CounterMEASURE FOR PLASTIC FREE RIVERS Stakeholder Conference

Live Session 3:Plastic Leakage Survey and its finding and data visualization platform (26th May 2020)

Conceptual Methodology and standardization for Plastic Hotspotting & Plastic Leakage Survey to adopt countermeasures in an urban setting in India

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Counter MEASURE FOR PLASTIC FREE RIVERS

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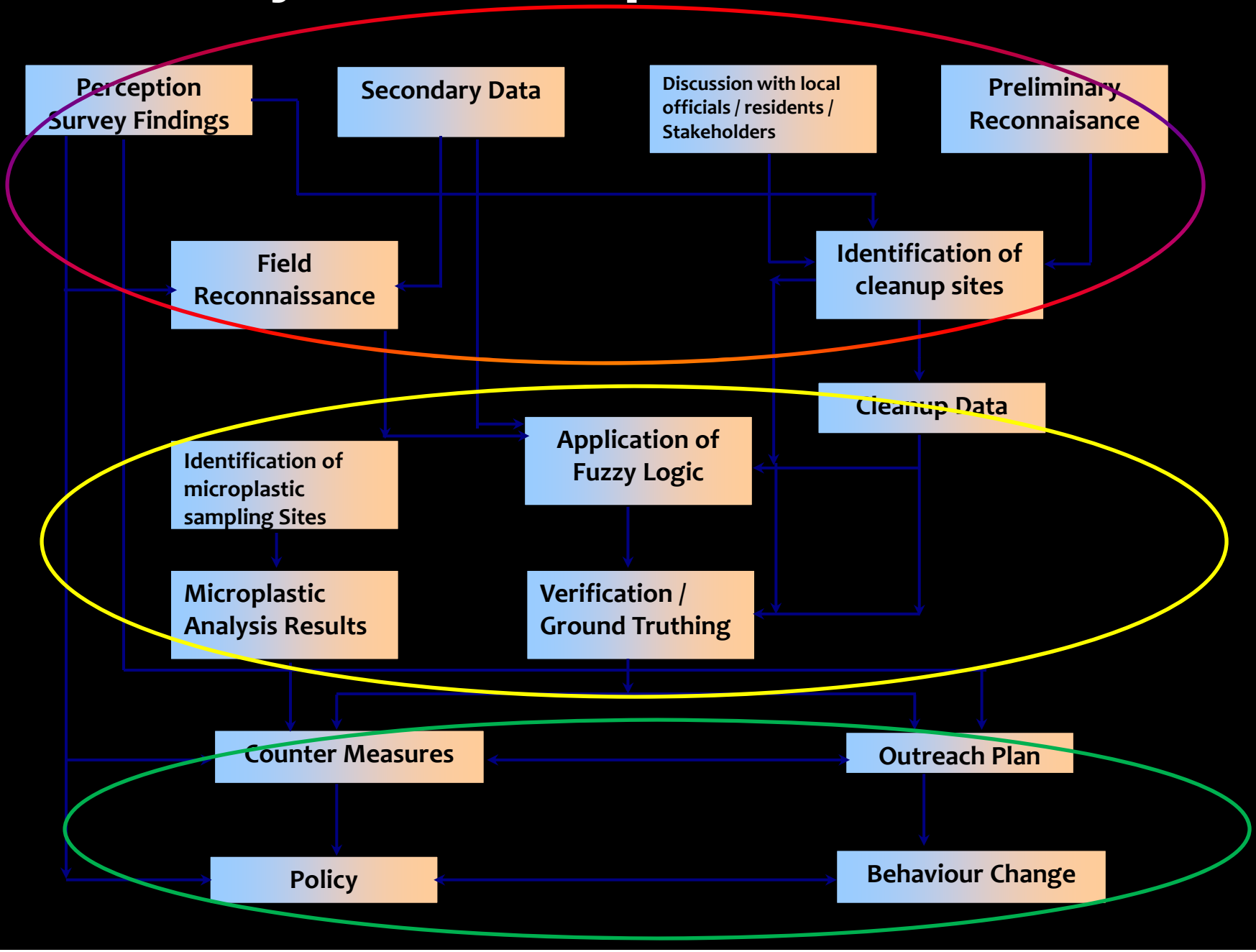
IRGSSA OVERVIEW

- Established in 2001, IRGSSA is an India based international professional services firm having executed more than *150 projects in 12 countries*.

- IRGSSA provides technical assistance in environment, energy, natural resources, disaster relief & reconstruction, IT & Geomatics in the region.

- The firm has executed several projects for a diverse set of clients such as The World Bank, ADB, UNDP / UNEP / GEF, JBIC / JICA / JETRO, DFID, USAID, GIZ, Government of India, Private Sector, NGOs and Industry Associations.

Project Conceptualization



Conceptual Methodology (Contd.)

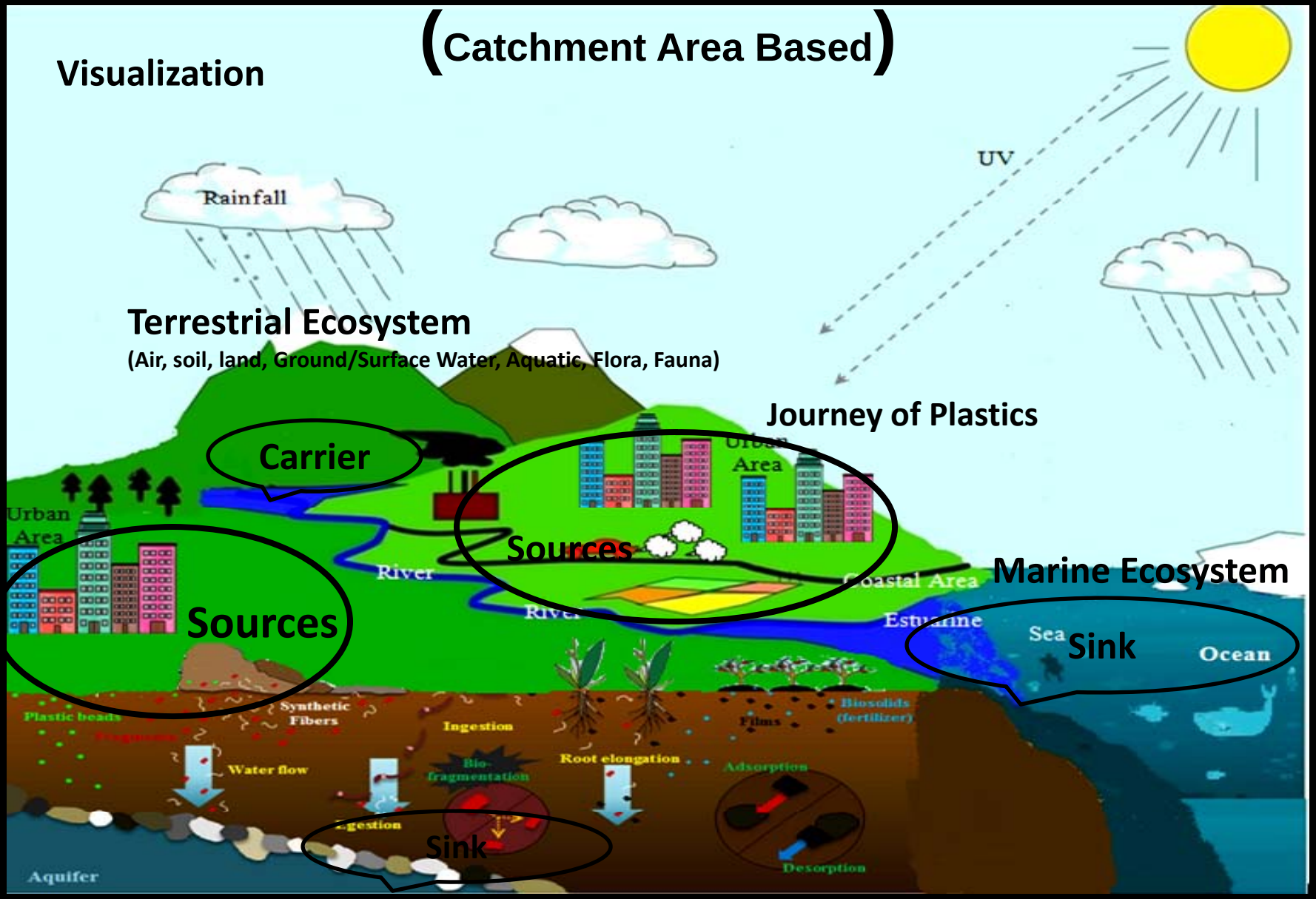
A combination of hybrid MFA-LCA when applied in sub-national geographical areas (region/city/any other geography) will assist in identification and classification of hotspots. The study boundary may include different stages where input-output analysis can be carried out within the boundary.

Tools/ Techniques

1. Reconnaisance & Perception Survey, Secondary Data, Preliminary / Primary Field Reconnaissance
2. GIS Technique & Fuzzy Approach, Identification of Clean up Sites, Microplastic Survey Sites
3. Microplastic Cleanup Assessment (Land/ Bank)
4. Microplastic Assessment (River/ Waterbody)
5. Waste Management Data Templates (Input/ Output, Mass Balance Approach)

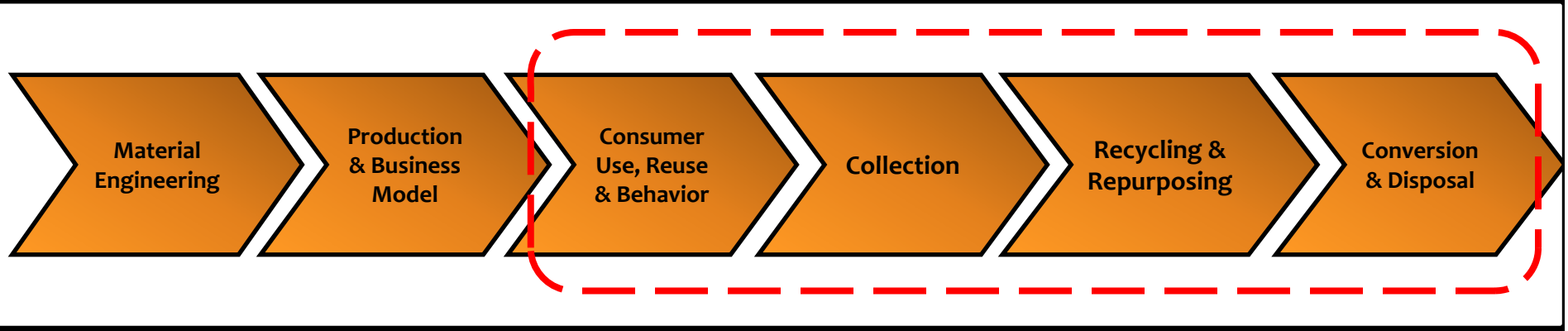
Conceptual Methodology

(Catchment Area Based)

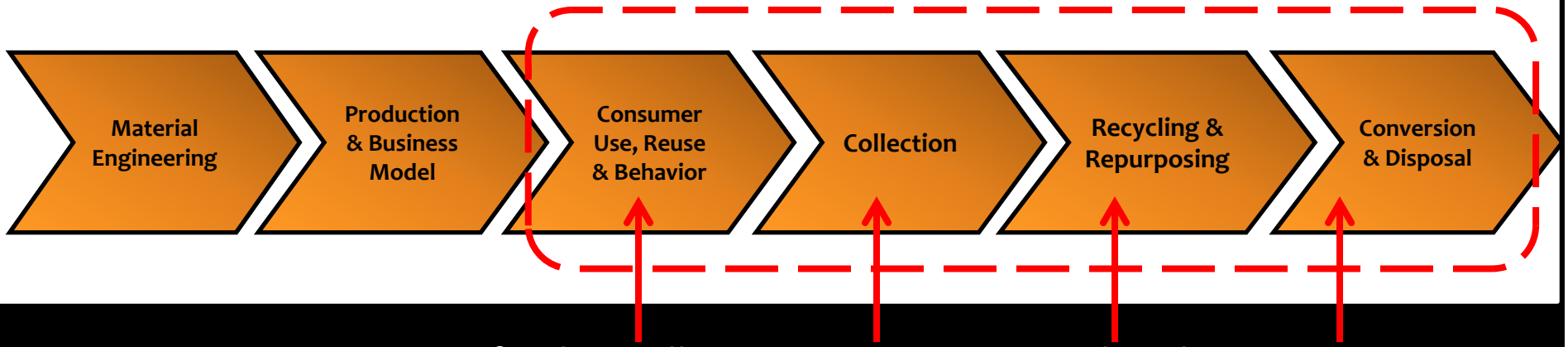


Sources leading to **Hotspot** Identification for Plastic Leakage Scenario

Conceptual Methodology (Contd.)

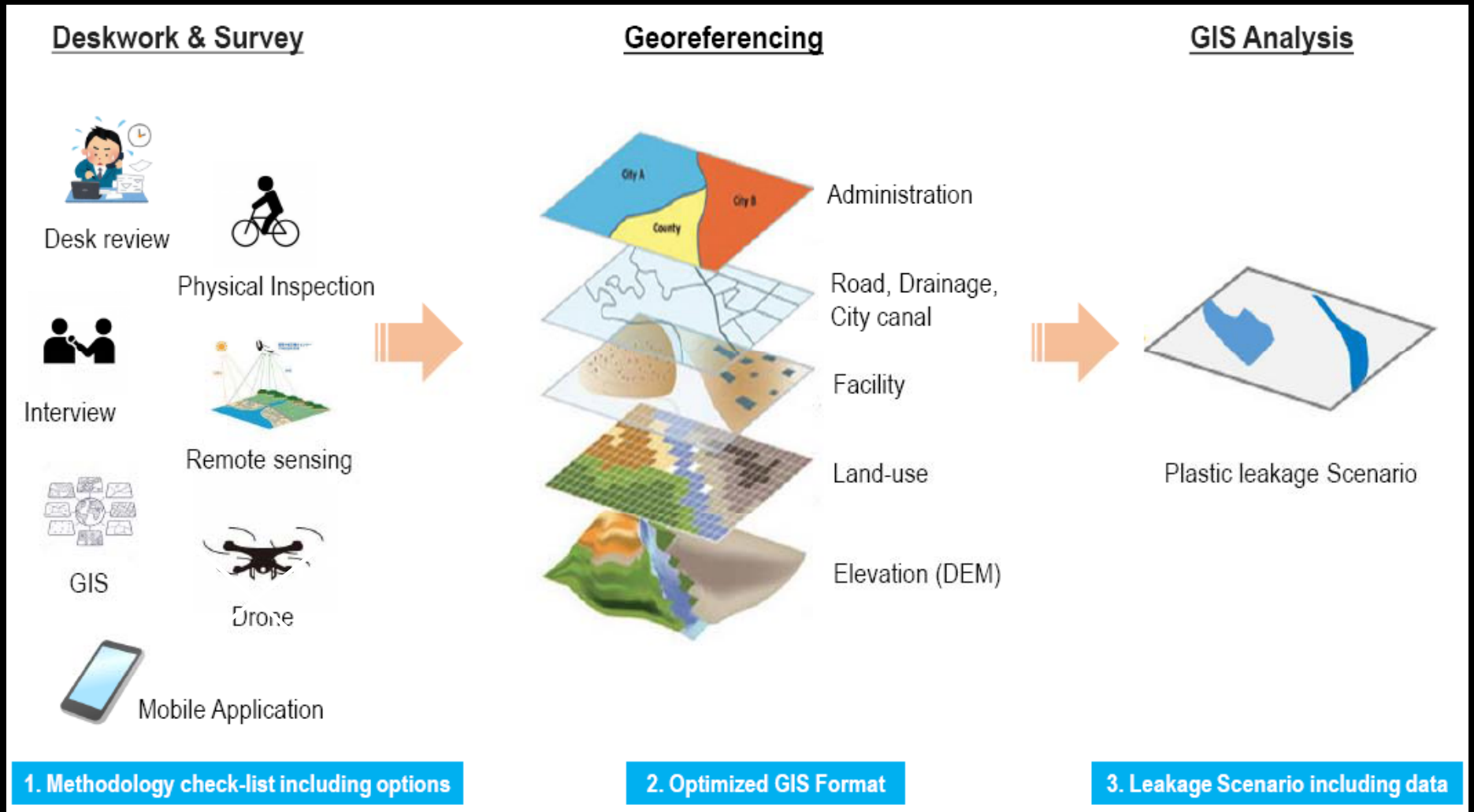


Plastic Value Chain Boundary Conditions within a geography



Data points for data collection, interpretation and analysis

Conceptual Methodology (Contd.)



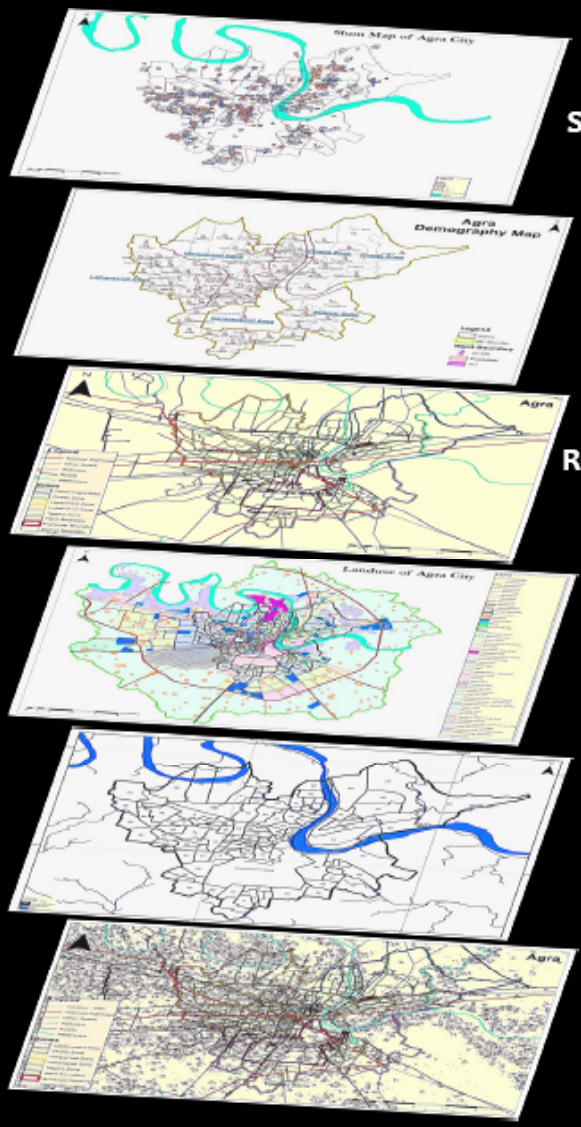
Source: Kakuko Yoshida, UNEP, June5th 2019

Mapping of Plastic Value Chain Geographically in an Urban Context

Conceptual Methodology (Contd.)

Plastic Leakage Risk Map (Fuzzy Logic Approach)

Variable (Indicator Factor, Layer)



SLUM LOCATIONS

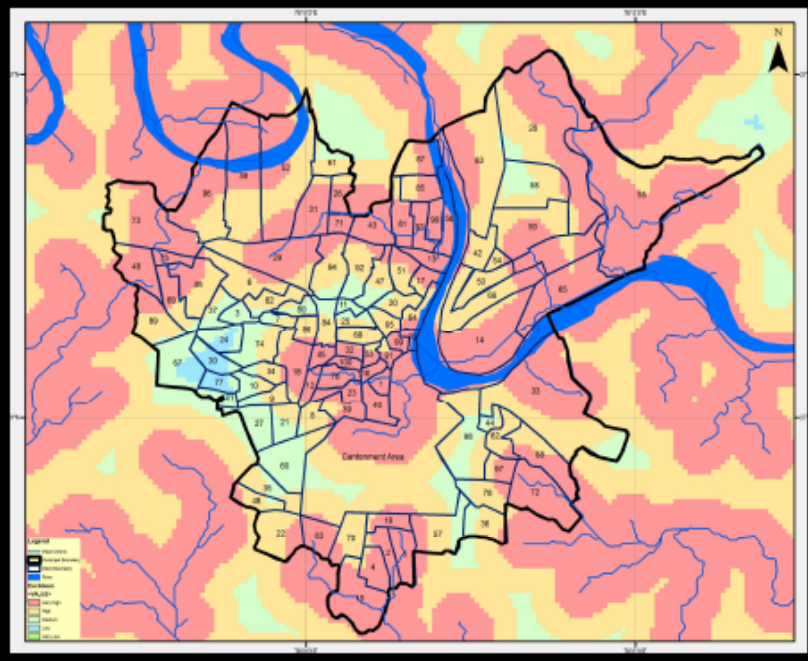
POPULATION DENSITY

ROADS, RAILWAYS AND RIVER

LAND USE

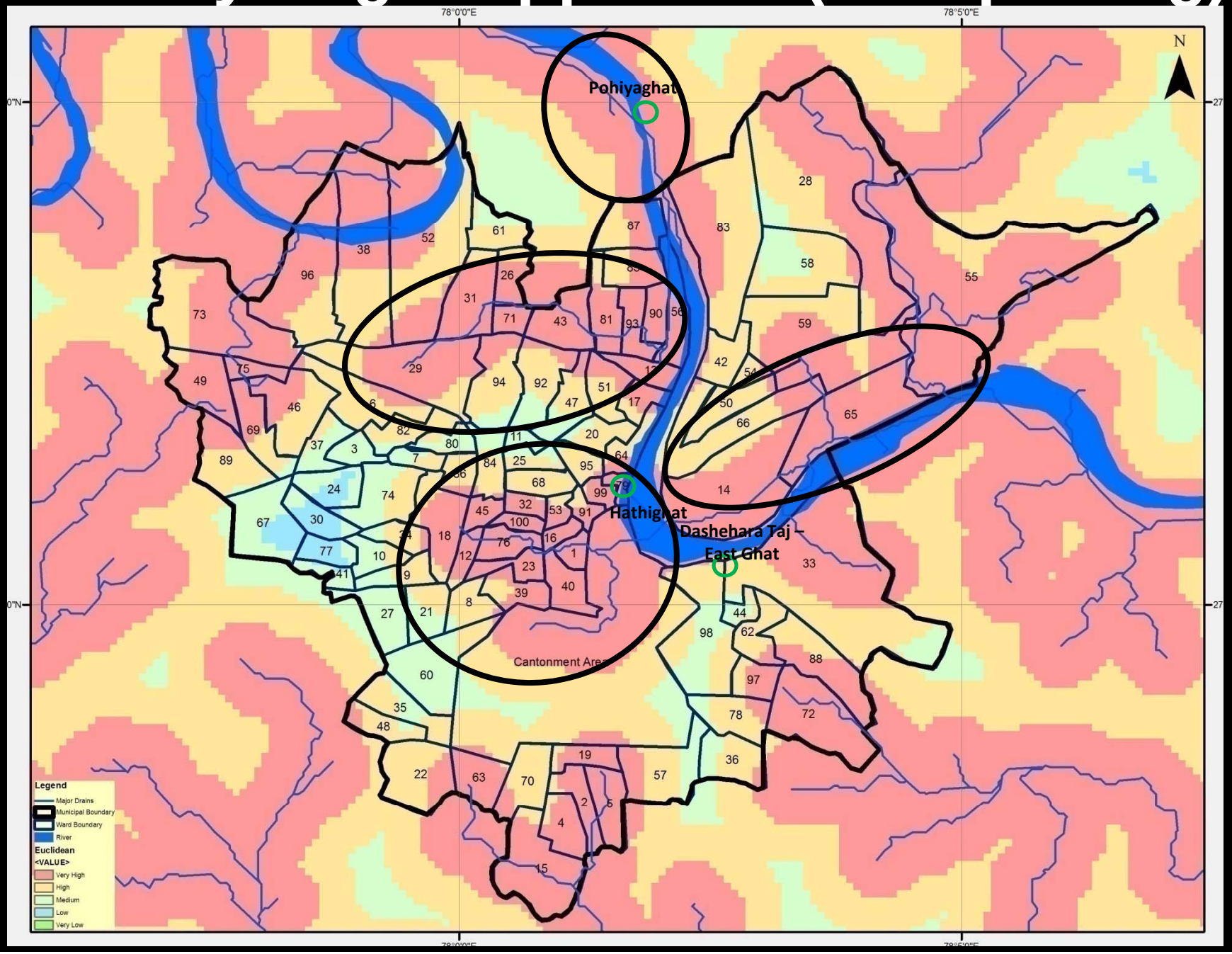
DRAINAGE

CONTOUR

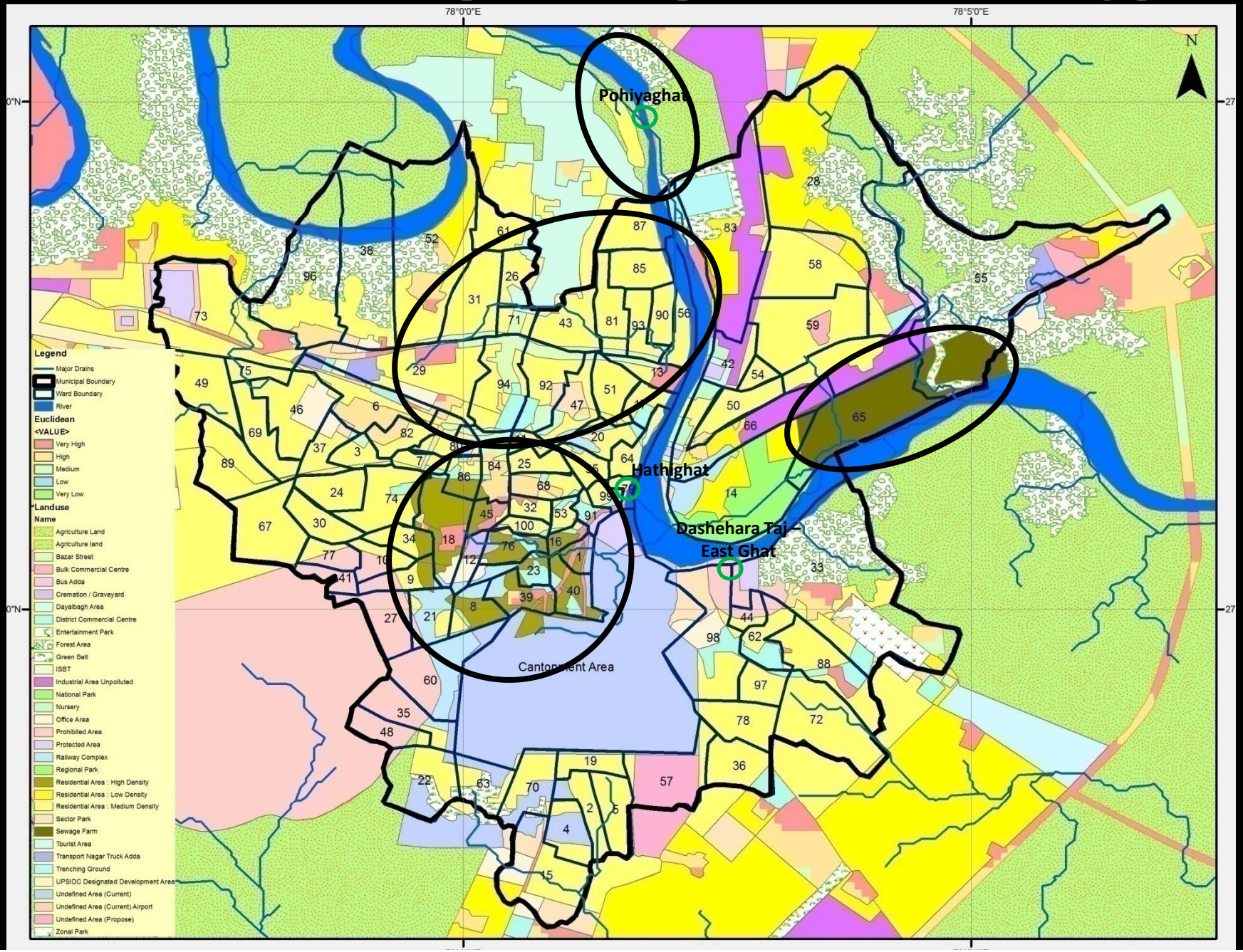


Risk Map on Plastic Leakage Source (Low – High)

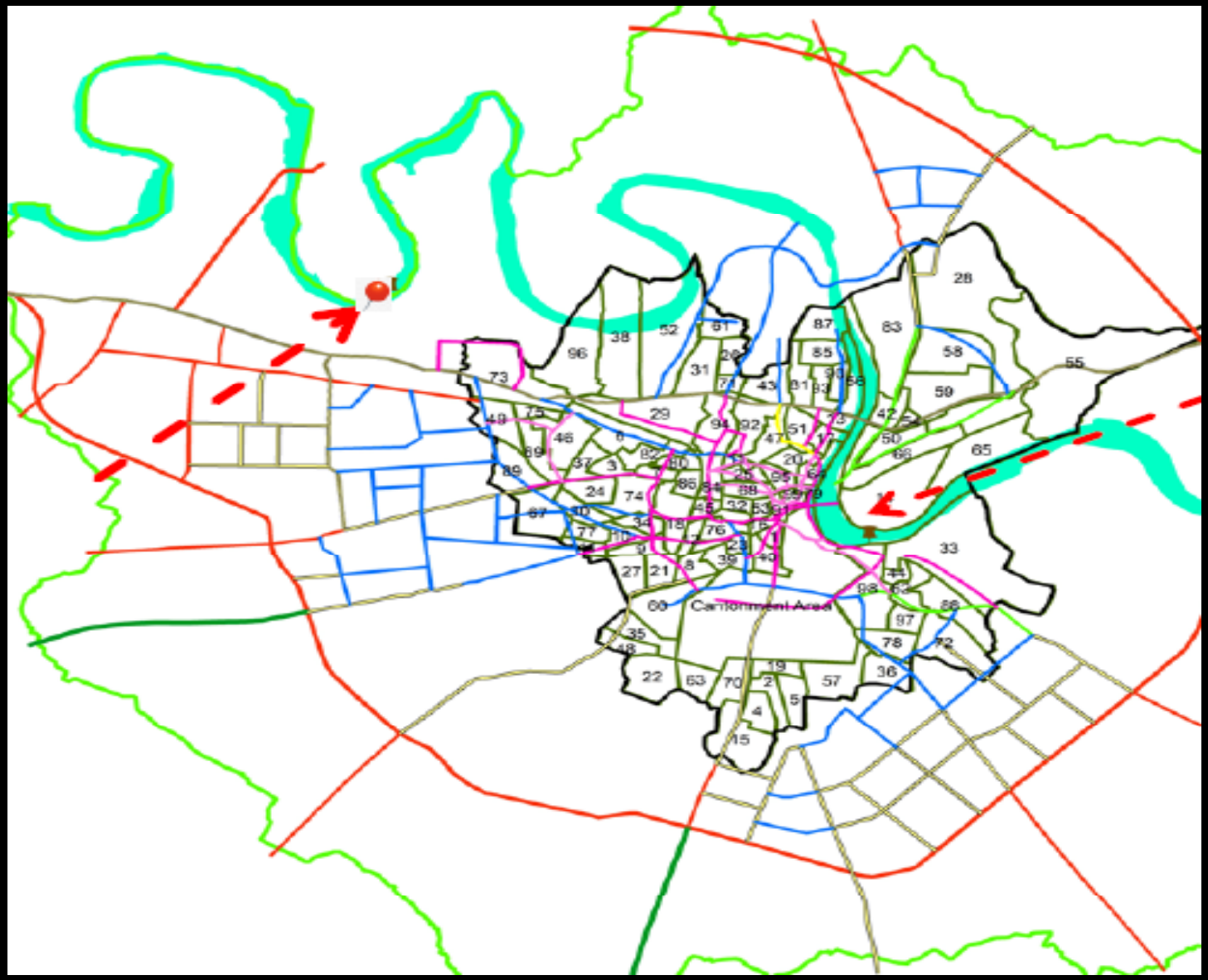
Fuzzy Logic Approach (Hotspotting)



Locations (Macroplastic Survey)



Locations (Microplastic Survey)



Ground Truthing & Validation (Hathi Ghat)

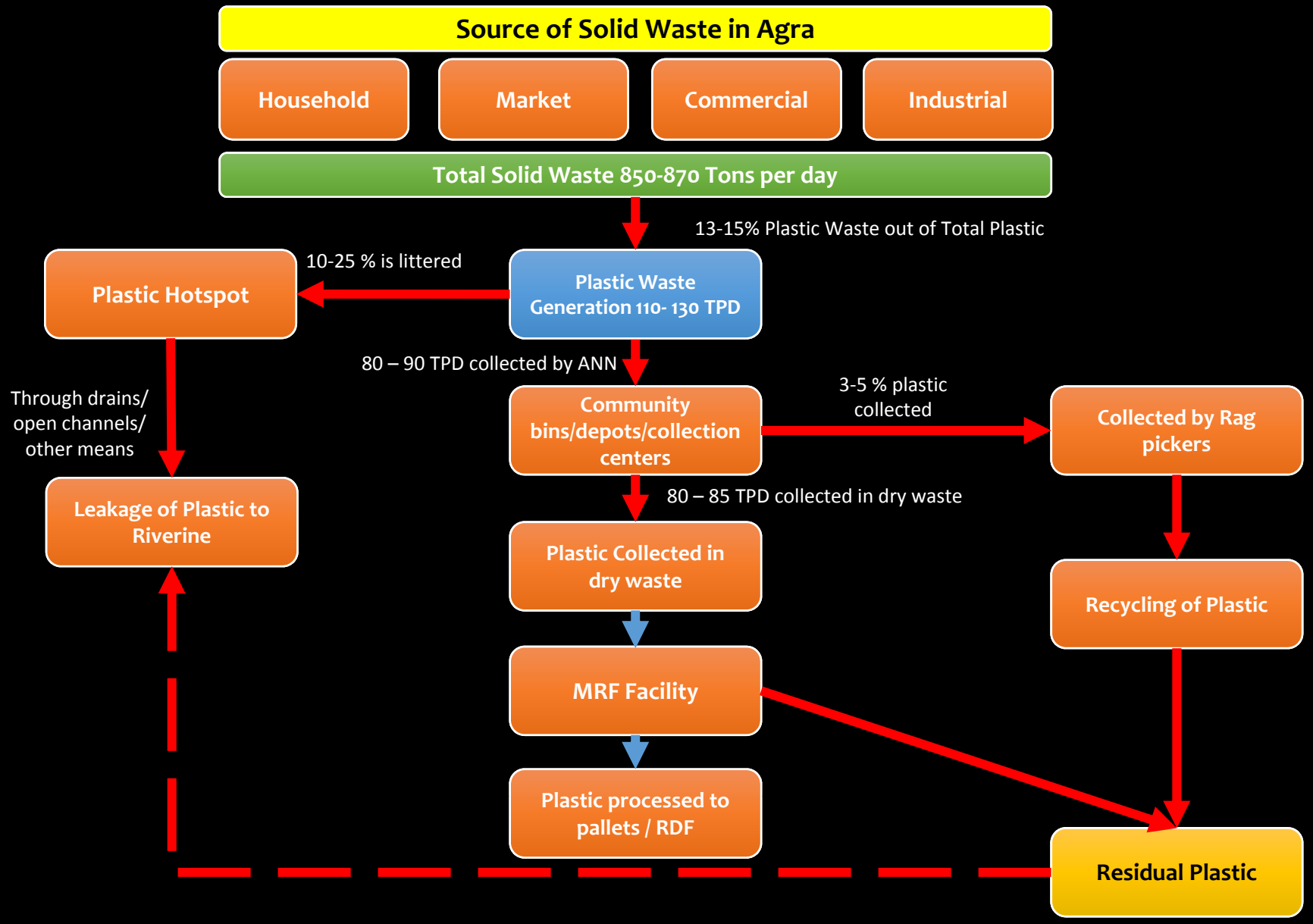
Before Cleanup

After Cleanup

After a Month

Survey Locations / Drains (Leakage Scenario)

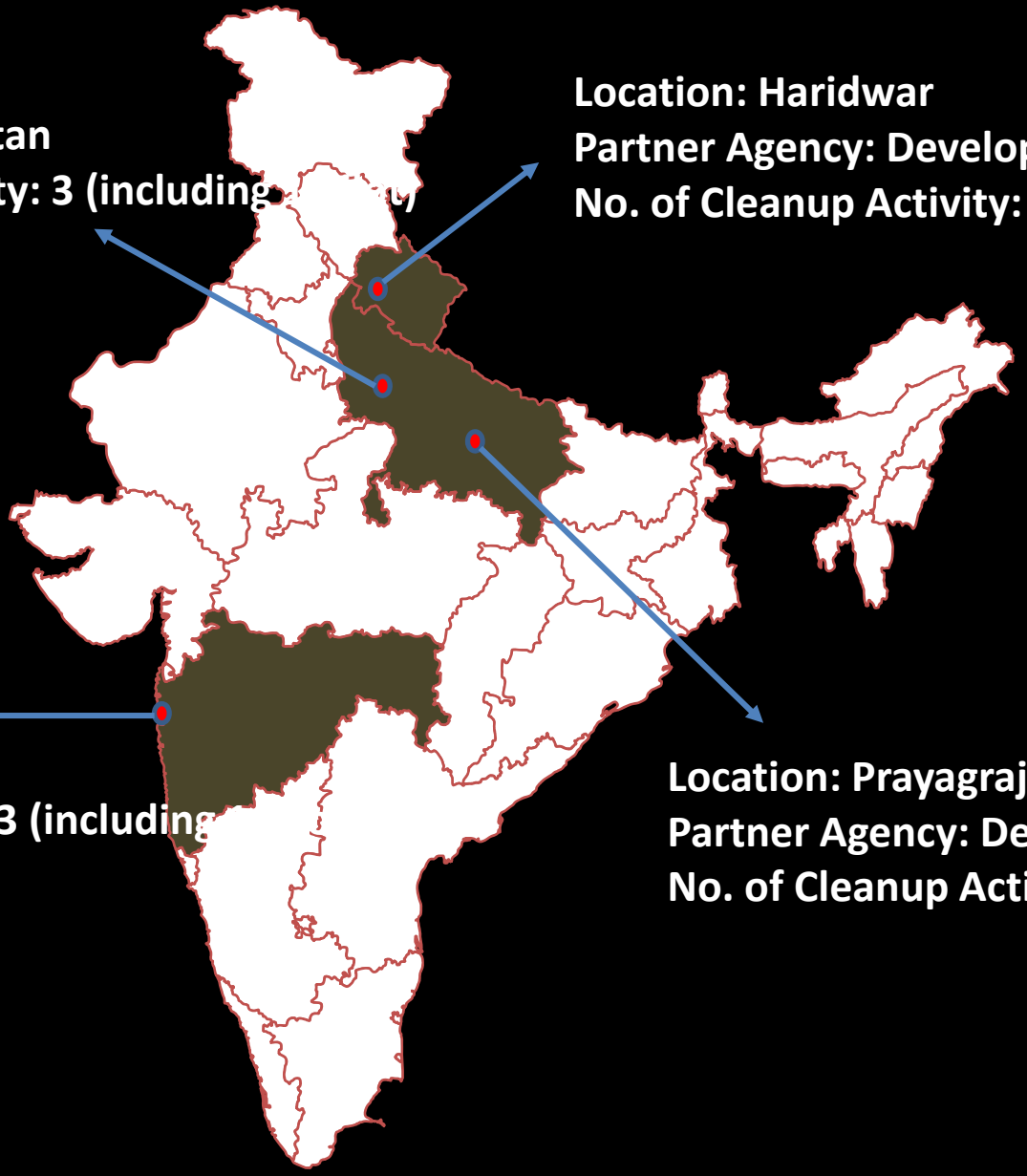
Input Output Analysis (Mass Balance)



Macroplastic Cleanup

Location: Agra
Partner Agency: Chintan
No. of Cleanup Activity: 3 (including

Location: Haridwar
Partner Agency: Development Alternativ
No. of Cleanup Activity: 2



Location: Mumbai
Partner Agency: Teri
No. of Cleanup Activity: 3 (including

Location: Prayagraj
Partner Agency: Development Alter
No. of Cleanup Activity: 11 (includi

Macroplastic Cleanup (contd.)

S.NO.	NAME OF HOTSPOT	NAME OF CITY	LATITUDE/LONGITUDE	AREA OF CLEAN UP (IN M^2)	DATE OF CLEANUPS
1	Hathi Ghat	Agra	27°11'6.1“, 78°1'26"	5,400	06-Nov-19
2	Pohiya ghat	Agra	27°12'33.05"N, 78°0.38'0"E	1,200	03-Jan-20
3	Hathi Ghat	Agra	27°11'6.1" N, 78°1'26.2" E	726	20-Feb-20
4	Ram ghat	Allahabad	25°25' 55.26"N, 81°52'54.12" E	10000	02-Nov-19
5	Katghar Basti,	Allahabad	25°25'28.38"N, 81°50'29.7"E	10000	03-Nov-19
5	Amitabh Bachan Pulliya	Allahabad	25°28'59.19"N, 81°52'46.2"E	1,380	08-Jan-20
7	Balua Ghat	Allahabad	25.423199 N, 81.839554 E	400	01-Mar-20
8	Katghar Basti	Allahabad	25.424560 N, 81.841739 E	150	01-Mar-20
9	Gau Ghat	Allahabad	25.426538 N, 81.848152 E	100	02-Mar-20
10	Triveni Ghat	Allahabad	25.429253 N, 81.857726 E	100	02-Mar-20
11	Arail Ghat	Allahabad	25.421782 N, 81.880523 E	400	03-Mar-20
12	Sachcha Baba Ghat	Allahabad	25.420153 N, 81.883211 E	400	03-Mar-20
13	Sangam Point (Below Naini Bridge)	Allahabad	25.423770 N, 81.861141 E	400	04-Mar-20
14	Near Naini Bridge	Allahabad	25°25'51.95"N, 81°51'18.17"E	861	12-Mar-20
15	Vishnu ghat	Haridwar	29°57'31.63"N, 78°10'8.72"E	1221	22-Jan-20
16	Pant Deep Parking	Haridwar	29°56'45.6"N, 78°10'3.084"E	1345	24-Jan-20
17	Vashi Mumbai	Mumbai	19°4'33.24"N, 72°59'4.92"E	100	02-Nov-19
18	Chimbai Beach	Mumbai	19°3'26.51"N, 72°49'24.49"E	353	03-Dec-19
19	Gorai Creek, Near Gorai Bridge, Kandivali	Mumbai	19°13'20.433"N, 72°49'42.665"E	29	02-Mar-20

SOP for Macro Plastic Assessment

SOP For Macro Plastic – Assessment / Cleanup Activity

Steps	Description	Sample Photos	Duration	Tools Require
1.	Demarcate cleanup area along the Boundary		30 minutes	strips of (fluorescent colour) chalk powder
2.	Label bags 1. Place 2. Date 3. Bag No.		20 minutes	Permanent marker pens
3.	Divide team into 2 groups 1. Collection of litter (Group 1) 2. Segregation of waste (Group 2)		20 minutes	Data Sheet for recording names
4.	Wear Personal Protective gear / equipments PPEs such as, Clove, Mask		10 minutes	Glove, Mask
5.	Collect 1 gunny bag per group of 4-5 volunteers for collection of waste litter		20 minutes	
6.	Pick the the litter and collect in the gunny bag and clean the site		60 – 90 minutes	tunny $a#) ust pan) $room
7.	After collection of litter report to NPC team		20 minutes	
8.	Weigh each waste litter bag and record and inform NPC team. In a group of 4-5 volunteers one person shall be responsible for collection, weighing and recording of weight of bag containing waste litter.		20 minutes	Weighing balance, data sheet for recording
9.	Transfer weighed bags to the blue sheet (around 3-4 bags in one blue sheet) and place the mixed waste on the sheet.		30 minutes	
10.	Volunteers of group 2 (segregation of waste) to join at this stage. And segregate of plastic waste from non plastic.		10 minutes	
11.	Weigh segregated plastic and inform NPC team			
12.	One volunteer to segregate one plastic category from segregation team. Then place it in appropriate carton box labeled with name of plastic waste category.		60-90 minutes	Carton box
13.	Non plastic material shall be discarded and placed in garbage bins available at cleanup site after segregation of waste.		30 minutes	Broom, dust pan
14.	Weigh cardboard boxes with one category of plastic waste and inform NPC team. For each plastic waste category, count waste piece and volunteers responsible for that category shall inform NPC team.		30 minutes	Weighing box, Datasheet for recording weight and count of plastic waste

Standard Operating procedure were developed

1. To Structure the over all cleanup drives.
2. To define the step wise activities to be performed within a specific time frame.

The SOP helped in enabling the participants of cleanup group to acquaint with the proceedings and accomplish the tasks.

The procedure reflected on aspects of

1. Demarcation of Boundary for Cleanup Area.
2. Wearing of Personal Protective Equipments (PPE).
3. Labelling of Gunny Bags.
4. Collection of Mixed Waste in Gunny Bags.
5. Weighing of the Collected Bags.
6. Segregation of Plastic waste (in 2nd Stage)
7. Weighing of segregated Plastic waste after suitable categorization.

Protocol for Segregation of Plastic waste

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NON-PLASTIC WASTE

Papers waste		Metal parts	
Food waste		Wood	
Beverage Bottle (glass)		Beverage Cans (Non -Plastic)	
Disposal Plates (paper)		Biodegradable waste	
Cotton fabric			

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PLASTIC WASTE

Milk Pouch and Water Pouches		Multilayered packaging material	
Razor toys Plastics		Cloth type - polypropylene bags	
Ritual Material e.g. Plastic Chains, Gods frame, Plastic moulds		Low density plastic packaging material e.g. Tea packs, Sanitary packs	
Food wrappers (Biscuits, namkin packet etc)		Bottle and Beverage Bottle (Plastic)	
Lids (Plastic)		Straws	
Grocery Bags (Plastics)		Polybags	
Woven bags (e.g. Cement bag)		Tubes (e.g. toothpaste)	
Disposable cups		Rubberised slipper	
Cups & Plates (foams)		Cigarette Butts	

Trash Data Sheet

S.NO.	MOST LIKELY TO FIND ITEMS:	TOTAL NO. OF CATEGORIZED PLASTICS FROM 22 GUNNY BAGS OF SEGREGATED PLASTICS AT AGRA CITY	TOTAL WEIGHT IN KG OF CATEGORIZED PLASTICS FROM 22 GUNNY BAGS OF SEGREGATED PLASTICS AT AGRA CITY
1.	Cigarette Butts	0	0
2.	**Multilayer Large and Medium Size for snacks, chips, namkeen, biscuits etc.**	**670**	**5.812**
3.	**Multilayer Sachets for Shampoo, Tobacco, tea, coffee, tomato sauce etc.**	**68**	**0.512**
4.	**Multilayer Gift Wrapping Paper**	**1**	**0.01**
5.	**Monolayer Plastic Packaging used for food, detergent etc.**	**256**	**10.85**
6.	**Synthetic woven bags used for cement packaging etc.**	**110**	**19.784**
7.	**Hard Plastic such as HDPE Pipes, HDPE bottles, HDPE tubes, tray, PVC etc.**	**31**	**0.876**
8.	**Polythene bags (colored white, black)**	**3521**	**55.791**
9.	**Woven Polycloth Bags for Carrying Groceries/Vegetables**	**47**	**2.572**
10.	**Disposable paper cups coated with plastic film**	**41**	**0.104**
11.	**Disposable plastic Cups/Glasses**	**148**	**0.85**
12.	**Packing used for water, milk etc.**	**275**	**1.315**
13.	Take Out/ Away containers (Plastic)	0	0
14.	Take Out/ Away containers (Food)	0	0
15.	Paper bags coated with plastic film	0	0
16.	Bottle plastic caps	0	0
17.	Shopping Bags/ Grocery Bags	0	0
18.	**Plastic tubes (Dant kanti, Facewash cap)**	**6**	**0.11**
19.	Flowers garlands, pooja samagri etc made up of Plastic	0	0
20.	**Black X ray film**	**9**	**3.66**
21.	**Plastic strings used for tying**	**4**	**0.16**
22.	**Plastic Purse (Synthetic Leather)**	**2**	**0.22**

Key Findings

1. Hotspots (Accumulation, Source, Application, Value chain) & Plastic Leakage pathways identified and methodology piloted in riverine (Haridwar, Agra, Prayagraj Ganga & Yamuna) and marine environment (Mumbai)

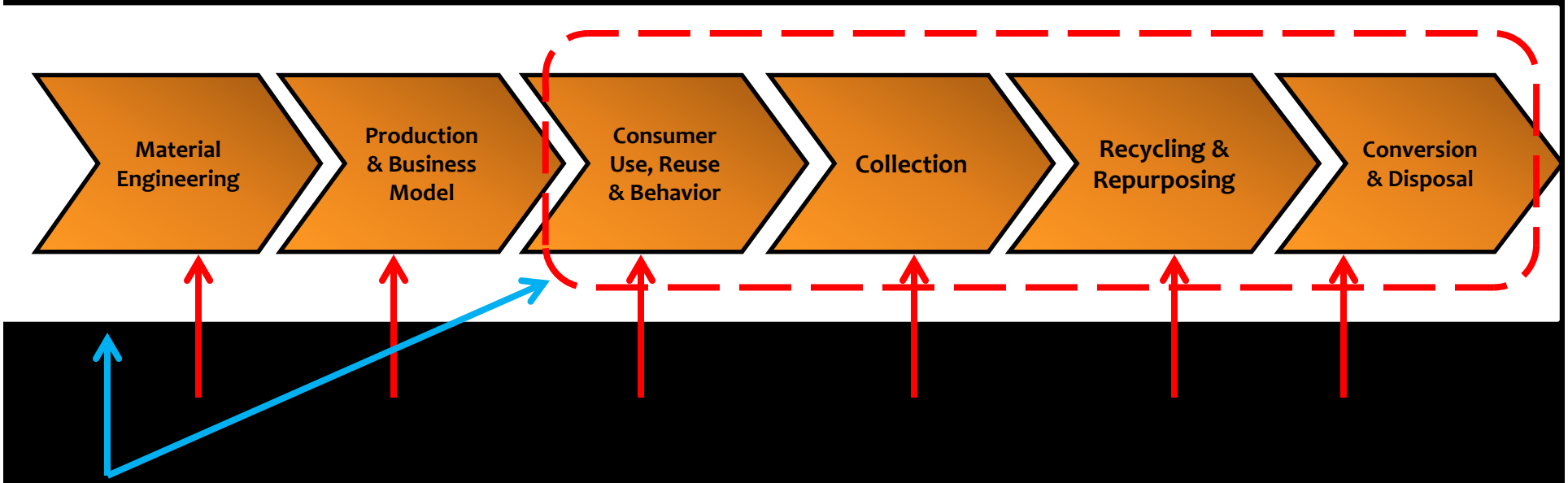
2. Inefficiencies in waste management system (10% - 25% littering)

3. Recycling of positive value plastic waste items in place

4. Identified about 50 categories of product based plastic litter at hotspots near rivers Gangaand Yamuna and about 40 types of polymer-based micro-plastics

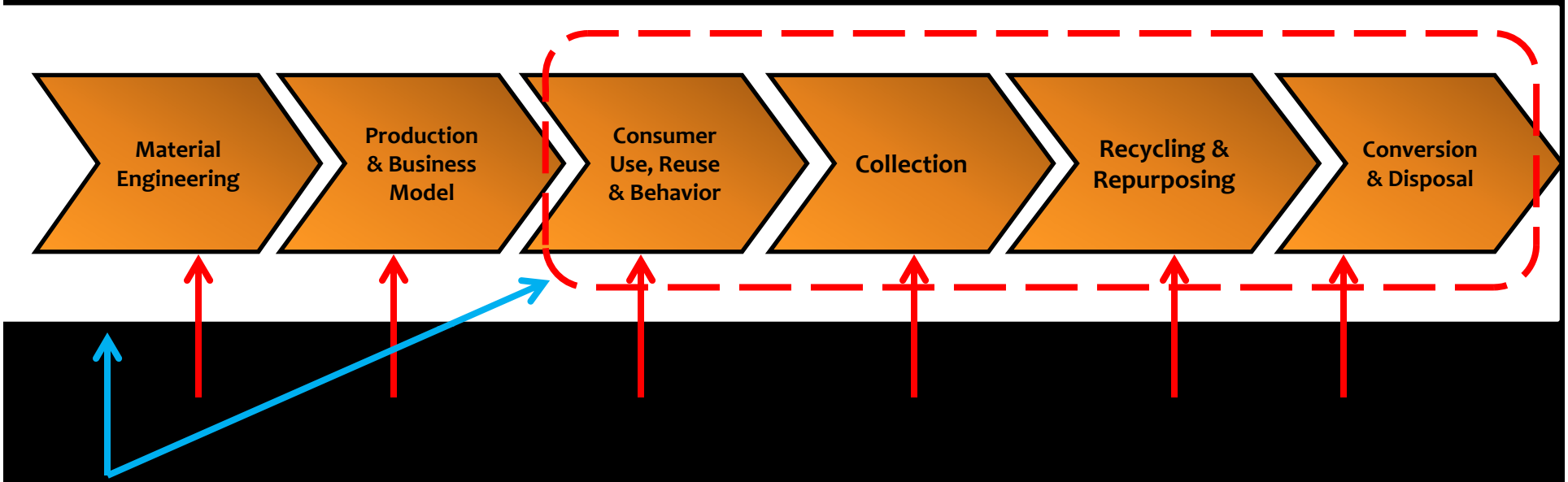
5. Correlation found between on land macroplastic waste items and microplastics in rivers

Counter Measures



1. Where (Geography)
2. What (Type)
3. How (Mechanism)

Counter Measures (Contd.)



1. Where (across the entire plastic value chain, part of chain, national, regional, state, city…)
2. What (Type – Selected Product or overall)
3. How (Mechanism - Instrument - Policy/ Regulatory, Market Based or a combination e.g. Ban, Cess, Tax, EPR, Recycling Fee etc..)
4. Monitoring (KPIs, Basis - resource efficiency, waste reduction, Pollution Control, sustainable reporting, SDGs)

Challenges/ Lessons Learned

1. Data availability & Data mapping
2. Customization & uniform application of methodology
3. Identification of sampling location
4. Modelling considering length of the river i.e. Towns / cities downstream of river
5. Application of Counter Measures

Recommendations

1. Application of Standard Assessment Methodology (developed under CounterMEASURE project) for scaling up;
2. Stage & time wise plastic phase-out to be strengthened across plastic value chain for selected items;
3. Creation of drivers of recycled plastics sector
4. Support for enhancing plastic segregation by strengthening waste management infrastructure and development of ecosystem (EPR, Instruments, Incentives Up & Down, Pricing)
5. Strengthening of reporting, monitoring& evaluation, and regulatory capacity;
6. Incentivising innovative product/packaging design to support recyclability
7. Application of LCA for scientific environmental evaluation of alternatives.
8. Awareness Raising & Behavior Change

THANK YOU

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