each member of Joint Venture)

The information should be provided for all the Members of the {Consortium/Joint Venture}

- (a) Name: -
- (b) Address of the corporate headquarters and its branch office(s), if any, in India:
- (c) Date of incorporation and/ or commencement of business:
- 2. Brief description of the Bidder including details of its main lines of Business and proposed role and responsibilities in this Project:
- 3. Details of individual(s) who will serve as the point of contact/ communication for the Authority:
 - (d) Name:
 - (e) Designation:
 - (f) Company:
 - (g) Address:
 - (h) Telephone Number:
 - (i) E-Mail Address:
- 4. Particulars of the Authorised Signatory of the Bidder:
 - (j) Name:
 - (k) Designation:
 - (l) Address:
 - (m) Phone Number:
- 5. In case of a {Consortium/ Joint Venture}:
 - (a) A copy of the Jt. Bidding Agreement, as envisaged in Tech Form 5 should be attached to the Application.
 - (c) Information regarding the role of each Member should be provided as per table below:

Sl.	Name of Member	Role*	Share holding of members in Consortium /Joint Venture
1.			
2.			
3.			

* The role of each member, as may be determined by the Bidder, should be indicated.

Tech Form 5

Sample Format for Joint Bidding Agreement for Joint Venture/ Consortium

(The Consutant may modify same as per their specific requirements)

(To be executed on Rs.100 Stamp paper of value)

THIS JOINT BIDDING AGREEMENT is entered into on this the *(date in words)* day of *(month in words)* [year in “yyyy” format]

AMONGST

1. [Company Name] a company incorporated under the Indian Companies Act, 2013 / Companies Act, 1956 and having its registered office at [Address] (Hereinafter referred to as the “**First Party**” which expression shall, unless repugnant to the context include its successors and permitted assigns)

AND

2. [Company Name] a partnership firm, having its registered office at [Address] (Hereinafter referred to as the “**Second Party**” which expression shall, unless repugnant to the context include its successors and permitted assigns)

AND

3. [Company Name] a partnership firm, having its registered office at [Address] (Hereinafter referred to as the “**Third Party**” which expression shall, unless repugnant to the context include its successors and permitted assigns)

The above mentioned parties of the FIRST, {SECOND and THIRD} PART are collectively referred to as the “**Parties**” and each is individually referred to as a “**Party**”

WHEREAS,

- (A) The National Institute of Urban Affairs (NIUA), 1st Floor, Core 4B, India Habitat Centre Lodhi Road, New Delhi (hereinafter referred to as the “**Client**” which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) has invited proposals (the Applications) by its Request for Proposal No. dated (the “**RFP**”) for (**Title of the Consultancy/Project**).
- (B) The Parties are interested in jointly Bidding for the Consultancy as members of a {Consortium/Joint Venture} and in accordance with the terms and conditions of the RFP document and other Bid documents in respect of the Consultancy, and
- (C) It is a necessary condition under the RFP document that the members of the {Consortium/Joint Venture} shall enter into a Joint Bidding Agreement and furnish a copy thereof with the Application.

NOW IT IS HEREBY AGREED as follows:

1. Definitions and Interpretations

In this Agreement, the capitalized terms shall, unless the context otherwise requires, have the meaning ascribed thereto under the RFP.

2. {Consortium/Joint Venture}

- 2.1 The Parties do hereby irrevocably constitute a Consortium/Joint Venture (the “{Consortium/Joint Venture}”) for the purposes of jointly participating in the Bidding Process for the Consultancy.
- 2.2 The Parties hereby undertake to participate in the Bidding Process only through this {Consortium/Joint Venture} and not individually and/ or through any other {Consortium/Joint Venture} constituted for this Consultancy, either directly or indirectly or through any of their Affiliates.

3. Covenants

The Parties hereby undertake that in the event the {Consortium/Joint Venture} is declared the Selected Bidder and awarded the Consultancy, it shall enter into Contract for consultancy services (“Contract”) with the Client for performing all its obligations as the Consultancy in terms of the Contract for the Consultancy.

4. Role of the Parties

The Parties hereby undertake to perform the roles and responsibilities as described below:

- a) The First Party [Company Name] shall be the Members in Charge/ Lead Member of the Consortium/Joint Venture until the Effective Date under the Contract;
- b) The Second Party [Company Name] shall be the consortium/ associate partner and shall have the power of attorney from all Parties for conducting behalf of the Consortium during the selection process for the Consultancy.
- c) The Third Party [Company Name] shall be the consortium/ associate partner and shall have the power of attorney from all Parties for conducting behalf of the Consortium during the selection process for the Consultancy.

5. Understanding of Scope of Work

The Parties do hereby undertake liabilities relating to the Consultancy and in accordance with the terms of the RFP and the Contract, for the performance of the Contract. Each Partner is jointly and severally liable in respect of the Consultant’s obligations.

6. Member in Charge or Lead Member

Without prejudice to the joint and several liabilities of all the Parties, each Party agrees that it shall exercise all rights and remedies under the Contract through the Member in Charge/Lead Member and the Client shall be entitled to deal with such Member in Charge as the representative of all Members. Each Party agrees and acknowledges that:

- a) [Representative of Company] will be official signatory on behalf of the consortium and act as manager of the consortium and will be authorised to act for the consortium in terms of committing it to any obligations and liabilities and to receive and act upon instructions from the Client and to make and receive payments;
- b) b. Any decision (including without limitation, any waiver or consent), action, omission, communication or notice of the Member in Charge on any matters related to the Contract shall be deemed to binding on it.
- c) Any notice, communication, information or documents to be provided to the Consultant shall be delivered to the authorized representative of the Consultant (as designated pursuant to the Contract) and any such notice, communication, information of documents shall be deemed to have been delivered to all the Parties.)

7. Representation of the Parties

Each Party represents to the other Parties as of the date of this Agreement that:

- (a) Such Party is duly organized, validly existing and in good standing under the laws of its incorporation and has all requisite power and client to enter into this Agreement;
- (b) The execution, delivery and performance by such Party of this Agreement has been authorized by all necessary and appropriate corporate or governmental action and a copy of the extract of the charter documents and board resolution/ power of attorney in favour of the person executing this Agreement for the delegation of power and client to execute this Agreement on behalf of the {Consortium/Joint Venture} Member is annexed to this Agreement, and will not, to the best of its knowledge:
 - (i) require any consent or approval not already obtained;
 - (ii) violate any Applicable Law presently in effect and having applicability to it;
 - (iii) violate the memorandum and articles of association, by-laws or other applicable organizational documents thereof;
 - (iv) violate any clearance, permit, concession, grant, license or other governmental authorization, approval, judgment, order or decree or any mortgage agreement, indenture or any other instrument to which such Party is a party or by which such Party or any of its properties or assets are bound or that is otherwise applicable to such Party; or
 - (v) create or impose any liens, mortgages, pledges, claims, security interests, charges or Encumbrances or obligations to create a lien, charge, pledge, security interest, encumbrances or mortgage in or on the property of such Party, except for encumbrances that would not, individually or in the aggregate, have a material adverse effect on the financial condition or prospects or business of such Party so as to prevent such Party from fulfilling its obligations under this Agreement;
- (c) this Agreement is the legal and binding obligation of such Party, enforceable in accordance with its terms against it; and

- (d) there is no litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its Affiliates is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfillment of its obligations under this Agreement.

8. Authorized Representation

The parties agree that, who is employed with consortium partner, or his/her nominee shall be the authorized representative of the consortium, to do on behalf of the Consortium, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of the Consortium's proposal for an the Consultancy including but not limited to signing and submission of all application, proposal and other document, participating in pre-bid and other conferences and providing information responses to the client, representing the consortium in the matters before the client, signing and execution of all contracts and undertakings consequent to acceptance of the consortium's proposal and generally dealing with the Client in all matters in connection with or relating or arising out of the Consultancy.

9. Termination

This Agreement shall be effective from the date hereby and shall continue in full force and effect until the Effective Date under the contract, in case the Consultancy is awarded to the {Consortium/Joint Venture}. However, in case the Consortium is not selected for award of the Consultancy, the Agreement will stand terminated upon intimation by the Client that it has not been selected and upon return of the Bid Security by the Client, as the case may be.

10. Miscellaneous

- 10.1 This Joint Bidding Agreement shall be governed by laws of India.
- 10.2 The Parties acknowledge and accept that this Agreement shall not be amended by the Parties without the prior written consent of the Client.

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED & DELIVERED

SIGNED, SEALED & DELIVERED

For and on behalf of MEMBER IN-CHARGE

For and on behalf of Associate Partner

By [Company Name):

By [Company Name):

Name:

Name:

Designation:

Designation:

Address:

Address:

In Presence of:

In Presence of:

1.

1.

2.

2.

Notes:

1. The mode of the execution of the Joint Bidding Agreement should be in accordance with the procedure, if any, laid down by the Applicable Law and the charter documents of the executants(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.
2. Each Joint Bidding Agreement should attach a copy of the extract of the charter documents and documents such as resolution / power of attorney in favour of the person executing this Agreement for the delegation of power and client to execute this Agreement on behalf of the {Consortium/Joint Venture} Member.
3. For a Joint Bidding Agreement executed and issued overseas, the document shall be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney has been executed.

Tech Form 6 - Work Experience

Previous work experience of similar assignments successfully completed with government departments and international agencies shall be preferred. The format for submission of previous SIMILAR assignments successfully completed **during last 10 years** is given below:

- Provide a brief description of the background and organization of your company, and – in case of a Joint Venture – of each member for this assignment.
- Include organizational chart.

Duration	Brief description of Previous Assignments	Brief description of main components / outputs	Name of Client and location of Assignment	Approx. Contract value (in INR)/ Amount paid to your firm	Competencies handled in particular project
<i>{e.g., Jan.2009 – Apr.2010 }</i>	<i>{e.g., Development and/or design of Program management platform/tool, etc)</i>		<i>{e.g., Ministry of, country}</i>		

(Place)

(Date)

(Signature)

Tech Form 7- Average Annual Turnover

Details to be furnished duly **certified by the Chartered Accountant.**

Consultant	------(Name of Consultant)				
FY	2022-23	2023-24	2024-2025	Total	Average Annual Financial Turnover
Gross Annual Turnover					
*CA Certified Balance certificate of last 3 Financial Years with UDIN number. Signature of Bidder For (Name of Accounting Firm) Date and Place Name and signature of Chartered Accountant Membership Number (with Seal and UDIN No)					

* The Consultant should provide the Financial Capability based on its own financial statements. Financial Capability of the Consultant's parent company or its subsidiary or any associate company will not be considered for computation of the Financial Capability of the Consultant.

Tech Form 8 – Certificate of Net worth

FORM FOR CERTIFICATE OF NET WORTH FROM CHARTERED ACCOUNTANT

Consultant	----- (Name of Consultant)		
FY	2022-23	2023-24	2024-2025
Net worth			
Signature of Bidder Date and Place For (Name of Accounting Firm) Name and signature of Chartered Accountant Membership Number (with Seal and UDIN No)			